A Definition of "Social Acceptability" in Ecosystem Management

Mark W. Brunson, Utah State University
Defining Wilderness Quality: The Role of Standards in Wilderness Management—a Workshop Proceedings
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Defining Wilderness Quality: The Role of Standards in Wilderness Management—a Workshop Proceedings

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Bo Shelby, George Stankey, and Bruce Shindler, Technical Editors
Department of Forest Resources
Oregon State University

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Integral to maintaining wilderness quality is the implementation of ecological, social, and management standards. A substantial body of wilderness research and management experience exists nationwide as a common-pool resource for professionals with a specialized interest in incorporating standards into planning processes. In a 2-day interactive workshop, wilderness managers and researchers joined together to assess the current use of standards, summarize and integrate what has been learned, capitalize on the diversity of this work, and develop ideas about directions for the future. The 14 papers in this proceedings represent their collaborative efforts.

Keywords: Wilderness management, wilderness standards, management objectives, environmental impacts, environmental indicators, monitoring.
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INTRODUCTION

WORKSHOP ON DEFINING WILDERNESS QUALITY: THE ROLE OF STANDARDS IN WILDERNESS MANAGEMENT

Bo Shelby, George Stankey, and Bruce Shindler

This publication represents the collective efforts of an interdisciplinary group of wilderness researchers and managers from around the country. It is the result of a workshop on "Defining Wilderness Quality: The Role of Standards in Wilderness Management," held on April 10-11, 1990 in Fort Collins, Colorado. The workshop was sponsored jointly by the Wilderness Program at the Pacific Northwest Regional Office of the USDA Forest Service, the Department of Forest Resources at Oregon State University, and the Department of Recreation Resources and Landscape Architecture at Colorado State University.

Standards in wilderness management have become increasingly important. Attention has increasingly turned to defining desired conditions and developing specific measures of those conditions in order that managers have a better idea of what they are attempting to achieve and the actions necessary to reach those ends. Current planning strategies rely upon standards as a crucial component of good professional management. These include the Limits of Acceptable Change (LAC) planning system (Stankey et al., 1985), the Carrying Capacity Assessment Process (C-CAP; Shelby and Heberlein 1986), and the Visitor Impact Management (VIM) framework (Graefe et al., 1990). Although these three systems differ in some respects, all rely heavily upon measurable standards as a means of defining unambiguous conditions regarding management objectives, outputs, or performance.

The purpose of this workshop was to review the body of management and research experience with regard to standards. It also provided a forum to explore how different approaches to standard formulation could occur, address concerns about their mis-use, and discuss the experience gained in applying standards across a wide range of settings and conditions. By capitalizing on the collective wisdom of the group and the individual and collaborative efforts of the
participants, it was possible to develop a comprehensive state-of-the-art synthesis of the role of standards in wilderness management.

The papers in this volume are organized around three themes. Papers in the first group examine the characteristics of good standards, describe the process for selecting indicators, describe and give examples of the normative approach to developing standards, describe examples of ways that standards have been measured, and discuss the usefulness of standards for management of non-wilderness areas. The second group provides contrasting views about the desirability of developing uniform or national versus area-specific standards. Finally, the last group of papers provides examples of standards from around the country, including the genesis of standards in the Pacific Northwest region of the Forest Service, the use of standards in the BLM wilderness program, and specific examples from Grand Canyon National Park, the Enchantment Peaks area of the Alpine Lakes Wilderness, and interest group standards for campsite impacts in wilderness areas.

Why Standards Are Important

The discussions during the workshop confirmed a growing recognition of the value of standards in wilderness management. A number of specific benefits were identified.

Standards help provide a professional foundation for resource management. They do this by helping articulate management philosophy, establishing clear and realistic targets for management efforts, helping assign priorities to budgets and management activities, giving field people a focus for their activities, providing management personnel with a sense of accomplishment, and providing a way to measure and recognize performance. Perhaps most importantly, establishing standards forces a careful consideration of the underlying rationale for management; exactly what is it we are trying to accomplish through a program of wilderness management? Finally, standards help take advantage of opportunities to improve conditions (e.g., setting new standards of recovery following expiration of a grazing permit) and help direct monitoring efforts and future research.

Standards help in dealing with change. Most fundamentally, they provide a base against which the rate and magnitude of change, an inevitable consequence of use, can be measured and evaluated. This also sets the stage for discussions of whether the standards themselves should be changed, and if so, in what ways.

Standards focus attention on future conditions, and they are output oriented. By highlighting future conditions, standards encourage managers to be proactive and to focus on what it will take to achieve or maintain desired conditions, rather than waiting for problems to occur and then reacting to them. A major feature of standards is that they direct attention to the outputs of management (i.e., the social and resource conditions) as opposed to inputs, such as the number of visitors or number of work days spent rehabilitating sites. Such a perspective helps define specific and measurable attributes to which management can aspire in their efforts to define and improve "wilderness quality."

Standards are not only of value to managers and researchers, but to visitors as well. Most importantly, they constitute a means by which informed and realistic expectations can be developed. Standards may also represent an educational tool to help visitors select areas whose conditions most nearly coincide with their desired experience. This also provides a framework within which appropriate behavior can be encouraged. Standards also are an essential attribute in helping the public understand the intricacy and complexity of wilderness management. By establishing a clear and unambiguous frame of reference for diverse groups interested in management, standards encourage more fruitful discussion of management objectives and alternative management strategies.

Finally, standards will help articulate the types of experiences managers are trying to provide. Although experiences are intangible social-psychological entities, the process of formulating standards can help identify the requisite conditions associated with their realization, heightening the likelihood that managers can provide opportunities for high quality experiences.

Setting Standards Is No Panacea

Many reasons can be cited to support the use of standards, but their presence is not a guarantee of successful wilderness management. The most obvious reason for this is that standards are only as good as the information upon which they are based. The invalid or inappropriate assignment of standards can lead to confusion and problems. If the basis and rationale of the standards is not explicit, they are as arbitrary and capricious as any other unfounded opinion.

Perhaps the most serious potential failing of a standards-based approach is that it can contribute to a mechanistic and rigid approach to management. The process of relying upon standards in no way eliminates
the need for discerning thinking about management. Unfortunately, standards have sometimes been used in a undiscriminating, mechanical fashion. When this occurs, the necessary debate about what standards should be and related discussions about how they should be met can be greatly hindered. As Socolow (1976) has noted, when standards become "golden numbers and golden rules," informed discussion ceases and the many values of standards noted above are lost.

It is critical to see standards as part of a larger process. The value of systems such as LAC, C-CAP, and VIM is that they provide a framework within which standards develop from a process; they are means to an end, not an end in themselves. The careful identification of issues, selection of relevant indicators, formulation of management objectives, and systematic inventory and monitoring of conditions and performance are equally crucial elements in these processes. Although setting standards is a key step in these processes, it remains only a necessary, not sufficient, condition for their successful implementation.

Standards can reflect different levels of quality in either resource or social conditions. For example, a standard can be set at minimum, optimum, or maximum impact levels. Given different definitions, the condition prescribed by the standard could represent the highest tolerable impact level or, alternatively, the preferred or ideal impact level. Such a situation clearly underlines the fact that the process of setting standards involves significant value judgements, in addition to the scientific aspects. Because of this, increased attention as to who should be involved in the formulation of standards is needed. Standards are not wholly technical in nature; given their prescriptive nature, a variety of stakeholders need to be involved in their formulation.

Although successful standards probably reflect some level of agreement among relevant groups, setting a standard does not guarantee consensus. There may be some who do not agree with the standards; in this case, the standards may need to be aggressively defended. In such cases, the validity of the underlying process as well as the scientific bases of the standard itself will come under scrutiny. Standards may also tend to "force" actions that are difficult politically, or standards may be seen to threaten the traditional flexibility that many managers value. In situations where impacts exceed acceptable levels defined by standards, there may be a tendency to alter the standards to mimic those conditions, rather than undertake what are seen as difficult, costly, or risky management actions to improve conditions.

Finally, some may find the very process of establishing standards uncomfortable, even inappropriate. In the most extreme case, the argument against standards constitutes an implicit decision to accept whatever conditions evolve on site, managing by default rather than by design. Even in this case, however, a standard is involved; the decision to accept any change represents one in which the standard is constantly evolving to accept progressively greater levels of impact. Such a perspective represents a mis-use of the standards approach and is examined in greater detail in the paper by Shindler in these proceedings.

What must be understood is that some standard is always employed when a judgment as to the acceptability or unacceptability of a given condition is made. The manager who justifies closure of an impacted campsite on the ground that it is his or her "professional judgment" that such conditions are unacceptable is nonetheless relying upon a standard to make such a decision. But it is an implicit standard, founded upon an unspecified rationale. What distinguishes the aforementioned planning approaches is that they require that standards be made explicit and be based on a specified, visible, and traceable rationale. Such an approach is clearly more likely to lead to management by design. Papers in this volume argue that standards based on a conscious, deliberate, and visible process are an important key to professional management.

Standards are not the end point of good professional management, only an important step in the process. Managers will still need to work creatively to identify indicators and standards that capture the important qualities of wilderness and recreation experiences, not just those which are easy to measure or accomplish. They will also need to establish priorities for their efforts, develop creative programs to keep impacts within standards, and monitor results to ensure success.

REFERENCES


RESEARCH
DEVELOPING GOOD STANDARDS:
CRITERIA, CHARACTERISTICS, AND SOURCES

Doug Whittaker and Bo Shelby

Abstract: Standards in recreation settings refer to levels of impact which are defined as acceptable. Standards are established for different "indicators," or variables which reflect various impact levels, and they have become a central idea in several recreation planning frameworks, focusing management attention on quality and future conditions. For all their usefulness, however, there is little information about how good standards should be developed: the criterion for choosing indicator variables for which standards are set, the characteristics of good standards, or the sources of good standards. This paper examines each of these issues. Discussion suggests that indicator variables should be specific, measurable, sensitive to change, correlate with and respond to alternative management actions, integrate well with several impacts or conditions, and significantly affect the environment or experience being provided. Good standards should be like good objectives: quantifiable, time-bounded, attainable, and output-oriented. The sources for good standards begin with broad laws or policy mandates, and may then include managers' professional judgement, scientific research, public involvement, and representative surveys of users, each with various advantages and problems.

INTRODUCTION

Standards in backcountry recreation settings are criteria used to evaluate social or environmental impacts. A standard is defined as the level of impact
which is deemed acceptable (or the limit of acceptable change), and standards can be established for any number of impact variables known as "indicators." Under this system of definitions, the indicator is the impact or condition, and standards define how much impact is too much.

Standards are a central idea in several recent recreation planning frameworks and are often offered as the critical element in defining and providing high quality recreation opportunities in wilderness or backcountry settings (Stankey et al., 1985; Shelby and Heberlein 1986; Graefe et al., 1989). While standards are only one component in these management frameworks and may have some limitations, discussion from the Ft. Collins workshop suggests that developing standards for relevant indicator variables is useful for at least four important reasons:

1. Standards focus attention on future conditions and allow managers to be proactive. Instead of waiting for "problems" to occur and then reacting to them, standards define minimum or optimum conditions and allow managers to note when impacts are approaching defined levels.

2. Standards focus attention on the quality of recreation opportunities and recreation environments instead of the number of users. The traditional focus of recreation management has been on the quantity of users in an area. But this says nothing about the quality of experiences. Standards return managers' attention to the conditions which create experiences, the "product" of recreation management.

3. Standards help articulate the experience being provided in an area, providing a focus for discussion among managers and diverse interest groups. Experiences are intangible, social psychological entities. Standards, in contrast, are tangible and specific. By developing standards, managers allow more rational discussion about the objectives for an area.

4. Standards increase the professionalism of planning efforts and can help prioritize (and in some cases generate) funding for further management efforts. The public is often confused by, or unimpressed with, recreation planning efforts. Many plans do not state what managers are trying to accomplish in specific, explicit terms. Standards reduce ambiguity and help the public understand why planning is important. In addition, standards give managers a way to measure accomplishment (or lack of accomplishment), which can lead to more efficient utilization of agency resources.

As useful and important as standards appear to be, there is a paucity of information about how they should be developed. All three of the currently prominent impact management frameworks (Limits of Acceptable Change or LAC (Stankey et al., 1985); Carrying Capacity Assessment Process or CCAP (Shelby and Heberlein 1986); and Visitor Impact Management or VIM (Graefe et al., 1990)) advocate the use of standards, and each evolved from case studies where specific standards were recommended. However, the literature from these frameworks offers less definitive discussion about choosing indicators, the characteristics of good standards, or the different methods of developing those standards. The objective of this paper is to briefly explore these three topics.

CRITERIA FOR CHOOSING INDICATORS

Before developing a standard, it is necessary to choose an appropriate indicator. Indicators have been used in many other sciences, including medicine, agriculture, forestry, and economics (Ott 1978); they refer to the variables used to represent the "health" of a particular system. Indicators identify what conditions will be monitored; in contrast, standards, in contrast define when those conditions are acceptable or unacceptable.

All three of the recreation impact frameworks (LAC, VIM, and CCAP) encourage selection of the "relevant" or most important impacts for indicators (Stankey et al., 1985; Shelby and Heberlein 1986; Graefe et al., 1989); generally because managers can not afford to measure, monitor, and manage every social or environmental impact that may affect recreation opportunities (Whittaker 1987; Merigliano 1989). While a substantial body of work has identified specific indicators (see Stankey et al., 1985 or Graefe et al., 1990 for partial listings), a smaller amount of work has discussed guidelines for choosing indicators or deciding which are more important. It is beyond the scope of this paper to develop such guidelines (see "Indicator selection: Which impacts matter more?" in this proceedings for more on this subject). However, it is useful to review some basic criteria for indicator selection. The following discussion is adapted from Shoemaker (1984); Stankey et al., (1985); and Merigliano (1989).

Specificity

Indicators are only useful if they refer to specific conditions. An indicator such as "water quality," for example, is too vague unless it is defined by some quantifiable measure, such as bacteria per volume of water.
Measurability

Similarly, good indicators should be easily and reliably measured in field situations. Agencies generally operate monitoring programs on shoestring budgets and sometimes must rely on relatively inexperienced (or volunteer) staff to collect indicator data. The quality and reliability of the data may be directly related to the simplicity of the collection method. In addition, indicators which require complex equipment or considerable effort to measure may be ignored when funding becomes scarce. When measuring trail impacts, for example, "length of trail with multiple trails" or "length of trail of widths greater than 20 inches" are probably better indicators than "cross sectional area of soil loss per mile." While the latter indicator may be more accurate and could better reflect erosion conditions on the trail, it is difficult to measure without considerable effort. The other indicators, in contrast, are relatively simple to measure and reasonably reflect the erosion situation.

Sensitivity

Indicators should be sensitive to changes in impact over a relatively short period of time (Merigliano, 1989 suggests within one year). If the indicator only changes after impacts are substantial, it lacks the early warning ability that allows managers to become proactive.

Correlation and Responsiveness

Indicators should reflect impact changes which are related to human-caused activities, and which can be affected by alternative management actions. Indicators measuring impacts that may be related to natural factors are much more difficult to use for management purposes. For example, "miles of stream bank in eroded condition" on an alluvial river where natural erosion rates are likely to be high will not help a manager determine if human activities are unacceptably contributing to the problem. In this case, more specific indicators which compare erosion rates at different sites (with and without the suspected human cause) are probably necessary. Similarly, measuring impacts that will be unaffected by management actions is inefficient.

Integration

The most useful indicators are those which reflect several impacts. Managers generally have small monitoring budgets; indicators which can be used to represent several different impacts allow managers to focus their attention and efforts, while being reasonably assured that overall quality is being maintained. River or trail encounters are examples of indicators that often reflect several other interaction-type indicators such as camp encounters, launch or (railhead congestion, or fishing hole competition.

Significance

Finally, indicators should represent significant impacts. This is, of course, the most important criterion of all. If people do not care about a social impact, or scientists are unable to show how an impact is important to the ecology of the area, it becomes difficult to justify developing standards. If users do not care about different sizes of fire rings or the amount of bare ground at a campsite, these are poor indicators of campsite impact from the social perspective. Similarly, if anglers at a popular fishing hole are more interested in fishing success than the number of people fishing next to them, it pays to focus on harvest success indicators rather than interaction indicators.

CHARACTERISTICS OF GOOD STANDARDS

Standards are established for indicators and define some minimally acceptable level of impact. By definition they involve value judgments and thus should be deeply imbedded in the goals and objectives for an area. In this way, they often resemble and should generally act like objectives. Shoemaker (1984) has discussed several important characteristics of good objectives and, therefore, good standards, as presented below.

Quantifiable

Indicators should be quantifiable, and standards also need to have this characteristic. A good standard will unequivocally state the level of acceptable impact. "Less than three encounters per day on the river" is a good standard. "Low numbers of encounters" is not.

Time-Bounded

"Time-boundedness" complements the quantifiable component of a good standard. Quantifiable standards only state "how much?" Time-bounded standards state "How much, how often?" or "How much, by when?" This is crucial with social impacts such as encounters. It is often desirable, for example,
that managers set different standards for different times of the year. These differences should be specified. Similarly, social impacts can be extremely variable and may involve a component of fate. Two river parties traveling on similar schedules may experience many encounters and camp competition; another two parties on different schedules may experience no impacts at all. Time-bounded standards would recognize the possibility of this variation. Standards expressed as "probabilities" can sometimes help avoid this problem (Stankey et al., 1985). An example is the standard "less than 3 encounters per day for 80 percent of days in the summer use season."  

Standards should be set for every important indicator, and at levels that reflect the resource or experiential needs identified by the management intent for the area. A standard that is too hard to attain may be undesirable, but it may still be necessary. One of the most cynical excuses for not setting appropriate standards is that managing for some conditions is "too hard." Even if true, the effort to meet the standard may result in enough positive change to make it worthwhile. Without a standard, it is easy to do nothing ("management by default") or even aggravate the situation.

Litter standards provide a useful example here. At least in wilderness settings, standards are generally set at no observable litter. This is partly for political reasons: who would respect a managing agency that was willing to accept any litter in wilderness? However, any wilderness area has some litter, and users obviously tolerate this to some degree (no one suggests restricting all access just because some litter is observable). A "no litter" standard, in this sense, is unattainable, yet still correct. There are several impacts for which most people agree the acceptable impact level is zero ("no tolerance" norms; see Whittaker and Shelby 1989). "No tolerance" standards accurately reflect this social concern even if there is some degree of unattainability.

Output-Oriented

Finally, standards should be "output-" rather than "input-oriented." Shoemaker's distinction here refers to a focus on the standard to be met as opposed to the way the standard is met. It is a focus on the acceptable impact level and not the tools used to keep impacts from exceeding standards. "Twenty groups floating the river per day" is not a good standard; it refers to an action (use limits) rather than the acceptable impact. "Less than ten encounters per day" is a better standard.

SOURCES AND TECHNIQUES FOR DEVELOPING STANDARDS

Identifying characteristics of good standards is a useful exercise, but it still does not provide much information about what standards should be or where they should come from. Many different managers and research efforts have developed or recommended various standards, utilizing a variety of techniques or sources of information. A review of the most common sources and techniques is given below.

 Laws or Policy Mandates

When available, laws or policy mandates from governing bodies can be used to help develop standards. Although managing agencies have a great deal of latitude in developing and implementing management actions, they get their initial and most general direction from the legislative and administrative branches of state and federal government.

The problem with laws or mandates is that they are generally written in broad and often vague language. Directives to "provide high quality recreation" or to "maintain and enhance the natural environment largely unaffected by the activities of man" do not translate...
easily into specific, quantitative standards. While all standards developed in a plan should ultimately be tested for their congruity with applicable laws or agency mandates, managers should be aware that these mandates will only provide a general basis for developing standards.

Managers’ Professional Judgment

In many cases, managers themselves could develop standards based on their interpretation of laws and policy mandates, their knowledge of the area, their understanding of the recreation opportunities, and their knowledge of the conditions which define those opportunities. Implicitly, this is precisely what managers have been doing for years: they examine the resource and impact conditions, decide if these are acceptable, and propose actions to mitigate the unacceptable ones. However, if managers would utilize standards more explicitly, they might have greater understanding of their objectives, provide greater justification for their actions, and ultimately provide more proactive management.

In addition, there is at least one major problem with this process: it assumes managers have a good understanding of the acceptability of different resource or experience conditions. Considerable evidence suggests managers may have very different ideas than users or even conservationists about acceptable impact levels. Similarly, evaluating ecological impacts requires extensive scientific input which may not be available to field managers. In order to be successful in developing standards, managers will probably have to invest a great deal of time and effort examining scientific research and the preferences of users.

Scientific Research

Scientific research is an important component in developing standards. Good descriptive information about how management actions affect impacts is critical for setting and then meeting standards. However, good science is supposed to be value free, and standards are evaluative entities. Good research can and should be used to describe various outcomes of a particular management system and impact situation, but it cannot tell the manager what outcome is more or less desirable. For example, it is commonly assumed that scientists are the appropriate people to set standards for acceptable pollution levels in the air or water. However, this is not strictly true. The scientists set standards for the number of pollutants per volume of air or water, but only after society (through its legislators or others government functions) has decided the acceptability of different risk levels. Even at extremely low levels of water pollution, for example, some people still become ill (and they have to buy more pure alternatives). It is impossible to set a standard until the acceptability of various risk levels has been stated.

Public Involvement

Public involvement is another important component of developing good standards, particularly with regard to social impacts. Users can identify important characteristics of their experiences, and when provided the appropriate forum, they can communicate their knowledge and preferences. Small “focus group” meetings with different interest groups are one public involvement technique which can be useful at the beginning of the process. Unconstrained by the problems of interacting with a larger group at large public meetings, interest groups can select the impacts they care about the most and help managers develop the indicators which might be used to reflect those impacts. A study on the Deschutes River in Oregon utilized this technique to choose indicators, which then became the focus of a subsequent user survey effort (Shelby et al., 1987).

It may also be possible to use larger public meetings to develop specific standards. However, it is difficult to organize discussion at these meetings. Individuals with strong concerns tend to dominate the flow of discussion, and may wander across several issues without focusing on specifics. One tool which can help avoid this problem is the use of an “alternatives workbook.” This essentially acts as a survey of public meeting attenders, and the questions in it can guide discussion (as well as collect information about everyone who attended the meeting, not just those who were willing to speak out). The State of Alaska Department of Natural Resources has utilized this technique during a number of recent planning efforts, and it has proven useful (Talbot, personal communication).

Finally, as standards are being developed, managers may find it useful to meet with representatives from important interest groups. In many cases, there may be polarized views about appropriate standards, and some negotiation and compromise must occur to

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2 Shelby and Shindler (1990) showed that Forest Service professionals were more conservation-oriented than even Sierra Club members when evaluating campsite impacts in wilderness areas.
develop standards with the required level of public support. This process, often termed "transactive planning," was employed during LAC planning efforts on the Bob Marshall Wilderness and the Flathead River. By most accounts, these efforts were arduous but ultimately worthwhile (Ashor et al., 1986).

User or Population Surveys

A final, and perhaps most useful, source for developing standards involves user or population surveys. Even the best public involvement efforts tend to neglect the "average user" or "general public" in favor of interest groups or individuals with strong concerns. The conventional wisdom about public meetings is that people attend meetings only if they have something to lose. While this is an oversimplification, information from public meetings is likely to represent more polarized or extreme views than information from representative surveys.

Many LAC, VIM, and CCAP planning efforts have utilized surveys to help develop standards, particularly for social indicators. A formal review of the techniques used in these studies is beyond the scope of this paper (see Kuss et al. for a good review of these studies). However, a summary of a few key concepts common to these efforts is given below.

First, it is most useful to ask about a range of impact conditions, as well as to attempt to gauge which of those impacts matter more. Managers may ultimately decide to only establish standards for a few impacts; however, most surveys are conducted before this decision is made. Asking about several different types of impacts (interaction impacts, signs of use impacts, and even environmental impacts) allows some flexibility in choosing different indicators. If users are asked to rank or indicate concern about the different impacts as well, surveys can help make indicator selection more successful.

Second, questions about users' personal standards should be direct, involve quantitative response categories, and be easy to understand. Extensive research has failed to show strong relationships between impact variables and more vague evaluative measures such as "satisfaction" or "perceived crowding." As a result, some researchers suggest a focus on the evaluation of impacts themselves (Shelby and Heberlein 1986). Questions should ask users to report the number of encounters they are willing to have per day or rate different encounter levels. Asking them to simply report whether the river is too crowded provides less useful information (although comparative analysis using a standardized measure may help identify problem areas; see Shelby, Vaske and Heberlein, 1989). An effective technique used in several studies involves parallel questions about the amount of impact users experience and the amount of impact they are willing to tolerate. Statistical comparisons of these results then allow definition of an "impact problem," as well as providing data about where to set standards (Shelby et al., 1987).

Third, it is useful to provide a 'this impact does not matter to me' response when asking about users' standards. Many users do not have opinions about acceptable impact levels or may not even be aware of the impact situation. Surveys without this option would force users to report a standard anyway, which could result in false conclusions.

Finally, analysis of survey data should go beyond simple frequencies or measures of central tendency. The development of one normative model (see Jackson 1965; Shelby and Heberlein 1986; Vaske et al., 1986; Whittaker and Shelby 1989) strongly suggests that measures of central tendency are useful starting points, but closer examination of response frequencies and the level of group agreement are also important.

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SELECTING INDICATORS:
WHICH IMPACTS MATTER MORE?

Doug Whittaker

Abstract: Currently prominent impact management frameworks stress setting standards or limits of acceptable change for relevant impact variables or indicators. However, little empirical research addresses the problem of selecting indicators that are most important, at least among social impact indicators. This paper examines the indicator selection issue by exploring relationships between 19 potential social indicators and overall users’ experiences. Data comes from a survey of users on five southcentral Alaskan rivers (n=449), part of a larger planning effort. Questions asked users from three sub-samples (floaters on low use and high use rivers, powerboaters on high use rivers) to report the effects of 19 different impacts, types of uses, or developments on their experiences. Results suggest that a number of potential indicators have important effects on trips, and that some indicators have greater negative effects than others (commercial developments more than private developments; signs of use impacts more than encounter or competition impacts; all impacts more than management presence impacts). Results also suggest certain types of uses have greater negative effects than others (airboats and powerboats had greater effects than ORV’s, helicopter landings, and airplane landings), and that floaters (and particularly those on lower use rivers) were more sensitive to all impacts than powerboaters. Finally, results show that competition impacts may have greater negative effects than encounter impacts, particularly on high use rivers. Implications for research and management are discussed.
INTRODUCTION

All three of the currently prominent impact management frameworks (Limits of Acceptable Change or LAC, Carrying Capacity Assessment Process or CCAP, and Visitor Impact Management or VIM) stress the importance of setting standards or "limits of acceptable change" for relevant impact variables, also known as "indicators" (Stankey et al., 1985; Shelby and Heberlein 1986; Graefe, Kuss, and Vaske 1989). These frameworks implicitly recognize that managers cannot measure, monitor, and address every impact with potential effects on resources or users' experiences and that some selectivity is crucial. However, relatively little attention has been given to the selection process, at least with respect to social impacts. 1

An earlier paper in this proceedings (Developing Good Standards: Criteria, Characteristics, and Sources" by Whittaker and Shelby) outlines several criteria for choosing indicators. Noting that indicators should be specific, measurable, sensitive to change, integrate well with several impacts, correlate with and be responsive to alternative management actions, this paper also suggests that significance is the most important criteria to consider: which impacts matter more?

The social impact literature is relatively silent on this issue, approaching but never directly addressing it. Several researchers have provided long lists of potential indicators and there has been a decided focus on certain "classic" indicators (leading this list are encounters and litter), but little empirical work has examined the selection of indicators in particular settings. Several studies, including two series of survey efforts in western wilderness areas (Stankey 1973) and on rivers across the country (Lime 1977), have asked users to rate the severity of various "problems," most of which reflect impact issues and could be used to help select social impact indicators. However, in-depth summary analyses that examine general patterns across these resources have not been conducted.

Similarly, work on perceived crowding has examined the relative importance of different impacts on that variable, but it has focused on understanding crowding rather than understanding the entire range of impacts and their effect on overall experiences (Lee 1975, Badger 1975, Schreyer and Neilson 1978, Shelby 1980, Vaske, Graefe, and Dempster 1982, Whittaker 1987).

Several studies examining users' tolerances or norms for encounters have indirectly explored the importance issue by including an "it doesn't matter to me" response in survey questions (Shelby 1981; Whittaker and Shelby 1988; Roggenbuck et al., 1991). While the percentage of "it doesn't matter" responses may not be an exact proxy, users are only likely to choose this response if an impact has unimportant effects on their trips.

Researchers and managers obviously recognize that some social impacts are more important than others; the focus on particular impacts is the starting point for their work (Lucas 1979; Kuss et al., 1990). At issue is whether their professional judgements about the importance of various impacts match similar judgements made by users. Previous research has shown that resource managers often have different ideas from users about acceptable levels of impact (Hendee and Harris 1970, Shelby and Shindler 1990). It is possible they have different ideas about which impacts matter more as well.

This paper is an attempt to examine the indicator selection issue by exploring relationships between potential indicators and overall experiences. Using data from a recent survey of users on several rivers in Southcentral Alaska, the paper compares reactions to 19 different impact, types of use, and development items among floaters and powerboaters in high and low use settings. The objective is to look for general patterns that can help determine which indicators "matter more" for different recreation opportunities. The list of impact, type of use, and development items examined include two signs of use impacts, three competition impacts, two encounter impacts, six types of use (motorized and non-motorized), four types of development, and two management presence impacts.

METHODS

Data for this paper come from a survey of users on five Southcentral Alaska rivers. The rivers (Little Susitna, Deshka, Lake Creek, Talkeetna, and Talachulitna) are five of the six state-designated Susitna Basin Recreation Rivers, which have been the focus of recent planning efforts designed to protect and enhance their outstanding fish, wildlife, and recreation values. The rivers have excellent salmon and trout fishing, several whitewater reaches, wilderness values on several fly-in reaches, and relative proximity to well over half the population of the state in the Anchorage area (for more information

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1There is a vast body of research examining visitor impacts on ecosystems (Kuss et al., 1990). This research can be used to choose appropriate resource impact indicators.
about the rivers and their resources, see Anderson et al., 1990).

The user survey was conducted by the National Park Service (NPS) for the State of Alaska Department of Natural Resources (DNR) through the Rivers and Trails Conservation Assistance program. The survey was developed after meetings with DNR staff and the Susitna Basin Recreation Rivers Advisory Board (with representatives from major interest groups appointed by the Governor), and it focused on defining types of experiences, current impact levels, acceptable impact levels, the effects of different impacts, and preferences for various management strategies. (For more information about the survey and the results, see Whittaker 1990).

Users were initially contacted on-site by state officials (usually Fish and Game technicians) or had their names collected by commercial air taxi or lodge operators. One person from each party was then mailed a survey corresponding to the river they visited. Three follow-ups were sent out. In all, 979 users were mailed surveys, 15 were undeliverable, and 728 returned them (response rate = 76 percent).

For this paper, only certain users visiting five of the rivers were included in the analysis. This was done to simplify analysis and avoid some sampling problems. The low use floater sample (n = 58) came from the Talkeetna River (15), Talachulitna River (16), and Lake Creek (27). Trips on each of these rivers require fly-in access and some whitewater boating skills; it is estimated that fewer than 50 float trips are taken on either the Talachulitna or Talkeetna each year, while less than 100 float trips are probably taken on Lake Creek. The high use floater sample (n = 81) came from the Little Susitna River (43) and the Deshka River (35). These two rivers are road accessible, closer to Anchorage, feature mostly flat water, and can largely be navigated by powerboat. Use levels can approach 50,000 user days per summer on the Little Susitna, and 35,000 user days on the Deshka, although the vast majority of this use is powerboat- or bank-oriented. The high use powerboat sample (n = 310) also came from the Little Susitna (116) and Deshka rivers (194).

In all, users were asked to react to fifteen different impact, type of use, or development items which they "may have seen or experienced" as well as nine other items which "could be allowed" in the river corridors. For this paper, responses to nineteen of the items have been analyzed; fifteen that currently exist in the river corridors, and four that could be allowed in the future (these are starred). The items are given below, organized by category.

Signs of Use Impact Items:
1. Litter
2. Signs of previous use (visqueen camps, fire rings, etc.)

Competition Impact Items:
3. Competition for camping sites
4. Competition for fishing holes
5. Congestion at boat launches

Encounter Impact Items:
6. Seeing other groups
7. Camping in sight or sound of others

Type of Use Items:
8. Seeing powerboats
9. Seeing airboats
10. Seeing ORV's (Off-Road Vehicles)
11. Seeing rafts or canoes
12. Airplane landings
13. Helicopter landings

Development Items:
14. Private cabins
15. Long-term tent camps
16. *Public use cabins (cabins rented to the public)
17. " Concessions for gas, groceries, tackle, etc.

Management Presence Items:
18. *Signs warning or advising of hazards
19. "Interpretive displays at launch areas

For each item, users were asked to indicate how each affects or would affect their visits to the river. Response categories were: 1) does not matter; 2) adds to experience; 3) detracts from experience; and 4)
strongly detracts from experience. The response categories for the "could be allowed" items were phrased in the future tense (i.e. "would not matter," "would add to," etc.).

Because this is a preliminary exploration of the data, only descriptive analyses were performed. Items were organized into six categories (signs of use, competition, encounters, type of use, development, and management presence) and two statistics were calculated for each sample and item. The first statistic is the percentage of the sample who reported the item "detracts" or "strongly detracts" from their experiences (hereafter referred to as "detracted"), and provides an intuitively useful number that represents the level of antipathy toward that impact, type of use, or development. The second statistic is a mean score, which is an overall measure of effect. The mean score is based on the assumption that response categories can be arranged as ordinal data from "strongly detracts" to "adds," with "it doesn't matter" reflecting the neutral response. Scores for this statistic range from -2 to +1, with more negative scores reflecting greater levels of antipathy toward the impact, use, or development. The mean scores could have been used for more detailed analysis (testing for significant differences between groups or items), but this level of analysis was judged unnecessary for the exploratory scope of this paper.

RESULTS

Results are organized in one table and a series of three graphs. Table 1 gives the percentage of sample reporting the item detracts and the mean score for each impact, type of use, or development item and the three user groups. Figures 1 through 3 show rankings of the impact, use, or development items based on the percent reporting the item detracts.

Results show several interesting patterns. First, they show that the majority of the impact, type of use, or development items have (or would have) negative effects on users' experiences. Two thirds of the time (38 out of 57 opportunities), a majority of each sample reported items detracted from their experiences, and among the two floater samples, this was true almost three-quarters of the time (29 out of 38 opportunities). The few items which were consistently rated as having negative effects include litter (86 to 91 percent), fishing competition (82 to 85 percent), campsite competition (73 to 86 percent), concessions (67 to 85 percent), and long-term camps (67 to 85 percent). The few items which were consistently rated as having less negative (or even positive effects) include rafting/canoeing use (only 7 to 32 percent reported this use detracts), interpretive signs (38 to 44 percent), private cabins (16 to 52 percent), and airplane landings (33 to 52 percent).

Second, floaters generally respond more negatively to all impact, types of use, and development items than do powerboaters, and low use floaters respond more negatively than high use floaters. Floaters on low use rivers reported that items detracted from experiences seventeen out of nineteen opportunities; floaters on high use rivers reported this only twelve out of nineteen times; and powerboaters only reported this nine out of nineteen times. The mean scores show similar patterns.

Third, there are sharp differences in the way floaters and powerboaters react to the type of use items. Floaters consistently rate all motorized uses except airboat use negatively (55 to 95 percent reported they detract), while powerboaters rarely reported that a motorized use detracts (the exception was with airboat use (61 percent)).

Fourth, among the type of use items, the greatest negative effects were generally reported toward airboat use, followed by powerboat use, ORV use, helicopter landings, and airplane landings. Seeing rafts and canoes was always reported to detract by the fewest number of users. It is also interesting to note that floaters themselves rated seeing rafts or canoes more negatively than did powerboaters.

Fifth, among the "interaction" impacts (encounters and competition), competition was generally rated more negatively than the encounters, although the differences narrowed with the low use floater sample. Among the high use floaters and powerboaters, fishing competition (83 and 85 percent report that the impact detracts) and camping competition (80 and 73 percent) were consistently rated more negatively than airboat use, river encounters (78 and 61 percent) and camping competition (78 and 44 percent). Launch congestion was also rated more negatively than river encounters for both groups, and powerboaters rated it more negatively than camp encounters as well. Among low use floaters, camp encounters were the most negatively rated impacts (88 percent report they detract), followed closely by camping competition (86 percent), fishing competition (82 percent), and then river encounters (78 percent) and launch congestion (57 percent).

Sixth, among the potential management presence impacts, only hazard signs were rated negatively by a majority of a sample (64 percent, and only among low use floaters). Among high use floaters and powerboaters, very few users reported that either
Table 1—Mean scores and percentage of respondents reporting impact "detracts" or "strongly detracts" from their experiences

<table>
<thead>
<tr>
<th>Impacts</th>
<th>Detracts</th>
<th>Mean score</th>
<th>Detracts</th>
<th>Mean score</th>
<th>Detracts</th>
<th>Mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Floaters on low-use rivers</td>
<td>Floaters on high-use rivers</td>
<td>Powerboaters on high-use rivers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Litter</td>
<td>86</td>
<td>-1.6</td>
<td>91</td>
<td>-1.4</td>
<td>89</td>
<td>-1.4</td>
</tr>
<tr>
<td>Signs of use</td>
<td>75</td>
<td>-0.8</td>
<td>66</td>
<td>-0.8</td>
<td>60</td>
<td>-0.8</td>
</tr>
<tr>
<td>Campsite competition</td>
<td>86</td>
<td>-1.2</td>
<td>80</td>
<td>-0.9</td>
<td>73</td>
<td>-0.9</td>
</tr>
<tr>
<td>Fishing competition</td>
<td>82</td>
<td>-1.2</td>
<td>83</td>
<td>-1.1</td>
<td>85</td>
<td>-1.2</td>
</tr>
<tr>
<td>Launch congestion</td>
<td>57</td>
<td>-0.8</td>
<td>60</td>
<td>-0.7</td>
<td>69</td>
<td>-0.9</td>
</tr>
<tr>
<td>River encounters</td>
<td>78</td>
<td>-0.9</td>
<td>49</td>
<td>-0.5</td>
<td>44</td>
<td>-0.3</td>
</tr>
<tr>
<td>Camp encounters</td>
<td>88</td>
<td>-1.3</td>
<td>78</td>
<td>-0.9</td>
<td>61</td>
<td>-0.7</td>
</tr>
<tr>
<td>Powerboat use</td>
<td>95</td>
<td>-1.6</td>
<td>83</td>
<td>-1.3</td>
<td>23</td>
<td>-0.2</td>
</tr>
<tr>
<td>Airboat use</td>
<td>95</td>
<td>-1.8</td>
<td>86</td>
<td>-1.6</td>
<td>61</td>
<td>-0.9</td>
</tr>
<tr>
<td>Rafting/canoeing use</td>
<td>32</td>
<td>-0.1</td>
<td>10</td>
<td>0.2</td>
<td>7</td>
<td>0.2</td>
</tr>
<tr>
<td>Airplane landings</td>
<td>52</td>
<td>-0.6</td>
<td>49</td>
<td>-0.6</td>
<td>33</td>
<td>-0.3</td>
</tr>
<tr>
<td>Helicopter landings</td>
<td>70</td>
<td>-1.0</td>
<td>55</td>
<td>-0.9</td>
<td>45</td>
<td>-0.6</td>
</tr>
<tr>
<td>ORV use</td>
<td>91</td>
<td>-1.5</td>
<td>59</td>
<td>-0.9</td>
<td>39</td>
<td>-0.5</td>
</tr>
<tr>
<td>Hazard signs*</td>
<td>64</td>
<td>-0.8</td>
<td>37</td>
<td>-0.2</td>
<td>32</td>
<td>0.0</td>
</tr>
<tr>
<td>Interpretive signs*</td>
<td>41</td>
<td>-0.6</td>
<td>44</td>
<td>-0.4</td>
<td>38</td>
<td>-0.1</td>
</tr>
<tr>
<td>Public use cabins*</td>
<td>70</td>
<td>-1.0</td>
<td>48</td>
<td>-0.4</td>
<td>42</td>
<td>-0.3</td>
</tr>
<tr>
<td>Private cabins</td>
<td>52</td>
<td>-0.6</td>
<td>31</td>
<td>-0.4</td>
<td>16</td>
<td>0.1</td>
</tr>
<tr>
<td>Concessions*</td>
<td>70</td>
<td>-1.4</td>
<td>85</td>
<td>-1.3</td>
<td>67</td>
<td>-0.9</td>
</tr>
<tr>
<td>Long-term camps</td>
<td>85</td>
<td>-1.4</td>
<td>79</td>
<td>-1.3</td>
<td>67</td>
<td>-0.9</td>
</tr>
</tbody>
</table>

a Floaters on Talkeetna River, Talachulitna River, Lake Creek (n = 56).
b Floaters on Little Susitna River and Deshka River (n=81).
c Powerboaters on Little Susitna River and Deshka River (n=310).
* Potential impacts or developments which "could be allowed."
hazard or interpretive signs would detract from their trips (37 and 32 percent), and among all users, very few report that interpretive signs would detract from their trips (38 to 44 percent).

Finally, among the development items, more users reported that long-term tent camps and concessions detract or have the potential to detract from their experiences than public use cabins or private cabins.

DISCUSSION

The patterns revealed in these results suggest a number of preliminary conclusions about how various indicators affect users' experiences in different settings or among different groups. First, there are a number of impacts, types of uses, and developments that have the potential to detract from users' trips. This conclusion may seem obvious, but confirmation is useful in any case. A recurring comment at public meetings for the Susitna Basin Recreation Rivers planning effort focused on how users "just want to catch fish" and that addressing impacts on experiences was a dubious enterprise. These results offer a sharp contrast to this idea and follow from other research which identifies multiple expectations of both consumptive and non-consumptive recreation (Hendee 1974, Driver and Brown 1978, Schreyer and Roggenbuck 1978). There are many potential impacts, types of uses, or developments which have (or could have) significant negative effects on users' trips on these rivers, and management attention is clearly warranted.

Second, some items have consistently greater negative impacts on users' trips than others, regardless of the setting, while others have consistently lesser negative impacts. Litter and other signs of use impacts (visqueen camps, fire rings, etc.), for example, appear to be uniformly important and are reported to detract more from trips than most types of use, development, or interaction, impacts. Among floaters, it rates among the top three impacts, and among
powerboaters it is the highest impact. This result appears to follow from the history of many river management programs, including the program for the Susitna Basin rivers. Past management efforts have typically centered on resource protection (fish and game management), litter clean-ups, and facility maintenance. Only recently has management focused on social impacts or the actions which would address them (Whittaker 1990). This result also supports this historical focus: recreationists seem to agree that a relatively litter-free environment is a starting point for providing quality wildland recreation, a result supported by research in other settings as well (Lee 1975; Shelby and Brunson, in press).

In contrast, the management presence impacts (hazard signs and interpretive stations or signs) were consistently reported as having relatively minor negative effects. A number of researchers have discussed the potential effects of various management variables and one of the most fundamental recreation management models, the recreation opportunity spectrum, discusses management settings on equal footing with physical and social settings (Driver and Brown 1978). These data do not directly address the utility of this notion, but they do suggest that two common management presence impacts (signs warning of hazards and interpretive stations) would not particularly affect most Susitna Basin river users. Physical signs of management presence, at least, are simply not as important an impact issue as litter, development, encounters, competition, or type of use.

Third, certain types of use have strong negative effects on floaters' trips (while having relatively weaker effects on powerboaters' trips). Airboat use was the most negatively rated item among both floater samples, and powerboat use was reported to have strong negative effects as well. These results, which will come as no surprise to managers grappling with motorized/non-motorized use conflicts, simply confirm other research in this area. Many non-motorized users have been shown to have deeply felt norms that motorized use is inappropriate in certain backcountry settings. In contrast, few powerboaters reported that seeing other types of uses (except airboats) detracted from their trips, confirming the "asymmetrical antipathy" noted by other researchers examining use conflicts (Adelman et al., 1982). At their most basic level, these results suggest that resolving types of use conflicts should be among managers' top priorities.

The types of use results are also interesting in regard to the relative ratings of the different motorized uses (consistent among the three samples). In order, the most negatively rated motorized uses were airboats, powerboats, ORV's, helicopter landings, and airplane landings. At least three possible ideas may help explain this order. First, the greater negative effects of airboat use may be related to their higher noise output, as frequently mentioned at public meetings. Similarly, helicopter landings may be rated more negatively than airplane landings because they have the potential to be much louder. Second, motorized use on the entire river may be judged more negatively than motorized use at specific places on or along the river. Airboat and powerboat use, where it occurs, occurs along the whole stretch and in considerable numbers. In contrast, ORV use, helicopter landings, and airplane landings happen at specific locations, and less frequently (there are no ORV trails which immediately parallel the rivers, and aircraft landing areas are relatively few and far between). Finally, airplane landings may have been judged less negatively because many floaters recognize that airplanes are necessary for access to many of the rivers, and so they may rationalize that airplane impacts are a necessary evil. Many powerboat users have been particularly vocal in their opposition toward "non-motorized use zones" and argue that floaters who support these zones and utilize fly-in services are hypocritical. These data confirm that floaters do view the different motorized uses differently. However, it is likely that floaters simply accept the motorized use on either end of their trip, while motorized use encountered frequently or even periodically (as in the case of powerboat use) is less tolerable.

Fourth, users differentiate between various types of development, and some may have surprisingly weak negative effects on their trips. At public meetings for the Recreation Rivers, some of the most heated discussion focused on the whether new development should be allowed. Results from the survey, however, suggest that some development items do not detract from users trips very much at all. While concessions and long term camps were among the most negatively rated items, private cabins and public use cabins appear to detract from very few users' trips.

These findings suggest users distinguish between different types of development, and it is possible the differentiation follows along commercial/private lines. Concessions and long-term camps on the Recreation Rivers are often associated with commercial recreation use, while both types of cabins are more likely to be associated with private use. Commercial users have received blame (right or wrong) from a

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3 It is interesting to note that helicopters can potentially land in any open place such as gravel bars, and this may have also contributed to the relatively higher negative ratings of the helicopter landing item than the airplane landing item.
number of users for causing crowding problems and changing the character of the rivers, and other results from the survey suggest users are strongly opposed to any new commercial lodge development (between 70 and 100 percent depending on the river).

Another possible explanation for these development results is that cabins may be significantly less visually obtrusive than concessions or long-term camps. Concessions involve advertising and long-term camps often feature visqueen-clad frame tents and other relatively unaesthetic primitive structures. In contrast, currently existing private cabins on these rivers are typically older homesteads and often feature rustic but high quality design (and they are usually made from local materials).

A final explanation may relate to the fact that future land disposals are prohibited by law in the river corridors, and users may understand that the number of private cabins will remain at current levels, which are low. Similarly, while public use cabin systems have been popular in the state, most residents recognize that facilities of this type are expensive and very few ever get built.

Fifth, competition impacts appear to have greater negative effects than encounter impacts for all groups, although floaters on low use rivers showed smaller differences in the ratings for these two categories of impacts. This is a somewhat surprising result. A considerable amount of research has focused on encounters as the pre-eminent social impact variable, and there is little doubt that they do have important effects on users' experiences (Shelby and Heberlein 1986; Graefe et al., 1989). However, these results suggest that encounters alone may not be as important as the way encounters occur, or the place where they occur (the idea was mentioned but not significantly explored in earlier work (Shelby and Heberlein 1986)). Having to share a camping site, a fishing hole, or a boat launch appears to have greater negative effects than just seeing other users.

This finding makes a great deal of sense and is also tangentially supported by other research. For example, Stankey (1973) noted that users were more sensitive to camp encounters than trail encounters, and several other studies have empirically shown that user standards for trail or river encounters are generally less than their standards for camp encounters (see Kuss et al., 1990 for a review). Similarly, Whittaker and Shelby (under review) found that a "discourteous behavior" impact explained a significant portion of perceived crowding even after adjusting for the effect of encounter impacts, concluding that the type of encounter is critical.

Finally, a number of researchers have noted less agreement about and greater refusal to name normative standards for acceptable encounter levels in relatively high use settings, suggesting this variable may be less meaningful in some situations (Patterson and Hammitt 1990; Roggenbuck et al., 1991; Whittaker and Shelby, under review).

The evolution of carrying capacity research has in many ways gone from a focus on satisfaction to perceived crowding to encounters, with the more specific variables offering a clearer focus and more reliable measures (Shelby and Heberlein 1986). These results suggest extending this idea, particularly in higher use settings. Above a certain use level, the number of encounters may not relate to important differences between experiences. In these cases, more specific indicators (the type of encounter, the location of the encounter, or the amount of competition for some scarce resource at that location) are necessary to fully understand the experience that is desired or being provided.

Several of the Susitna Basin rivers feature what has been described as "combat fishing" during the king and silver salmon runs. During these periods, anglers stand shoulder to shoulder at the best fishing holes and try their best to hook fish instead of each other. In these situations, it is absurd to talk about encounters as being any sort of real measure of the experience, and interaction actually appears to be part of the quality of experience. An indicator which more specifically examined how users interact, how they compete or co-exist at the fishing hole would provide much more useful information. Researchers should address these issues by developing and testing the efficacy of some of these measures.

Finally, users oriented toward primitive recreation opportunities are generally more sensitive to impacts than users oriented toward less primitive opportunities. Low use floaters rate most items more negatively than the high use floaters, and all floaters rate most items more negatively than the powerboaters. This result also follows from past research. For example, several studies have discussed or empirically found that encounters and other impacts have greater effects on users interested in solitude than on those for whom solitude is less salient (Schreyer and Roggenbuck 1978; Ditton et al., 1982; Stankey and McCool 1984; Shelby and Heberlein 1986; Kuss et al., 1990). Similarly, researchers have noticed that "purist" or more "specialized" users are more sensitive and have lower tolerances for various impacts than other users (Stankey 1973; Bryan 1977). These results suggest similar conclusions. Users who take trips to lower use, less developed settings tend to
have more stringent standards which define acceptable impact levels.

This result also reflects management tradition toward impact management in general, which had its initial impetus in wilderness and backcountry areas. Areas with the lowest impacts are often the first to show changes, and management attention naturally addressed these relatively untouched areas first. Users seeking higher density opportunities may be sensitive to any number of impact issues, but the "noise" in the system (particularly the number of users and the variety of their attitudes, preferences, and expectations) makes it difficult to sort them out. In low density settings, the effect of users on themselves is much more evident; it is not surprising users and managers find it easier to focus on how impacts in these settings can change experiences.

Planners for the Susitna Basin rivers have taken this idea to heart, choosing to set standards for at least two social impact variables (camp competition and river encounters) on only the low use segments on the three whitewater rivers. This decision partially reflects the lack of political opposition to management actions which might accompany such standards in the future, but it also reflects the fact that users are sensitive to and in agreement about appropriate indicators and standards on those segments. Consensus is far less clear on other segments or rivers.

This paper is an initial look at indicator selection data, and conclusions are preliminary. Considerably more work is needed before any general "rules" for choosing indicators can be listed for various types of opportunities or resource settings. However, these data suggest that several indicators are important, and that some are more critical than others in certain settings. The bottom line is that both researchers and managers can reap important dividends by carefully exploring the range of possible indicators before focusing attention on a select few.

REFERENCES


ABSTRACT: The importance of developing evaluative standards for judging the acceptability of impacts caused by recreation is common to all recent natural resource management frameworks. A normative model has been advanced as a useful way to conceptualize, collect, and organize empirical data representing standards for resource management issues. This paper summarizes the findings from social and ecological research to illustrate the utility of the normative approach from a manager's perspective. The social data (e.g., encounter norms, proximity norms, and tolerances for launch wait times) were obtained from 13 different study sites, while the ecological data (e.g., tolerances for the amount of bare ground, size of fire rings, instream flows, and wildlife management practices) were collected at three specific sites and from one statewide survey. Findings from the social research indicated that encounter norms exist for particular types of contacts with certain types of visitors at particular places and for certain types of experiences. The recreationists reported norms for acceptable distances between individuals, encounters with others at campsites or attractions, and waiting times to run rapids. These social norm evaluation techniques were also shown to be transferable to normative evaluations of ecological impacts. The users had opinions about...
ecological impacts and were willing to express them. In addition, the ecological norms were of moderate to high intensity. It is argued that the usefulness of normative approaches lies in their ability to characterize group agreement about appropriate use conditions or impact levels for a particular recreation experience, thus providing the evaluative information needed to establish management standards.

INTRODUCTION

Recent natural resource management frameworks emphasize a systematic process for measuring impacts caused by recreational use, developing standards for acceptable levels of impact, and selecting among alternative management strategies when impacts exceed standards (Stankey, Cole, Lucas, Petersen, and FrisseU 1985; Shelby and Heberlein 1986b; Graefe, Kuss, and Vaske 1990). Such frameworks can be applied to social or ecological impacts, and involve descriptive and evaluative components. The descriptive component identifies specific problem conditions (impacts) which result from recreational use. The evaluative component involves value judgments about the acceptability of specific levels of impact which can be used to develop evaluative standards.

The normative approach has been developed as a useful way to conceptualize, collect, and organize empirical data representing value judgments about resource management issues. Norms are standards that individuals use for evaluating activities, environments or management proposals as good or bad, better or worse (Vaske, Shelby, Graefe, and Heberlein 1986). They define what people think behavior ought to or should be.

Much of the normative research is based on the work of Jackson (1965), who proposed a model which describes norms (evaluative standards) by means of a graphic device which we have referred to as an impact acceptability curve (See Vaske et al., 1986, for a review). The curve can be analyzed for various normative characteristics including optimum conditions, the range of tolerable conditions, the intensity or strength of the norm, and the crystallization or level of group agreement about the norm.

Evaluative standards for encounters in a wilderness setting, for example, might have an optimum of zero encounters, a low range of tolerable contacts, high intensity, and high crystallization, while norms for a developed recreation area might show a greater tolerable range, lower intensity, and less group agreement.

Since the initial conceptual illustration of the model to natural resource environments (Heberlein 1977), the approach has been empirically used to understand encounter norms (Vaske 1977; Vaske et al., 1986; Shelby 1981; Heberlein and Alfano 1983; Heberlein, Alfano, and Ervin 1986; Whittaker and Shelby 1988; Patterson and Hammitt 1990; Martinson and Shelby 1991; Williams, Roggenbuck, and Bange 1991; Roggenbuck, Williams, Bange, and Dean 1991; Shelby and Vaske 1991; Young, Williams, and Roggenbuck 1991), and perceived ecological impacts (Shelby, Vaske, and Harris 1988; Vaske and Donnelly 1988; Whittaker and Shelby 1988; Shelby and Shindler 1990; Shelby and Whittaker 1990). Encounter norms have been examined for canoeing, rafting, tubing, sailing, fishing, hunting, backpacking, and camping. Norms for ecological impacts have included evaluations of the amount of bare ground and the size of fire rings in campgrounds, the level of instream flows required for recreation activities, and the perceived acceptability of wildlife management practices. The areas studied have also shown considerable diversity, with some showing extremely high density and use impact problems, others showing low density and no impact problems, and still others actively using management strategies to control densities and use impacts.

This paper briefly summarizes the findings from this social and ecological research to illustrate the utility of the normative approach. The intent is to provide an encapsulated overview of this body of knowledge from a managers' perspective, rather than presenting the details from each study. Readers interested in the specifics are referred to the individual articles.

ENCOUNTER NORM EXAMPLES

The Brule River (Wisconsin)

The Brule River study was the first attempt to use Jackson's model to describe encounter norm curves (Heberlein and Vaske 1977, Vaske 1977). Visitors were asked how they felt about seeing 0, 1, 2, 3, 5, 7, 9, 15, 20, and 25 canoers, tubers and fishermen. There were five response categories: very pleasant, pleasant, neutral, unpleasant, very unpleasant.

Zero was the optimum encounter level, with higher levels rated as relatively less pleasant. For canoeers,
the mean range of tolerable contacts was smallest for encounters with tubers (0-2.3); increasing to 0-5.7 for contacts with other canoers, and 0-7.2 for encounters with fishermen (fig. 1). These contact norms were held with different intensities. Encounters with tubers provoked the most extreme reactions, resulting in the highest intensity. Encounters with fishermen provoked reactions nearer to the neutral line, so intensity here was lowest, and intensity for encounters with canoes was in between. Crystallization, or the level of group agreement, for all three encounter norms was fairly comparable, although there was the most consensus about encounters with canoes and least about those with tubers.

Using the upper limit of the encounter tolerance range (3 for tubers, 7 for canoers, and 9 for anglers), data on encounter reports were used to examine how often these standards were exceeded. Canoers reported seeing more than three encounters with tubers 37 percent of the time, more than seven canoes 76 percent of the time, and more than nine anglers only 5 percent of the time. Thus, the canoers’ standard for meeting canoers was exceeded most of the time and some of the time for tubers. The standard for anglers was rarely exceeded.

During the year following the Brule River study (1976), a management plan was introduced that restricted the number of canoes and eliminated tubers from the river. Although the restrictions on canoeing were consistent with the normative tolerance limits, understanding the ban on tubing requires an examination of the intensity and crystallization indicators. Because tubing represented a non-traditional activity on the Brule, encounters with even a few individuals engaged in this new form of recreation evoked the most intense negative reactions. Crystallization of an encounter norm may also be a function of an activity’s heritage on a river. Trout fishing, for example, began as a recreational pursuit on the Brule before the turn of the century. This history of usage increases the probability that anglers were relatively more aware of a norm regarding appropriate encounters.

Sandhill Wildlife Area and Bong Recreation Area (Wisconsin)

Deer hunters at the Sandhill Wildlife Area and pheasant hunters at the Bong Recreation Area were also asked to evaluate a range of different contact levels (Heberlein and Alfano 1983). The encounter levels and response categories paralleled those in the Brule River study.

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makes it possible to specify important differences in definitions of hunting experiences. Some hunters, for example, view deer hunting as a solitary experience and thus, prefer few encounters. Others believe that the presence of additional hunters help to move deer, thereby increasing the likelihood of seeing game. For this group, a large number of encounters may be preferable. This bimodal distribution of encounter preferences documents different norms.

The Apostle Islands National Lakeshore (Wisconsin)

Heberlein, Alfano, and Ervin (1986) present a variant of the repetitive item format. Boaters at the Apostle Islands National Lakeshore were asked how they felt about mooring with 1, 3, 5, 7, 9, 11, 15, 25, or 35 other boats at the two most popular mooring locations (Anderson Bay and Quarry Bay). Each respondent, however, was given only one encounter level to evaluate, rather than all 9 levels.

At both Anderson Bay and Quarry Bay, boaters’ evaluated mooring with 1 to 5 boats positively, and were neutral toward 7 to 11 contacts (fig. 3). When the number of boats reached 15 or more, boaters consistently rated the experience negatively. Boaters moored off Quarry Bay showed greater norm intensity and crystallization (group agreement) than the Anderson Bay boaters.

Given this tolerance limit of 15 boats moored in the same location, it was possible to observe the number of nights this standard was exceeded under current conditions, and to estimate the impact of additional marina development. During the year the study was conducted (1981), moorings exceeded the 15 boat tolerance limit on two percent of the week nights and 46 percent of the weekend nights. Since there are fewer weekends than weekdays overall, the number of boats exceeded the visitor standard on 17 percent of the available nights during the summer.

Using linear regression techniques, the authors then projected the impact of increasing the number of available marina slips in the area. Projections were based on increases of 100 slip increments up to 400 slips. Adding 100 new slips had no effect on week nights, and a slight effect on weekends. At 400 slips, the standard would be exceeded on 8 of 10 weekend nights at Anderson, and on 6 out of 10 at Quarry. Based on these projections, 200 new slips was the largest amount that could be tolerated before the standard of 15 boats was greatly exceeded.

Figure 3—Apostle Islands boater encounter norms for Anderson Bay and Quarry Bay.

The Grand Canyon (Arizona)

Two different approaches were used to develop evaluative standards for contacts in the Grand Canyon (Shelby and Heberlein 1986). A single item on a questionnaire given to floaters as they left the river asked how many other parties they preferred to see each day on the river. This preference approximates an optimum encounter norm because it represents an ideal. The greatest number of users preferred zero encounters (34%), about two-thirds preferred less than three contacts, and more than three-fourths (78%) preferred four or fewer. In the absence of more complete information about user norms, managers decided on three river encounters as the evaluative standard. This translated into a use level of 24 trips per week (400 to 700 people), or about 3 trips per day. Given that previous limits had allowed 7 to 8 trips to launch on the busiest days, the new limit meant a substantial reduction at certain times.

Using the preference item as an evaluative criterion, however, does not provide the details of the impact acceptability curves. To learn more about public reaction to the new management plan and contact norms, the National Park Service conducted a series of public meetings across the United States. The questionnaire handed out at the meetings was a modified version of the Brule River survey (Shelby 1981). Respondents were asked to indicate the highest number of encounters they would tolerate before the experience changed by completing the statement: OK to have as many as ___ river encounters per day." Other similar items asked about time spent in sight of others, the number of stops at which another group might be seen, meeting others at popular stops, and the number of nights spent camping in sight of another party. Analysis of each item provided estimates of the normative
characteristics: the optimum contact level (defined as the mode), the range of tolerable contacts (zero to the median response), and crystallization (the standard deviation of each distribution). Norm intensity is not measured with this approach.

Because tolerances for varying numbers of encounters depends on people's ideas about the kind of experience to be provided, people were asked to think about the Grand Canyon in three different ways: a wilderness experience, a semi-wilderness experience, and an undeveloped recreation area experience. Respondents defined wilderness as one or fewer river encounters per day, less than one-half hour in sight of others on the river, meeting other parties at no more than one out of ten attraction sites, and camping away from other parties virtually all the time. Appropriate contact levels were higher for semi-wilderness and undeveloped recreation. For example, 50 percent would tolerate three or fewer contacts for a semi-wilderness experience, and four or fewer for undeveloped recreation.

These normative standards (based on median responses - 50%) can be thought of as the upper end of the tolerable range. If the criterion for acceptable tolerance limits is broadened to include 90 percent of the respondents, more than four contacts exceeds the wilderness standard, more than five contacts exceeds the semi-wilderness standard, and more than ten exceeds the standard for undeveloped recreation. Group agreement about these norms (crystallization) was highest for wilderness and lowest for undeveloped recreation.

The evaluative standard based on the normative data from the public meeting was similar to the standard based on the single contact preference item. The preference based standard suggested that managers should keep encounters at three or less per day, while the norm based standard suggested a management goal of one per day; four or more contacts should be avoided. The advantage of the more elaborate normative approach is that it gives more detail and provides information about alternative experiences.

Rogue and Illinois Rivers (Oregon)

Evaluative standards for the Rogue and Illinois Rivers were developed with the same approach used at the Grand Canyon public meetings (Shelby 1981). Despite the fact that the Rogue and Illinois Rivers are considerably different from the Grand Canyon, and responses were obtained from user populations rather than persons attending public meetings, the range of tolerable contacts for the three experiences were dramatically similar. The wilderness norm was .9 for the Grand Canyon, 1.5 for the Rogue and .7 for the Illinois. Similarly, the semi-wilderness norm ranged from 2.0 river contacts on the Illinois to 2.9 on the Rogue. For the undeveloped recreation norm, norms were 2.7, 4.0, and 4.2 for the Illinois River, the Grand Canyon and Rogue River, respectively. These findings suggest considerable consensus regarding acceptable limits of encounters in a variety of settings.

Commercial jet boats share the lower 12 miles of the Rogue River with the floaters. Fifty percent of the jet boaters would tolerate 4.4 contacts on a wilderness trip, while the wilderness experience tolerance limit for the floaters was 1.5. This difference can be partially attributed to structural differences in the two activities. Because jet boats travel further and faster in a day, they experience more encounters and are willing to tolerate a higher number. The norm for jet boaters was also less crystallized. Floaters responses ranged from 0 to 10, while those of jet boaters ranged from 0 to 100; the standard deviation for floaters was 2.0 and for jet boaters it was 24.9 (Shelby and Heberlein 1986). All of these data show less crystallization for higher contact experiences, suggesting that norms are less specific as the number of encounters increases.

Current use limits on the Rogue allow 120 people per day, which translates into an average contact level of 105 per day (Shelby and Heberlein 1986). This exceeds the standard even for undeveloped recreation experiences (0-4.2), and helps to explain why people viewed the river as one of the most crowded areas we have studied (See Shelby, Vaske, and Heberlein 1989, for a review).

The Klamath River (California)

Shelby and Stein (1984) examined encounter norms for summer season floaters and winter season salmon anglers on the Klamath River in northern California. This study used a slightly different methodology in that visitors were asked to give their encounter norm for the Klamath, and then asked what kind of experience they thought the river currently offered. For summer floaters who defined the current experience on the Klamath as semi-wilderness, the norm for encounters with other parties was 3 per day. For summer floaters who defined the current experience as undeveloped recreation, the norm was 2.5 per day. Salmon angling during the winter season was a substantially different experience with different norms. Among anglers fishing from the bank, the norm for parties floating by on the river was 6.5 per
day. The norm for anglers seen along the river bank was 25 per day.

Waimakariri and Rakaia Rivers (New Zealand)

Martinson and Shelby (1991) contrasted encounter and proximity norms for salmon anglers on the Waimakariri and Rakaia Rivers to those on the Klamath River. Encounter norms were determined using the procedures developed previously for the Grand Canyon public meetings. Proximity norms were assessed by asking anglers on the New Zealand rivers to indicate the minimum distance they would tolerate between themselves and other anglers. Response categories included, "shoulder to shoulder," "one rod length (3 meters)," "two to four rod lengths (6 to 12 meters)," "casting range (12 to 30 meters)," and "makes no difference."

The shapes of the encounter norms for these settings suggested single tolerance and multiple tolerance norms. A single tolerance norm exists when users show similar agreement at impact levels greater than zero, while a multiple tolerance norm exists when two or more groups of users have different standards for acceptable impact levels (Whittaker and Shelby 1988).

The Klamath and upper Rakaia were characterized by a single tolerance norm (fig. 4). The majority of anglers reported standards greater than zero, with tolerance dropping off beyond the levels represented by peaks in the graphs. The lower Rakaia and Waimakariri were characterized by a multiple tolerance norm (fig. 5), with less norm intensity (a flatter distribution) and low norm crystallization (less group agreement). Between 15 and 20 percent of the anglers would tolerate only a few encounters. As encounters increase, the percent who would tolerate each level drops somewhat. The curve turns upward at the highest impact level where 14 percent (Waimakariri) and 22 percent (lower Rakaia) are willing to tolerate over 50 encounters.

The lower tolerance limits for contacts on the upper Rakaia is perhaps due to the relatively remote, undeveloped setting and traditionally low use levels. The greater tolerance limits on the lower Rakaia and Waimakariri, probably reflects the more developed settings as well as the anglers' realistic expectations of use levels at these sites. If visitors expect higher encounter levels, they are more likely to tolerate higher encounter levels (Shelby and Heberlein 1986). This again suggests that encounters are less important in high density fishing situations. In these situations, management efforts aimed at reducing conflicts or environmental degradation may be more appropriate.

Managing for low encounter levels is likely to be more important for other types of fishing experiences (e.g., trout fishing), where the anglers seek a relatively solitary experience (Heberlein and Vaske 1977, Harris and Bergersen 1985).

Similar to prior research (Vaske et al., 1986; Kuss et al., 1990), norms for encounters were affected by the type of group encountered. On the Klamath River, anglers had a significantly lower tolerance for encounters with boaters (0-5) than with bank anglers (0-13). Bank anglers felt boaters were disturbing the fish, and as a result were reducing the fishing quality at the site.

Data on the proximity norms indicated that the acceptable distance from others appears to be 6 to 12 meters. Generalizing this preferred proximity standard to other situations, however, is difficult because fishing closer to others was commonly
tolerated. Thus, norms for proximities may not be as well defined as norms for encounters, though individuals may have fairly clear norms defining personal territory. Hendee, Stankey, and Lucas (1977), for example, found a strong sense of territoriality within groups of backcountry anglers, and reported that while 80 percent fished within 20 feet of companions, two thirds remained 100 feet or more from strangers. The proximity standard appears to be somewhat more restrictive in a less developed setting.

The New River (West Virginia)

A study of floaters on the New River in West Virginia was reported by Williams, Roggenbuck, and Bange (1991). The paper addresses the question of whether differences between norms and reported encounters affect evaluations of social conditions and the quality of recreation experiences. Results indicated that those whose reported encounter levels were incompatible with (greater than) their norm were less likely to receive the kind of trip they expected. They were more likely to say they saw too many other people, were disturbed by the number they saw, and took some action to avoid encounters with other boats. There was no effect of compatibility on overall satisfaction.

This paper makes a good case for management standards based on norms. Norm-impact compatibility had a greater effect on specific evaluations (e.g., the number of people seen), and less effect on general evaluations (e.g., overall satisfaction). The authors reiterate earlier arguments (e.g., Shelby and Heberlein 1986; Williams 1989; Kuss et al., 1990) that overall satisfaction is probably not a useful criterion for these kinds of management decisions.

A second paper using the same data set from the New River in West Virginia asked two questions: 1) Do recreation users have norms, and 2) Do they agree about norms? (Roggenbuck, Williams, Bange, and Dean 1991). Following Shelby (1981), respondents were asked about three different types of trips on the New River: wilderness whitewater, scenic whitewater, and social recreation. For each type of trip, respondents were asked to give norms for the number of other boats seen on the river, percent of time in sight of other boats, and number of rapids where it was acceptable to wait in line before running. Response choices were "makes no difference," "makes a difference but can't give a number," or to give a number.

In response to the question about the existence of norms, Roggenbuck et al., found that a large percentage of New River floaters did not specify a number: 12-58 percent said "makes no difference," 13-34 percent said "makes a difference but can't give a number," and 29-66 percent gave a number. There was, however, considerable variation across the type of experience and the type of norm. Boaters were more likely to specify a norm (and less likely to say "makes no difference") for the experiences closer to the wilderness end of the spectrum. The proportion of respondents who gave a norm for wilderness was 50-66 percent, while 45-55 percent gave one for scenic whitewater, and 29-37 percent gave one for social recreation. They were also more likely to specify a norm for waiting at rapids than for number of encounters or time in sight.

The data from the Grand Canyon, Rogue and Illinois River revealed a similar pattern (Shelby 1981). The percent of respondents in the "don't know" category was consistently low for a wilderness experience, higher for the semi-wilderness and still higher for undeveloped recreation. For all categories, however, the percent of respondents in the "don't know" category for the three western rivers was considerably lower than in the New River study.

In response to the question about consensus, Roggenbuck et al., presented means, medians, seventy-fifth percentiles, standard deviations, and coefficients of variation. The authors then compared agreement levels across experience types. Although the standard deviations consistently increased from wilderness to scenic to social recreation, coefficients of variation stayed the same or trended in the opposite direction, leading the authors to conclude that "we see little compelling evidence for norms that are more crystallized for law density or wilderness experiences" (Roggenbuck et al., 1991). While this interpretation deviates from the one offered for the three western rivers, their findings support the notion of less crystallization for higher density situations.

The New River is a day use river, with use levels reaching an average of over 1,000 persons per day on summer weekends. Use on the Rogue River is limited to 120 per day, and averaged 65 people per day during the season (Memorial through Labor Day) when the study was conducted. Use on the Colorado River in Grand Canyon was limited to 150 people per day during the time of the study, and averaged about 75 per day during the season (April through September). Use on the Illinois River is not recorded by the managing agency, but during the time of the study averaged less than 10 people per day. Taken together, these differences in use levels suggest that the New River does not offer a wilderness experience.
comparable to the wilderness experiences provided on
the western rivers.

The Appalachian Trail (North Carolina - Tennessee)

A study of backpackers on the Appalachian Trail
(Patterson and Hammitt 1990), asked the following
question: When personal norms for encounters in
backcountry are exceeded, what is the effect on the
user's experience? Users who reported more
encounters than their norm and who indicated that the
number of encounters detracted from their experience
were classified by the researchers as the "congruent"
group (32% of the sample). Those whose norms were
exceeded but for whom the encounters did not detract
were the "incongruent" group (51% of the sample)..
The remaining group did not have their norms
exceeded. For the congruent group, the norms
tolerance for encounters) were lower, agreement
crystallization) was greater, and solitude was more
important. These appear to be the people who were
seeking a wilderness experience, and encounter
impacts are important for them in defining that
experience.

Because many respondents fell into the "incongruent"
group, this paper raises questions about the
importance of encounter impacts. We have argued
here and elsewhere (Shelby 1981, Shelby and Vaske
1991) that encounter norms are more crystallized for
lower density experiences, which suggests that
encounters are a more important impact for
experiences closer to the true wilderness/low density
end of the spectrum. The Appalachian Trail offers
relatively high density backcountry, particularly in
areas around shelters where this study was done, so it
seems likely that encounters were a less important
impact in that setting.

Encounter Norms - Summary

The results summarized here suggest several general
conclusions regarding backcountry encounter norms.
First, a number of specific types of norms can be
identified. Encounter norms exist for particular types
of contacts with certain types of visitors at particular
places and for certain types of experiences. It is also
apparent that recreationists have norms for acceptable
distances between individuals, encounters with others
at campsites or attractions, and waiting times to run a
rapids. The empirical evidence has recognized this
diversity by becoming increasingly specific in the types
of norms measured.

Second, individuals are capable and willing to specify
their norms when asked.

Third, Jackson's model and the various
methodological approaches summarized here provide
a basis for quantifying where and to what extent
different subpopulations of recreationists share the
same normative standards.

Fourth, although encounter norms vary for different
activities and different areas, there is some consistency
in the norms for certain types of experiences. For
example, norms for encounters during a wilderness
experience tend to be quite low (about 4 or fewer
encounters in most cases).

ECOLOGICAL NORMS

Mt. Jefferson Wilderness (Oregon)

The Mt. Jefferson study represents an attempt to build
on the encounter norm literature by extending the
model to user evaluations of ecological impacts at
wilderness campsites (Shelby and Harris 1985; Shelby,
Vaske, and Harris 1988). Two ecological impacts
(area of bare ground - in square feet; and outside
diameter of fire rings - in inches) were examined.
Respondents were asked to evaluate each impact
(bare ground or fire ring) using a five-point scale
ranging from totally unacceptable to totally acceptable
with a neutral point at zero. User standards were
developed by computing a group mean for each site
(each site represented a different level of impact).
These mean ratings were then plotted, producing
impact acceptability curves for bare ground and fire
rings.

The impact acceptability curves for fire rings (fig. 6)
and bare ground (fig. 7) revealed three interesting
findings common to both types of impacts. First,
small amounts of impact were rated more acceptable
than no impact at all. Small fire rings were rated
more acceptable than no fire ring, and small areas of
bare ground were more acceptable than no bare
ground. Second, acceptable impact levels appear to
be different at different locations. Larger fire rings
were acceptable at Russell Lake, and larger bare
ground areas were acceptable at Scout Lake; both
these lakes are closer to main trails and receive
greater use. Third, the norms were of moderate to
high intensity, with average ratings generally well
above or below the neutral line.

There are at least two possible explanations for the
low to moderate impacts being rated higher than the
no impact condition. On one hand, some respondents
may have felt that camping should be done at pre-existing sites, which are defined by areas of bare ground and evidence of previous campfires. A camp with no impact would thus be seen as undesirable because use would cause unacceptable change. On the other hand, users may identify camps by the evidence of previous use (bare ground and fire rings), and these impacts, at least in moderation, actually increase the utility or desirability of camps. Other studies examining the physical characteristics of campsites have shown that site impacts are not a major influence on the choice of camps (Zuckert 1980, Frissell and Duncan 1965, Merriam and Smith 1974, Echelberger and Moeller 1977). These studies suggest that from the visitors' perspective, managers should not make major commitments of resources to remove or prevent signs of low to moderate impact, at least in heavily used camp areas.

The amount of agreement about these normative standards can be thought of as the percentage of respondents who rated a particular impact as either acceptable or unacceptable (figs. 8 and 9). For 17 of the 20 sites studied, more than 70 percent agreed about the acceptability or unacceptability of impact, and agreement exceeded 84 percent at 10 of the 20 sites. The normative approach clearly indicates a degree of user support which should serve well as one of the components of management decisions.

In a related study, Shelby and Shindler (1990) compared the ecological impact standards held by outdoor activity clubs, environmental organizations, and resource managers. Fire ring impact acceptability curves for these groups are shown in figure 10. For Sierra Club members and managers, acceptability dropped as levels of impact increased. In contrast, the curve for hunters and horse riders depicted no fire ring as unacceptable, and the moderate and heavy rings as increasingly acceptable; the curve declined to just below the neutral line for the largest fire ring. The scouts and hikers reported near-neutral ratings for all but the severe impact level, which they rated somewhat unacceptable.

The norm curves for bare ground impacts were also shaped differently (fig. 11). Again, the Sierra Club and managers had downward-sloping curves, where acceptability declined as impacts increase. The combined curve for hunters, horse riders and scouts (outdoor activity group curve), sloped downward from no impact to minimal impact, but then moved upward to greater acceptability as the amount of bare ground increased. On average, most of the bare ground impacts were rated as acceptable (above the neutral line). All three curves were at or above the midline through the moderate impact level.

These findings again suggest that impacts such as bare ground and fire rings actually attract users to campsites. When the respondents were asked if they preferred a site with a previously established area, most (80% for bare ground; 60% for the fire ring) said "yes." Among those who answered "yes" to either question, 92 percent said they preferred a site where these changes had already occurred so that their presence would create no additional impact, while 71 percent said these features help identify the site. It appears that these impacts may be detractors when they are at severe levels, while at moderate levels they are simply neutral. At low levels the presence of impacts may be an attractor.

It also appears that the managers' standards differ from those of most user groups; 67 percent of the
possible impact comparisons showed disagreement. Managers were least likely to prefer a site with an established area of bare ground (49%) or an existing fire ring (53%). The activity and environmental groups, however, may not be as different as the literature suggests (Dennis and Zube 1988, Lunch 1987). Data for all bare ground impacts indicated 65 percent agreement between the groups. Additional questions on site preferences showed similar agreement: 64 percent of the Sierra Club members preferred sites with existing bare ground, compared to 80 percent of the members of activity groups; 53 percent of the Sierra Club members preferred an existing fire ring, compared to 64 percent of activity group members.

The Dolores River (Colorado)

The normative model has also been applied to evaluations of acceptable instream flows for recreation activities on the Dolores river in Colorado (Shelby and Whittaker 1990). This study was conducted as part of a larger instream flow needs assessment undertaken by the Bureau of Land Management. Experienced users were asked to evaluate the flow levels which provided minimum or optimum opportunities for recreation.

The impact acceptability curves indicated that different hydrologic flow regimes have different effects for different types of recreational craft (fig. 12). Minimum canoer flow needs were significantly less than those for rafters or kayakers (200 cfs versus...
800-1000 cfs, respectively). The curve for canoers indicated that flow rates in excess of 2500 cfs were rated just as negatively as too little flow. When the flow is too high, safety becomes an issue for open canoes, while too little flow hinders floatability. For the rafters and kayakers, higher flows were consistently rated positively. The ideal or optimum flows were roughly 700 cfs for whitewater open canoeing, 2000 for rafts, and 3000 cfs for kayakers.

Finally, the flow levels typically required to support fishery needs appeared to be below those needed for minimum floatability, and well below those needed to provide minimum or optimum whitewater opportunities. On the Dolores, fishery needs were estimated at roughly 50 to 125 cfs, depending on the season. This is not enough to provide even the minimum flow required for open canoe trips.

On a dammed river with a finite amount of water available, providing the higher flow or more optimum opportunities can mean very short seasons. Managers could provide for longer canoe seasons or shorter rafting and kayaking seasons. Determining acceptable instream flows in these situations implies choosing between competing recreation opportunities. This implies that managers need to make judgments about the type of opportunity they are trying to provide before developing an instream flow protection strategy. If there are several different types of craft using the river, balancing competing needs can become difficult.

Statewide Moose Hunt (New Hampshire)

Conceptually, the analytical approach described here applies equally to normative evaluations of wildlife management practices. Norms regarding the acceptability of a proposed moose hunt in New Hampshire have been reported by Vaske and Donnelly (1988). New Hampshire had not had a moose hunting season since the early 1900's, but in recent years the population has successfully been re-established. The state's Fish and Game Department proposed a hunting season for the fall of 1988. Data showing the norms held by different groups of New Hampshire residents (conservation groups, hunters and the general public) for the proposed hunt were used to empirically illustrate the application of the model to wildlife management.

Individuals rated their overall reactions to re-introducing the controlled moose hunt on a four-point scale ranging from "strongly disapprove" to "strongly approve." Tolerances for acceptable statewide harvest limits were indicated by having respondents complete the sentence: It would be OK to take ___ moose during a season. Additional questions examined respondents norms regarding an acceptable season length, a fair price for a resident moose license, and the percentage of licenses that should be allowed for non-residents.

Although the different publics varied in their level of support, a majority of each group were favorable to the hunt (60% — general public, 51% — conservation groups, 83% - hunters). Hunters favored a higher harvest limit than the other two publics, although their norm was consistent with the limit proposed by the state's Fish and Game Department. Norms for season length varied statistically between the hunters and the other two groups, with hunters specifying a slightly longer season. The norms, however, were again within the range suggested by Fish and Game. A similar pattern of findings emerged for the three publics' norms for a fair price of a moose hunting license. The norms for percentage of non-resident licenses did not vary significantly among the three groups and were consistent with the Fish and Game proposal.

The hunters showed more consensus for approval of the proposed hunt, the cost of a hunting license and the percentage of non-resident licenses, while the conservation groups were more crystallized with regard to bag limits and length of season. The least amount of agreement was found among members of the general public.
using the techniques initially adopted for encounter norms. To date, normative evaluations for ecological impacts have been examined for the amount of bare ground and the size of fire rings in campgrounds, the level of instream flows required for recreation activities, and the perceived acceptability of wildlife management practices. In each of these investigations, the users had opinions about ecological impacts and were willing to express them. Virtually all respondents avoided the neutral response category and took a position in evaluating impacts. In addition, norms were of moderate to high intensity, with average ratings generally well above or below the neutral line.

DIFFERENT IMPACTS - DIFFERENT NORMS

As suggested throughout this paper, individuals hold different norms for different types of impacts. Our discussion has examined these norms for social (number of encounters on a trail or river, camp encounters, proximity to others, waiting times to run a rapids) and ecological (amount of bare ground, size of fire rings, instream flows, wildlife management practices) impacts. Conceptually, both social and ecological norms can be categorized into one of three types (no tolerance, single tolerance, and multiple tolerance).

A recent paper by Whittaker and Shelby (1988) identified all three types of norms in a study of boaters on the Deschutes River in Oregon. The standard for human waste represented a no tolerance norm (fig. 13). Eighty percent of the respondents reported it never acceptable to see signs of human waste. Other norms which fit the no tolerance type included discourteous behavior and jet boat encounters for non-jet boaters.

In general, no tolerance norms are characterized by a mode at zero impact, high intensity, and high crystallization. On the Deschutes River there was little variation in the responses for the no tolerance norms on different segments of the river, and one would expect little variation for different resources. These impacts appear to be unacceptable under most circumstances.

The time in sight of others (river encounters) appeared to represent a single tolerance norm on the Deschutes (fig. 13). Almost all visitors (99%) reported standards greater than zero, but were willing to tolerate few impacts beyond a certain level (two hours out of four in sight of others). Other impacts which fit the single tolerance norm type included jet boat encounters for jet boaters, launch waiting times, angling disturbances, fishing competition, camp sharing, and camp competition.

A single tolerance norm can generally be characterized by a mode at some impact greater than zero, with a sharp decline in the percentage of respondents reporting tolerances for impacts greater than the modal level. In contrast with the no tolerance norm, single tolerance norms vary between resources or even within areas of the same resource. On the Deschutes, tolerances for encounters with others were different for different segments of the river. Tolerances for this type of impact were generally higher for segments with higher levels of development and use.

The standards for fire ring impacts illustrated a multiple tolerance norm on the Deschutes (fig. 13). Forty percent of the respondents favored a standard at zero impact, and the percentage reporting higher tolerances declined for the next three impacts. The curve turned upward, however, at the highest impact level where 17 percent would tolerate a fire ring at every campsite. Because the distribution is essentially bimodal, there appears to be two groups with different norms for this impact. It makes little sense in these situations to talk about an average or median representing consensus.

The characteristics of each of these norm types have different implications for developing management standards. Because no tolerance norms show agreement among a majority of users, they provide a clear basis for managers to set a standard at no impact. For single tolerance norms where users show agreement at impact levels greater than zero, a strategy is needed for identifying an acceptable standard. Most of the investigations examined
throughout this paper used the median response as the standard, however, other measures of central tendency (e.g., means, the mode) can and have been reported (See Shelby and Vaske 1991 for a review of the trade-offs). With a multiple tolerance norm where two or more groups of users have different standards for acceptable impact levels, developing a credible standard becomes even more complex, and measures of central tendency are clearly misleading. Because different user groups envision different experiences, developing a standard may mean choosing among them, or zoning the resource to provide different experiences.

CONCLUSION

Taken together, the papers summarized here raise several general issues about norms, standards, and their place in resource planning, decision making, and management. Current frameworks for resource management (e.g., LAC, C-CAP, and VIM) require managers to specify standards for the conditions they aim to provide. The goal is to offer high quality recreation opportunities. A number of different sources can be used by managers in developing these standards, including legal and administrative mandates, agency policy, historical precedents, interest group politics, and user or public opinion. Research information about norms is thus one useful component of a more informed decision environment.

Much of the normative work in resource management has grown out of the Jackson (1965) approach, although it is clear that both the scope of applications and the specific techniques for measuring, analyzing, and representing the data have evolved considerably. Included among these modifications are: changes in measures to reduce respondent burden and allow consideration of larger numbers of issues, use of different analytic techniques and descriptive statistics, development of graphic schemes for representing norms and amounts of agreement, and expansion of the overall focus from norms for individual behavior to norms for a variety of social, managerial, and resource setting characteristics. The model is appealing because it is straightforward and moves from the individual to the aggregate level in a way which is empirical and traceable. It also provides a basis for discussing important properties of norms.

The usefulness of normative approaches lies in their ability to characterize group agreement about appropriate use conditions or impact levels for a particular recreation experience, thus providing the evaluative information needed to establish management standards. Managers are increasingly turning to researchers for help in developing these standards, and normative approaches have great potential to put the issue on an empirical basis.

REFERENCES


Shelby, B.; Shindler, B. 1990. Interest group norms for ecological impacts at wilderness campsites. Paper presented at the third conference on social science and natural resources; [date unknown]; [year unknown]. College Station, TX.


MEASURING BACKCOUNTRY STANDARDS IN VISITOR SURVEYS

Maureen P. Donnelly, Jerry J. Vaske, and Bo Shelby

ABSTRACT: This paper reviews a sample of survey questions that have been used to develop standards for backcountry settings. The survey items were drawn from existing recreation impact research conducted in terrestrial and water based environments by both university and agency based investigators. Measures of both the descriptive and evaluative components needed for establishing standards are presented. Because the impact of encounters (a descriptive impact) can vary according to where and when the contact occurs, separate measures for these spatial and temporal differences are illustrated. Concepts such as satisfaction, perceived crowding, and norms used to examine the evaluative component have to some extent been standardized, however, differences in question wording and response format are apparent. Sometimes they are measured with multiple items, sometimes with single items, and the response alternatives vary from study to study even when the same measure is used. While no attempt is made to standardize these stylistic differences, the use of standardized measures would clearly enhance comparisons among alternative settings and activities. We urge other investigators to review these questions and adopt them when appropriate so that the data base of existing knowledge can be expanded.

Maureen P. Donnelly, at the time of this conference, was Assistant Professor, University of New Hampshire, Durham, presently she is Assistant Professor, Dept. of Recreation Resources and Landscape Architecture, Colorado State University, Fort Collins. Jerry Vaske, at the time of this conference, was Assistant Professor, University of New Hampshire, Durham, presently he is Associate Professor, Dept. of Recreation Resources and Landscape Architecture, Colorado State University, Fort Collins. Bo Shelby is a Professor, Dept. of Forest Resources, Oregon State University, Corvallis.
INTRODUCTION

Attempts to develop evaluative standards for social and ecological impacts in backcountry settings have utilized a variety of survey measures. The tables in this paper present a sampling of these survey items. Our listing is not intended to provide an exhaustive presentation of all possible measures. Rather, the goal here is to highlight the range of alternative formats researchers have used in attempts to develop evaluative standards.

The survey items were drawn from existing research in wilderness and/or backcountry. Some are concerned with the impacts that occur in terrestrial settings (e.g., trails, campgrounds), and other questions are directed at water based environments (e.g., lakes, rivers). Because the surveys were obtained from numerous university and agency researchers across the United States, question wording reflects the format and style preferences of the investigator. No attempt is made to standardize stylistic differences. Items were selected to portray a range of question wording and response formats. In some cases, researchers have opted for close-ended responses where individuals simply check the appropriate space, while other investigators have used open-ended items where respondents provide their own estimate.

Following previous work demonstrating that both descriptive and evaluative judgments are necessary to establish standards (Shelby and Heberlein 1986; Kuss, Graefe, and Vaske 1990), examples of both types are presented. The descriptive component is concerned with observable characteristics of a recreation system. Table 1 shows examples of items measuring reported encounters with other recreationists (a descriptive impact). Encounters can occur at different locations/times such as at a (railhead (beginning of the trip), while the person is on the trail or in the campsite. The impact of encounters has been shown to vary according to where the contact occurs. Consequently, separate measures for these spatial and temporal differences should be included in the survey.

Determining an acceptable level of any impact parameter (encounters with others, perceived ecological impacts) requires a value judgment that the impact exceeds some standard (Shelby and Heberlein 1986). In general, attempts to incorporate the evaluative component have utilized three approaches: visitor satisfaction, perceived crowding, and normative evaluations.

Visitor Satisfaction

The initial efforts to develop standards concentrated on single (table 2) and multiple (table 3) item measures of satisfaction. The single item satisfaction measure shown first in table 2 has been used extensively. A review article comparing the responses from hunters/anglers and nonconsumptive recreationists (e.g., boaters, hikers, etc.) on this item was published in 1982 (Vaske, Donnelly, Heberlein, and Shelby 1982). At that time, data were presented from 12 different studies across the United States. The activities examined ranged from hunting and fishing in Maryland and Wisconsin to hiking in New Hampshire and whitewater rafting in Arizona and Oregon. Although the consumptive users reported significantly lower satisfaction scores than did the nonconsumptive recreationists, few differences were noted among the different types of nonconsumptive users. In 10 of the 11 surveys of nonconsumptive recreation populations, better than 60 percent indicated that their experience was excellent or perfect. Given this lack of variance, and the fact that the studies were conducted in areas where visitor densities varied substantially, this single item satisfaction measure should not be used for developing evaluative standards.

Recognizing that satisfaction from a recreation experience can be influenced by numerous indicators (table 3), other researchers have developed multiple item satisfaction scales (Hendee 1974; Decker, Brown, and Gutierrez 1980; Ditton, Graefe, and Fedler 1981; Vaske, Fedler, and Graefe 1986; Hammitt, McDonald, and Patterson 1990). This research generally supports the concept of multiple satisfactions with social, psychological, and environmental influences each contributing to individuals’ evaluations of an experience. Although the multiple item approach results in a better measure of satisfaction and has improved our understanding of the concept, problems still remain. For example, to develop standards, a decision regarding an acceptable level of visitor satisfaction is still necessary (Vaske, Donnelly, and Williamson 1991).

Perceived Crowding

Perceived crowding combines descriptive information (the density or encounter level experienced by the individual) with evaluative information (the individual’s negative evaluation of that density or encounter level). When people evaluate an area as
Table I—Examples of reported encounter measures

About how many hiking parties do you remember seeing when you were on the trail. I saw ...

- no hiking parties
- 1 hiking parties
- 2 hiking parties
- 3 hiking parties
- 4 hiking parties
- 5 hiking parties
- 6-10 hiking parties
- 11-15 hiking parties
- 16-20 hiking parties
- more than 20 hiking parties

About how many boats per hour float by the area where you usually fish?

- 1-3 boats
- 4-6 boats
- 7-10 boats
- 11-20 boats
- 21-60 boats
- more than 60 boats
- I don't know

On an average Chetco fishing trip, about how many motorized boats are within sight of you at any one time?

There are about __ motorized boats within sight at any one time.

On a usual Upper Klamath trip, about how much time are you in sight of another boating party?

- almost never
- about 1 hour out of every 4
- about 2 hours out of every 4
- about 3 hours out of every 4
- almost all of the time
- don't know

While you were floating the river, about what percent of the time were you in sight of watercraft from other groups?

- % of the time

While on the river, did you ever have to wait in line at the beginning of a rapid to permit another river group to go through the rapids?

- no
- yes, If yes, about how many times did you have to wait? ___ times

If you camp on the Upper Klamath, how many other parties are usually camped within sight/sound of your campsite?

- other parties
- I don't camp on Upper Klamath trips
Table 2—Examples of satisfaction measures (single item format)

Overall, how would you rate this trip to the Brule River last summer?

___ Fair, it just didn't work out very well  
___ Good, but I wish a number of things could have been better  
___ Very good, but could have been better  
___ Excellent, only minor problems

___ Perfect

Did you feel the number of parties that you encountered:

___ Added greatly to your experience?  
___ Added a little to your experience?  
___ Neither added or detracted from your experience?  
___ Detracted a little from your experience?  
___ Detracted greatly from your experience?

Did you feel the size of the parties that you encountered:

___ Added greatly to your experience?  
___ Added a little to your experience?  
___ Neither added or detracted from your experience?  
___ Detracted a little from your experience?  
___ Detracted greatly from your experience?

Do the actions of other river users (boaters, anglers, etc.) ever detract from your own enjoyment of a boating trip?

___ Yes
___ No

*How often* is your enjoyment of an Upper Klamath boat trip diminished by the actions of others?

___ rarely  
___ sometimes (once or twice a day)  
___ often (more than twice a day)

We are interested in finding out how you feel about the number and kinds of parties you encounter in the wilderness. Please indicate on the following page what percentage of full satisfaction you would experience for each of the situations described (for example, the situation that is completely satisfactory for you would be scored 100%; any of the situations below that would be totally unsatisfactory for you, would be scored 0%. It is possible, however, that in your opinion the least satisfactory situations would still provide you with some enjoyment and you might score them anywhere between 0% and 100%).
Situation A: Meeting average-sized backpacking parties (and no other kinds of parties) on a three-day trip.

% of full satisfaction

Meeting no other parties of any kind in three days ___
Meeting one backpacking party in three days ___
Meeting three backpacking parties in three days ___
Meeting six backpacking parties in three days ___
Meeting nine backpacking parties in three days ___
Meeting fifteen backpacking parties in three days ___
Meeting thirty backpacking parties in three days ___
Meeting sixty backpacking parties in three days ___

Situation B: Meeting average-sized horseback parties on a three-day trip.

Situation C: Meeting large parties (at least a dozen people) on the trail on a three-day trip.

Situation D: Camping within sight or sound of an average-sized backpacking

Situation E: Having the following number of average-sized hiking groups (3 or 4 persons/group) walk through your campsite.

Table 3—Examples of satisfaction measures (multiple item format)

<table>
<thead>
<tr>
<th>Scale 1 River floaters (Cronbach alpha = .70)</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I thoroughly enjoyed the trip</td>
<td>1  2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>I cannot imagine a better river trip</td>
<td>1  2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>I do not want to run any more rivers like this one</td>
<td>1  2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>I was disappointed with some aspects of my trip</td>
<td>1  2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>The river trip was well worth the money I spent to take it</td>
<td>1  2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Scale 2 Waterfowl hunters (Cronbach alpha = .79)

<table>
<thead>
<tr>
<th>Scale 2 Waterfowl hunters (Cronbach alpha = .79)</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I thoroughly enjoyed the hunting trip</td>
<td>1  2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>The hunting trip was not as enjoyable as I expected it to be</td>
<td>1  2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>I cannot imagine a better hunting trip</td>
<td>1  2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>I do not want to go on any more hunting trips like this one</td>
<td>1  2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>I was disappointed with some aspects of the hunting trip</td>
<td>1  2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>The hunting trip was well worth the money I spent to take it</td>
<td>1  2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Scale 3 Deer hunters (Cronbach alpha = .79)

<table>
<thead>
<tr>
<th>Scale 3 Deer hunters (Cronbach alpha = .79)</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I was very satisfied with my hunting visit</td>
<td>1  2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>The hunting visit was well worth the money I spent to take it</td>
<td>1  2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>The hunting visit was not as enjoyable as I expected it to be</td>
<td>1  2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
crowded, they have at least implicitly compared the impact they experienced with their perception of the standard (a personal or social norm, or both).

The first crowding measure shown in table 4 has been used by numerous investigators to measure crowding in a wide variety of situations. Activities that have been studied include: hunting, fishing, rafting, canoeing, tubing, motor boating, rock climbing, backpacking, day hiking, sailing, photography, and driving for pleasure. The areas studied also show considerable diversity, with some showing extremely high density and use impact problems, others showing low densities and no problems, and still others actively utilizing management strategies to control densities and use impacts. These study areas were located in Alaska, Arizona, California, Maryland, Michigan, Minnesota, New Hampshire, New Zealand, Oregon, Pennsylvania, West Virginia, and Wisconsin. The investigators collecting the data also varied considerably, including theoretical academic researchers, applied researchers in both public agencies and private consulting firms, graduate students, and undergraduate students. To date, over 17,000 individuals have completed this item. This diversity of applications suggests that researchers have found this single item measure of crowding to be universally useful. A recent paper by Shelby, Vaske, and Heberlein (1989) summarizes the studies that have used this item, and illustrates how the findings may be used to suggest standards for backcountry settings.

Perceptions of crowding and evaluations of a backcountry experience (satisfaction) are influenced by the visitor’s expectations and preferences (Shelby, Heberlein, Vaske, and Alfano 1983). Items measuring expectations and preferences for encounters are shown in tables 5 and 6, respectively. Including these types of items in a survey facilitates one’s understanding of recreationists’ reactions to varying density levels, and provides preliminary data necessary for the establishment of standards.

Normative Evaluations

Efforts to understand the impacts resulting from visitors in recreation settings have increasingly turned to normative explanations. Normative information makes a vital contribution to the evaluative component. At a general level, it is necessary to decide what type of experience is to be provided. For example, should the area be managed to provide opportunities for a wilderness experience or something else. At a more specific level, norms are evaluative standards which define the important aspects of a particular recreation experience. Tables 7 and 8 illustrate the range of approaches researchers have adopted to explore questions of specific social norms. Table 7 presents a repetitive item format that has been used to calculate the structural properties of recreationists’ personal and social norms (Vaske, Shelby, Graefe, and Heberlein 1986). Table 8 provides examples of single item questions that have been used to achieve the same objective (Shelby 1981; Patterson and Hammitt 1990; Roggenbuck, Williams, Bange, and Dean 1991; Williams, Roggenbuck, and Bange, 1991; Young, Williams, and Roggenbuck 1991). A summary of the pros and cons of both approaches (i.e., repetitive item versus single item format) can be found in Shelby (1981).

More recently, researchers have broadened the scope of normative evaluations to include measures of ecological impacts (Shelby, Vaske, and Harris 1988; Whittaker and Shelby 1988). Examples of this type of survey item are presented in table 9.

In conclusion, this paper has tried to provide an overview summary of the alternative questions and response formats researchers have used to assess backcountry and wilderness standards. Items measuring both the descriptive and evaluative components necessary for developing standards have been presented. We urge other investigators to review these questions and adopt them when appropriate so that the data base of existing knowledge can be expanded.
Table 4—Examples of crowding measures

Did you feel the river was crowded today?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crowded</td>
<td>Crowded</td>
<td>Crowded</td>
<td>Crowded</td>
</tr>
</tbody>
</table>

I felt:
- there were too many canoeists
- there were too many tubers
- there were too many fishermen

If you feel crowded on a wilderness trip, how does it affect you? (check all answers that apply)
- I have never felt crowded in the wilderness.
- I accept the fact of a more crowded experience.
- I try to avoid other campers whenever practical.
- I decide to make future visits at a time when I can expect to see fewer people.
- I decide to go to a more remote area next time.

Overall, how did you feel about the amount of uses while floating the river?
- Not congested
- Saw lots of people, but not enough to bother me
- Congested enough to bother me
- Very congested, but I did not mind
- Very congested; unacceptable for my float trip

Table 5—Examples of expectation measures

Did you expect to see ___ more ___ about the same ___ or fewer canoeists than you saw today?

Overall, how many people did you expect to see during your trip?
- Less than you actually saw
- About as many as you saw
- More than you saw
- Didn't know what to expect

How many parties per day did you expect to see while floating on the River?
- none ___ 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ 6 to 10 ___ 11 to 20

Before you arrived on the island, how many camping parties did you expect to see? I expected ___
- no camping parties
- 1 ___ ___ 6-10 camping parties
- 2 ___ ___ 11-15 ___ ___
- 3 ___ ___ 16-20 ___ ___
- more than 20 camping parties
- I didn't know what to expect

For the entire trip, about how many encounters with other parties did you expect?
Number of encounters
### Table 6-Examples of preference measures

About how many hikers do you prefer to see per day, when you are hiking in a wilderness area?

<table>
<thead>
<tr>
<th>Preference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>6-10 hikers</td>
</tr>
<tr>
<td>1 hiker</td>
<td>11-15 &quot;</td>
</tr>
<tr>
<td>2 hikers</td>
<td>16-20 &quot;</td>
</tr>
<tr>
<td>3 &quot;</td>
<td>more than 20 hikers</td>
</tr>
<tr>
<td>4-5&quot;</td>
<td></td>
</tr>
</tbody>
</table>

How many motorized boats would you prefer to see at any one time?

I prefer [ ] motorized boats within sight at any one time.

[ ] makes no difference to me

If you had a choice, would you prefer a campsite:

[ ] On the same beach as another party
[ ] Where you might be able to see or hear another party
[ ] Out of sight and hearing of others

Assuming that you will see some other people while traveling in the wilderness, which of the following situations would you prefer:

Seeing one large party of 30 people during the day or ten parties of three people each, spaced through the day?

[ ] One large party
[ ] Ten small parties
[ ] Makes no difference

Seeing one large party of 30 people over a week-long trip and no one else the rest of the week or three or four small parties every day for a week-long trip?

[ ] One large party
[ ] Three or four small parties
[ ] Makes no difference

If you had to choose, which would you rather see in a day?

[ ] 3 large parties (20-40 persons each) and no one else
[ ] 6 small parties (10-20 persons each) and no one else

Seeing a lot of people within the first mile or so from where the trail takes off from the road and no one else the rest of the trip or several other parties in the area where I expect to camp?

[ ] On the trail
[ ] Near my campsite
[ ] Makes no difference

How often would you prefer to encounter another party while hiking in a wilderness area?

I would prefer to see another party about every:

[ ] 15 minutes or less
[ ] 3 to 5 hours
[ ] half hour
[ ] 6 to 8 hours
[ ] hour
[ ] I prefer to see no one
[ ] 2 hours
[ ] I have no preferences

When you are at your campsite, how often should you be able to see other parties?

[ ] not at all
[ ] occasional glimpses
[ ] fairly regularly

constantly in sight

[ ] makes no difference
Table 7—Examples of social norm measures (repetitive item format)

The questions are divided into 3 sections. The first section refers to Fishermen, the second to Canoers and the last section refers to Tubers. Please answer all 3 sections. A party would include from 1 or 2 up to 5 people.

\[
\begin{align*}
VU &= \text{Very Unpleasant} \\
u &= \text{Unpleasant} \\
N &= \text{Neutral (Do not care either way)} \\
p &= \text{Pleasant} \\
VP &= \text{Very Pleasant} \\
\end{align*}
\]

Section I.

What would be your feelings about seeing no other parties each day, neither Fishermen, Canoers nor Tubers? 

<table>
<thead>
<tr>
<th></th>
<th>VU</th>
<th>u</th>
<th>N</th>
<th>p</th>
<th>VP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Fisherman each day?</td>
<td>VU</td>
<td>u</td>
<td>N</td>
<td>p</td>
<td>VP</td>
</tr>
<tr>
<td>toward seeing 2 Fishermen each day?</td>
<td>VU</td>
<td>u</td>
<td>N</td>
<td>p</td>
<td>VP</td>
</tr>
<tr>
<td>toward seeing 3 Fishermen each day?</td>
<td>VU</td>
<td>u</td>
<td>N</td>
<td>p</td>
<td>VP</td>
</tr>
<tr>
<td>toward seeing 5 Fishermen each day?</td>
<td>VU</td>
<td>u</td>
<td>N</td>
<td>p</td>
<td>VP</td>
</tr>
<tr>
<td>toward seeing 7 Fishermen each day?</td>
<td>VU</td>
<td>u</td>
<td>N</td>
<td>p</td>
<td>VP</td>
</tr>
<tr>
<td>toward seeing 9 Fishermen each day?</td>
<td>VU</td>
<td>u</td>
<td>N</td>
<td>p</td>
<td>VP</td>
</tr>
<tr>
<td>toward seeing 15 Fishermen each day?</td>
<td>VU</td>
<td>u</td>
<td>N</td>
<td>p</td>
<td>VP</td>
</tr>
<tr>
<td>toward seeing 20 Fishermen each day?</td>
<td>VU</td>
<td>u</td>
<td>N</td>
<td>p</td>
<td>VP</td>
</tr>
<tr>
<td>toward seeing 25 Fishermen each day?</td>
<td>VU</td>
<td>u</td>
<td>N</td>
<td>p</td>
<td>VP</td>
</tr>
</tbody>
</table>

Table 8—Examples of social norm measures (single item format)

What is an acceptable number of motorized boats to have within sight of you at any one time? Please indicate the highest number you will tolerate before the fishing experience becomes unpleasant.

It is OK for _ _ motorized boats to be within sight at any one time.

_ _ makes no difference to me

It is OK to be in sight of other parties as many as...

_ _ hour(s) out of four when boating this section.

_ _ it doesn't matter to me.

It is OK to see jetboats as many as...

_ _ time(s) per day on this section.

_ _ it doesn't matter to me.

It is OK to wait as long as...

_ _ minute(s) for other boaters before I can use a put-in or take-out area.

_ _ it doesn't matter to me.

It is OK to spend as many as...

_ _ night(s) out of four within sight or sound of another party on this section.

_ _ it doesn't matter to me.
Table 8—continued

It is OK to be in sight of other parties...

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Almost never</td>
<td>About one hour out of four</td>
<td>About two hours out of four</td>
<td>About three hours out of four</td>
<td>Almost all the time</td>
</tr>
<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Almost all the time</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>It doesn't matter to me</td>
</tr>
</tbody>
</table>

It is OK to wait to use a launch or take-out area as many as...

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>minute(s)</td>
<td>It doesn't matter to me</td>
</tr>
</tbody>
</table>

What is the highest number of groups you would tolerate before it would no longer be a wilderness experience? (Fill in one number for each statement)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Number of parties</th>
<th>Size of parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum number of parties within sight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum number of parties within sound</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum number of parties within sight and sound</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum number within 25 feet of you</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In your opinion, about what is the maximum number of parties and size of parties that you could tolerate before solitude reaches unsatisfactory levels?

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of parties</th>
<th>Size of parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>At trailhead?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At campsite?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Along trail?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you feel there should be a limit on the size of horseback parties, what is the maximum number of horses that should be permitted for one party? Circle one

| Horses | 2 | 4 | 6 | 8 | 10 | 12 | 15 | 20 | 25 | 30 | 40 | 50 | 75 | 100 | 150 | 200 | 300 | 400 | 500 |
|--------|---|---|---|---|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|
|        | 2 | 4 | 6 | 8 | 10 | 12 | 15 | 20 | 25 | 30 | 40 | 50 | 75 | 100 | 150 | 200 | 300 | 400 | 500 |

How often would you be willing to pass up a good campsite?

1. Rarely or never
2. About 25 percent of the time
3. About 50 percent of the time
4. About 75 percent of the time
5. Almost every time
6. This impact doesn't matter to me

How far should another campsite be from yours? Please specify the minimum acceptable distance, (check one)

<table>
<thead>
<tr>
<th>Distance</th>
<th>10-25 feet</th>
<th>26-50 feet</th>
<th>51-75 feet</th>
<th>76-100 feet</th>
<th>more than 100 feet</th>
<th>makes no difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-25 feet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26-50 feet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51-75 feet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>76-100 feet</td>
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<tr>
<td>more than 100 feet</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>makes no difference</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

The following section asks you to think of the "Rogue River experience" in three different ways, and your answers may vary from one to another. At the end you can indicate which kind of place you think the Rogue should be.
I. Imagine the Rogue as a "wilderness", a place generally unaffected by the presence of man. If the Rogue were this kind of area, which of the following encounter levels would be appropriate? Indicate the highest level you would tolerate before the trip would no longer be a "wilderness experience".

Number of encounters with other parties while floating on the river each day.
   OK to have as many as ___ encounters per day.
   ___ makes no difference to me.

Amount of time in sight of other parties while floating on the river each day.
   OK to spend as much as ___ hours and ___ minutes in sight of others.
   ___ makes no difference to me.

Number of stops (to hike, swim, etc.) at which you meet another group.
   OK to meet others at as many as ___ out of 5 stops.
   ___ makes no difference to me.

Chances of meeting 5-20 people (outside your own group) at places like Howard Creek, Tate Creek, or Zane Grey's cabin.
   OK to have ___ % chance of meeting others.
   ___ makes no difference to me.

Number of nights spent camping within sight of another party.
   OK to be near others as many as ___ out of 5 nights.
   ___ makes no difference to me.

Now imagine the Rogue as a "semi-wilderness", the kind of place where complete solitude is not expected. In this case, which of the following encounter levels would be appropriate? Indicate the highest level you would tolerate before the trip would no longer be a "semi-wilderness experience".

Now imagine the Rogue as an "undeveloped recreation area", the kind of place where a natural setting is provided but meeting other people is part of the experience. In this case, which encounter levels would be appropriate? Indicate the point at which there would be too many people for even this kind of "undeveloped recreation experience".

Of the three kinds of experiences described above, which do you think the Rogue River trip currently provides (circle one)?
   ___ wilderness
   ___ semi-wilderness
   ___ undeveloped recreation

Of the three kinds of experiences described above, which do you think the Rogue River trip should provide (circle one)?
   ___ wilderness
   ___ semi-wilderness
   ___ undeveloped recreation

Which of the following kinds of experience do you think the Alsek-Takshenshini river trip should be managed for?
   ___ It is likely that no other parties will be encountered
   ___ It is likely that other parties will be encountered occasionally
   ___ It is likely that about one other party will be encountered per day
   ___ It is likely that two or three other parties will be encountered per day
   ___ It is likely that more than three other parties will be encountered per day
We would now like to explore your specific evaluations of wilderness conditions in the Cohutta wilderness. Different people desire different things from wilderness and managers need to know what things you find acceptable and what things you find unacceptable. Managers can use this information to enhance your wilderness experience.

For each characteristic below we want you to make three types of judgments:

a. Is there a range of values along the scale provided that is completely unacceptable? If so please indicate the unacceptable range by drawing a line above it as shown in the example.

b. Is there a range of values that would also be acceptable? If so please indicate with a line below the scale as shown in the example.

c. Is there a point on this scale that is most preferred? If so please indicate by placing an x on that point as shown in the example.

PLEASE REMEMBER: NOT DRAWING A LINE OR PLACING AN X IS OKAY BUT THIS MEANS YOU ARE EITHER UNCERTAIN OR DON'T CARE ABOUT THAT ITEM.

EXAMPLE

The percent of time I spend travelling on old roads in the wilderness.

<table>
<thead>
<tr>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1 1 X 1 1 1 1 1 1</td>
</tr>
<tr>
<td>0 10 20 30 40 50 60 70 80 90 100</td>
</tr>
</tbody>
</table>

Acceptable

In this example this person prefers to travel on old roads 30% of the time but 0 to 40% is acceptable; travelling on old roads more than 60% of the time is unacceptable; this person is uncertain about the acceptability between 40 and 60% and therefore the acceptable and unacceptable lines do not meet.

A. The number of groups of hikers I see along the trails in a day.

| 1 1 1 1 1 1 1 |
| 0 5 10 15 20 25 |

The number of horse groups that travel past my campsite while I am there.
The percent of trees around a campsite that have been damaged by people.
The number of pieces of litter I can see from my campsite.
The percent of time I spend travelling on old roads in the wilderness.
The number of wild animals I see in a day.

The New River Gorge National River is 52 miles long and various sections of the river could be managed for different experiences. We would like your help in making this important decision. We are asking you to think of the New River trip experience in three different ways, and then to tell us what would be an appropriate amount of use for each kind of experience. These questions are similar to some you've already answered, but the information is important.

Imagine the New River trip as a "wilderness whitewater trip", a trip through a scenic gorge with little evidence of man, many opportunities for solitude, and a chance for challenge and for you to battle the waves. If the New River was this kind of area, which of the following encounter levels would be acceptable? Indicate the highest level you would accept before the trip would no longer be a wilderness experience.
1. Contacts with boats (Check A or B below)
   A. ___ Makes no difference to me how many boats I see on a wilderness trip.
   B. ___ Does make a difference to me how many boats I see on a wilderness trip.
   What number would be acceptable? (Mark I or II below)
   I. Would accept ___ boats per day on my wilderness trip.
   II. ___ Number of boats I see on a wilderness trip does make a difference, but I don't feel I can suggest an acceptable number.

2. Percent of time in sight of other boats (Check A or B below)
   A. ___ Makes no difference to me what percent of time other boats are in sight on a wilderness trip.
   B. ___ Does make a difference to me what percent of time other boats are in sight on a wilderness trip.
   What percent would be acceptable? (Mark I or II below)
   I. Would accept boats in sight ___% of the time on my wilderness trip.
   II. ___ Percent of time boats are in sight on a wilderness trip does make a difference to me, but I don't feel I can suggest an acceptable percent.

3. Waiting at rapids (Check A or B below)
   A. ___ Makes no difference to me how many rapids I wait in line to run on a wilderness trip.
   B. ___ Does make a difference to me how many rapids I wait in line to run on a wilderness trip.
   What number would be acceptable? (Mark I or II below)
   I. Would accept waiting in line at ___ rapids on my wilderness trip.
   II. ___ Number of rapids I wait in line for on a wilderness trip does make a difference to me, but I don't feel I can suggest an acceptable number.

Now imagine the New River trip as a "scenic whitewater trip", a trip through a scenic gorge with some evidence of man, fewer opportunities for solitude, and guidance when running wild rapids. If the New River was this kind of area, which of the following encounter levels would be acceptable? Indicate the highest level you would accept before the trip would no longer be a scenic trip.

Now imagine the New River trip as a "social recreation trip", a trip on a scenic river with much evidence of man, exciting rapids, and seeing other people on the river making the trip more fun. If the New River was this kind of area, which of the following encounter levels would be acceptable? Indicate the highest level you would accept before there would be too many people for even this kind of social recreation trip.

Table 9-Examples of ecological norm measures

In this section you will be shown a series of slides of wilderness campsites. Please evaluate each site using the ratings listed below. Please respond to the specific question asked at the beginning of each section. Be sure to circle your response for the corresponding site number.

Focus your attention on the amount of bare ground at this site. How acceptable is the amount of bare ground on a scale from 1 = totally acceptable to 5 = totally unacceptable?

Site #1

1. Totally acceptable
2. Somewhat acceptable
3. Neutral
Now focus your attention on the size and appearance of the fire ring at this site. How acceptable is the fire ring on a scale from 1 = totally acceptable to 5 = totally unacceptable?

Site #11

<table>
<thead>
<tr>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totally acceptable</td>
</tr>
<tr>
<td>Somewhat acceptable</td>
</tr>
<tr>
<td>Neutral</td>
</tr>
<tr>
<td>Somewhat unacceptable</td>
</tr>
<tr>
<td>Totally unacceptable</td>
</tr>
</tbody>
</table>

It is OK to notice fire rings at as many as...

___ camp(s) out of four on this section.
___ it doesn't matter to me.

How often would you be willing to see substantial amounts of litter?

1. Rarely or never
2. At about 25 percent of the places I stop
3. At about 50 percent of the places I stop
4. At about 75 percent of the places I stop
5. At almost every place I stop
6. This impact doesn't matter to me

REFERENCES


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Vaske, JJ.; Fedler, AJ.; Graefe, A.R. 1986. Multiple determinants of satisfaction form a specific waterfowl hunting trip. Leisure Sciences. 8: 149-166.


COUNTERING THE LAW OF DIMINISHING STANDARDS

Bruce Shindler

ABSTRACT: The need for formal standards has long been recognized in wilderness management, but when these standards are slow to develop management is often relegated to the existing informal standards set by visitors and conditions that come with them. The difficulty with informal standards is that they are undefined, inconsistent, and changeable. Without mitigating action, quality control is reduced to a matter of accepting whatever evolves. A likely outcome is the long term deterioration of popular recreation settings, suggesting a "law of diminishing standards" is at work. Management's ability to stem resource decline is influenced by more than just the need to protect ecosystems; visitor access and planning systems set in a political framework are also major factors. This paper discusses the influence these factors have on wilderness quality and the implications of managing without formal standards. Key aspects of responsive planning systems are outlined.

INTRODUCTION

In his essay on the preservation of natural ecosystems, N.L. Christensen (1988) identifies four questions facing resource managers: (1) What should be preserved? (2) How much should be preserved? (3) In what state should preserves be maintained? (4) By what means should natural ecosystems be maintained? In the ease of the nation's more than 90 million acres of designated Wilderness, legislation has essentially answered the "what" and "how much" part of the preservation equation. But Congress has left the specifics of "in what state" and "by what means" to the managing agencies.

Bruce Shindler, Doctoral Candidate and Faculty Research Assistant, Dept. of Forest Resources, Oregon State University, Corvallis, OR.
Christensen’s optimal solution of “let it be” is problematic when the same laws also guarantee public access to wilderness. Over time, many popular sites have become substantially impacted by recreation use. Although we might like to do so, it is inappropriate to simply assign problems of environmental deterioration to high visitation levels. Crowding and resource impacts also occur at developed recreation sites, but managers routinely establish management objectives and use facility standards to bring these problems under control. Yet, these same management tools have not successfully been employed to implement standards for environmental conditions in wilderness (Hendee et al., 1978; GAO 1989).

For the most part, the backcountry has been allowed to evolve under informal “standards” that are based on whatever use or behavior is deemed acceptable by recreationists. This situation permits visitors who are willing to accept greater impact levels to dictate conditions, forcing others to eventually accept the resulting lower standards or go someplace else (Vaske et al., 1980). Over decades of use, many backcountry sites have been subject to a succession of diminishing standards in resource quality. The purpose of this paper is to reaffirm the role of formalized standards in wilderness management systems through problem identification, an examination of resource standards, and a discussion of suitable management responses.

THE PROBLEM

Wilderness designations are made for sites having special and unique qualities. Problems arise when we do not have management systems in place to determine whether these areas are maintained at levels that continue to meet wilderness criteria. Adding to the complexity of the managerial task is the need to manage these sites as forest-human ecosystems. Resource professionals must infuse human values into forest plans, and very often the views of diverse constituencies are involved.

Resource management frameworks have been developed in recent years to assist with visitor impact management and capacity determinations (see Stankey et al., 1985; Shelby and Heberlein 1986; Graefe et al., 1987). Each system emphasizes the need to measure human caused impacts, develop acceptable standards, and select among alternative management strategies. Thus far, concerns exist over the success of such frameworks in achieving on-the-ground results (Stankey and McCool 1989). In order to protect precious resources and accommodate public uses, agency managers must integrate a range of views into management action. This requires meshing ecological and social carrying capacity with legal and political influences (Stankey and McCool 1984).

When an "all things considered" approach is taken, solutions specific to environmental deterioration may be compromised. Certainly, the recent emphasis on integrating social perspectives with the preservation of wildland ecosystems is prudent; scientific processes are ultimately affected by norms, values, and ethical concerns (Rolston 1988). And no doubt there is a time and place for resource trade-offs in order to reach publicly supportable decisions. But the management pendulum should not be allowed to swing too far toward the social preferences end of the spectrum at the expense of the natural resource. Too much emphasis on political process may obscure the importance of standards for environmental quality. We cannot make informed value judgments without some discernible criteria to base them on.

MANAGEMENT OBJECTIVES AND RESOURCE STANDARDS

The need to establish management objectives that clearly define satisfactory levels of quality was identified in early research on wildland carrying capacity (Wagar 1964, Frissell and Stankey 1972). Researchers generally agree that this fundamental principle is the critical step in determining acceptable levels of resource change. Stankey and McCool (1989) called management objectives “operating rules” that allow us to define what is acceptable and what is not.

Part of setting management objectives is establishing standards which delineate the specific environmental conditions to be maintained or achieved. Common examples include the amount of exposed mineral soil at campsites, coliform counts in lakes and streams, and the number and size of social trails in a defined area. Objectives without any degree of specificity, such as "maintain natural conditions," may be easy to agree on but are difficult for managers and the user public to interpret (Stankey and McCool 1989). Standards not only act as targets for achieving levels of quality, they serve as performance criteria for judging the effectiveness of management programs (Shelby and Heberlein 1986). A failure to formalize standards suggests management objectives will be little more than hollow statements which provide insufficient direction.

The need for evaluative criteria was not lost on lawmakers. The National Forest Management Act (P.L. 94-588, 1976) requires preparation of guidelines for land management plans which "insure research on
and evaluation of the effects of each management system (based on continuous monitoring and assessment in the field) to the end that it will not produce substantial and permanent impairment of the productivity of the land.” Not only does the NFMA mandate the development of minimum standards for wilderness, the U.S. Forest Service has provided management objectives for wilderness in its agency manual (USDA Forest Service 1986). But wildland managers have had difficulty in fulfilling these requirements and backcountry quality has suffered.

Lack of Planning

In their seminal work *Wilderness Management*, Hendee et al. (1978) pointed out that most national forest plans of the 1970s lacked objectives which stated preferred wilderness conditions. The plans also failed to provide methods to measure existing conditions. Five years later, Washburne and Cole (1983) reported on a survey of wilderness managers which found that planning practices had not significantly improved. Forest visitors were generally allowed unencumbered freedom within the backcountry, and steps were taken to improve conditions only when substantial damage and loss of solitude had occurred.

In a subsequent review of issues facing wilderness managers, Lucas et al. (1985) were surprised so few resource plans had been implemented considering the growing number of problems. They also found that when effective techniques for mitigating impacts were developed, these were rarely communicated to other management units. More recently, a General Accounting Office survey (1989) of wilderness employees reported that the majority of wilderness designations were without monitoring systems and that programs to manage changing conditions had not been implemented. While reporting on these inadequacies, the same studies indicated that one of management’s major concerns during these two decades was the proliferation of environmental impacts.

Two Management Approaches

The failure to implement effective management plans appears to be the result of two different approaches taken by those responsible for wilderness. One method was the absence of management, designation of a wilderness area was enough. At these locations a wildland set-aside was interpreted to mean that management was unnecessary (Hendee et al., 1978). For many, the non-management option was a legitimate approach; meeting the intent of wilderness legislation meant providing opportunities for visitor solitude without the intrusion of management presence. This approach resulted in areas being left largely untended, with managers responding only when major conflict or problems occurred (Washburne and Cole 1983).

The second method was a more direct attempt at managing the resource, but there were problems here as well. Backcountry managers had been handed an ambitious set of legislated guidelines which often seemed in conflict with one another. Managers were directed to retain pristine conditions, provide access to a wide range of users, and allow certain nonconforming uses. In addition, setting objectives required resource inventories and establishing baseline data, but managers were faced with questions about which things should be monitored, how often, and to what degree. Unfortunately, adequate knowledge of wildland ecosystems had not been developed, and funding levels limited research capabilities (Cole 1983).

Finally, as the recreational use of wilderness grew and concerns for the resource increased, managers found they not only had to set objectives and monitor conditions, they also had to negotiate about types and levels of use. With more decisions being made in public arenas, managing wilderness had become a political as much as a technical process (Stankey et al. 1984). Over the years, whether management responsibilities were abdicated or attempted, the outcome was very nearly the same: few effective management plans have been implemented.

EVOLUTION OF STANDARDS

Informal Standards

The absence of well developed management plans for wilderness implies that no standards for environmental conditions are present in these areas. This is not the case. Standards exist in any recreation setting, whether they are articulated or not. This is particularly evident at dispersed sites where limited management activity is the general rule. Informal standards for resource and social impacts in wilderness are set by the users themselves, based on their continued use and acceptance of the sites they select.

Research suggests visitors continue to use popular sites even when they become substantially impacted (Shelby and Shindler 1992). They are popular because of other attractor attributes (good scenery, fishing, or camping) which serve to offset resource impacts.
When high-use sites reflecting substantial ecological and social impacts continue to be used, it follows that the impacted conditions become the accepted standard. The debate whether the original users are displaced and it may not be the same visitors returning to these sites is mute. Even if user succession-displacement is in progress (see Schreyer 1979), continued visitor use implies acceptance of site conditions. That these individuals may be less discriminating visitors than those who preceded them, only gives credence to a diminishing standards argument.

This view of standards may be contrary to the idea of standards being explicit and measurable products of some prescriptive judgment. But unless there is a mechanism in place to define desired conditions, and test results against expectations, informal standards determined by the users is what we end up with. Informal standards for acceptable conditions develop and ultimately evolve to the lowest allowable level, fostering a situation which may be described as the "law of diminishing standards."

Drucker (1985) indicated the problem of informal standards is a common one for both private industry and public service agencies. He observed that in the absence of management principles which establish, communicate, and systematically monitor standards, organizations must accept random outcomes. In a controlled workplace, diminishing outputs are avoided by establishing policies and performance guidelines. Production standards maintain a level of quality on manufactured goods and safety procedures maintain a clean, healthy working environment. In less organized settings, however, informal standards more easily evolve. Common examples include the drop-off in production when equipment is not maintained or when inadequately supervised facilities show signs of wear and tear.

In even less organized settings, such as wilderness, neglect can have long-lasting effects. Deterioration at popular sites results from seasons of over use and remains when no mitigating action is taken. This reduction in the quality of conditions becomes the standard when, over time, it is accepted by those involved. Drucker (1985) concluded that in such unmanaged environments, the result accepted yesterday inadvertently becomes today's policy.

**Formal Standards**

In contrast, formal standards are explicit and require specific management action. Behavioral scientists note that true standards involve three basic criteria: objectivity, measurability, and evaluation (McGregor 1960). Objectivity indicates standards must be defined and articulated. Measurability requires that standards have some criteria for assessing success or failure, and evaluation involves monitoring tangible results that can be seen and compared to standards. The formal establishment of standards has several real advantages. It forces communication, causes a validation process, and leads to a common standard for identifiable conditions.

To help establish these resource standards, critical evaluation of objective data obtained through scientific research is required. Formal standards for environmental conditions may then become yardsticks for determining how much is too much (Shelby and Heberlein 1986). Likely questions include how much bare ground at a campsite, how many trails and to what extent should they be developed, or how close to lake shorelines should people camp? Armed with this kind of information, we are better prepared to address the question Stankey and McCool (1989) suggest is more suitable to the carrying capacity issue: what are the desired resource and social conditions? By necessity, resource decisions involve value judgments on the part of managers, but when judgments are based on explicit and quantitative information they tend to result in better management objectives.

By collecting and examining data through an established procedure, the aggregate biological and social suitability of proposed standards can be assessed. The standard setting process then becomes one that is logical, traceable and open to public review (Stankey et al., 1985). These steps allow managers to determine if standards will be accepted by the public as realistic and legitimate, important criteria for gaining support from affected users.

**RESPONSIVE PLANNING SYSTEMS**

Wilderness quality has diminished substantially at many locations, affecting not only natural ecosystems, but the scope of recreation available. Without management action, the opportunities provided will continue to shift to the more heavily impacted, higher density end of the recreation opportunity spectrum (Shelby et al., 1988). A responsive planning system uses management objectives as the basic framework for defining preferred environmental conditions and recreation opportunities (Stankey and McCool 1989). The potency of an objective planning system relies heavily on the incorporation of three primary components: (1) integrating scientific input, (2) effective use of public involvement, and (3)
encouraging managerial judgment (Stankey 1980). Each element suggests implications for management.

Better Science

The first managerial task may well be to get the science end of the program caught up with the political forces. Thus far, the relationship between recreational uses and resource impact is complex and not well understood (Stankey and Mc Cool 1989). With an improved understanding of wilderness ecosystems, managers will be in a better position to consider a range of alternatives expressed by their broad constituency.

That the planning function be based on empirical observations is critical. Along with ecosystem data, research must focus on resource opportunities, visitor use patterns, and the tendency of users to adapt to a decline in environmental conditions. We seem to be well established in the latter areas; the last three decades have brought a wealth of information on human use patterns in recreation settings (see Manning 1986 for a partial coverage). Yet, we are still noticeably short on long-term physical-biological data. Magnuson (1990) argued that operating in this "invisible present" leads us to underestimate the degree of change in our ecosystems. Because we are unable directly to sense slow changes in environmental settings, we have difficulty interpreting their cause-and-effect relationship. Unless we can view the resource over time, misjudgments will occur in our attempts to predict change and manage the resource.

Long-term ecological research seems essential and is a view shared by resource managers. Practicing foresters in the Northeast United States recently identified and prioritized 46 topics in need of research; 8 of the first 11 ranked items were concerned with forest deterioration (Broderick et al., 1991). The second most important topic overall was the need to develop management strategies for reducing forest decline. The third ranking item was an interest in human-influenced causal factors. Managers realize compiling data bases and establishing monitoring systems may be difficult at current budget levels. But guidelines for setting standards are available (e.g., Cole 1987, Merigliano 1990) and successful programs are underway in some locations. These steps are necessary if well supported programs are to evolve; resource plans built on management objectives and standards for performance are inherently more successful in the budget process. The reality is that solid support for conserving natural ecosystems exists whenever the issues can be clearly depicted (Davis 1990; Steel et al., 1992).

Involving the Public

The second course of action urges a more realistic approach to public involvement in the planning system. Historically, managers and their recreation clientele have been out of sync with their resource attitudes. Recent studies (e.g., Vining and Ebreo 1991, Shelby and Shindler 1992) reflect little change from early research comparing the views of resource managers with resource users (e.g., Hendee and Pyle 1971, Downing and Clark 1979).

The need to close this communication gap clearly exists. A frequent complaint from affected publics is that management agencies only go through the motions of gathering user input. Whitelaw and Niemi (1990) suggest as much in describing U.S. Forest Service planners as "benevolent administrators" who have not always played the part of good listeners, nor given substantial credence to constituent concerns. The job of soliciting public opinion is most effective when viewed not as an unavoidable requirement, but instead treated as a critical and delicate component of the planning system. But while the public's opinion is important, it does not mean that one dissenter should be able to bog down the process completely. The process provides a forum for a variety of opinions, broadening the input beyond one or two loud voices, and brings public (and agency) viewpoints closer together. Skillfully conducted, public participation may help diffuse traditional adversarial relationships and help produce consensus-based, functional decisions for management standards.

Meaningful participation, not just token involvement, is important to the backcountry constituency. Unless the public understands what is being proposed and has had the opportunity to provide meaningful input, the overall planning system is unlikely to succeed (Stankey et al., 1984). When people participate in what they view as a legitimate planning process, legitimacy is transferred to the resulting policies. Thus empowered, management can implement even controversial decisions.

Leadership

With public participation comes a need for strong leadership. It is important that we have a system which encourages the managerial role. This role has been cast as one in which resource managers are
operating in "a microcosm of the political marketplace" (Stankey et al., 1986). It requires individuals who not only have technical skills, but also possess "political competence that ensures understanding of the various interest groups and their beliefs, values, and motives." In more direct terms, managers must employ exceptional abilities and insights to negotiate appropriate outcomes. Clearly, their task seems herculean and ought to be acknowledged as such. In doing so, we may be moved to provide sufficient training and support for them to operate in the political marketplace.

The skills necessary to evaluate social needs and incorporate user views into successful recreation strategies have not commonly been present in traditional professional forester ranks. The recreation staff of the U.S. Forest Service recognized this problem and has set out to solve it. Three years of self-examination resulted in an internal report (USDA Forest Service 1991) recommending establishment of a professional recreation manager series within the agency. It was determined that today's complex recreation resource issues requires individuals who are educated in behavioral science and recreation management and possess a background in natural resource conservation and planning techniques. These are skills not normally found in employees who have come up through the ranks in the forester or the technician professional series.

The non-action of the past must be exchanged for an improved advocacy-oriented management. Backcountry managers are justifiably concerned that visitor acceptance of resource impacts, particularly at popular sites, can make gaining support for formal standards more difficult. To users, improving conditions often means site closures or limiting access. But managers are professionally bound to represent the resource's natural integrity as well as its continued accessibility. Assertive professional judgments with attendant risk factors will be necessary; we cannot afford to wait until definitive scientific answers about wilderness ecosystems are fully developed. Management responsibilities include promoting environmental quality and educating the public on wilderness preservation values. Professional recreation managers with an interdisciplinary approach will be best suited to interpret policy directives and integrate public preferences into meaningful resource standards.

Effort is Continuous

Management solutions for declining resource conditions is a continuous struggle. The task includes implementing systems to evaluate objective ecological and social science data, then translating this information into formal resource standards which reflect existing social values. Simply setting formal standards, however, is not sufficient. Standards alone do not ensure conditions will be maintained, management strategies must also specify appropriate methods to actually achieve the desired conditions (Stankey et al., 1985) and include sanctions for non-compliance. Moreover, even well designed programs must be re-evaluated periodically. Management plans that are not monitored and evaluated will outlive their usefulness (Drucker 1985); they become more damaging than no system at all because they engender a false sense of security that the resource is being protected.

Lapses in our planning systems can mean that changes in conditions go undetected and problems unresolved. In essence, the system would be back to operating under informal standards. Until formal standards permanently replace informal ones, the law of diminishing standards implies that those with the greatest tolerance for impacts will dictate conditions, and managers will continue to have difficulty maintaining environmental quality.

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STANDARDS FOR MANAGING NON-WILDERNESS RECREATION AREAS

Mark Brunson and Don Rodriguez

ABSTRACT: Techniques used for developing and applying standards for wilderness can and should be adapted for use in non-wilderness recreation settings. This paper examines some central issues pertaining to non-wilderness standards, focusing especially on the undeveloped, dispersed recreation settings which tend to characterize the middle of the Recreation Opportunity Spectrum (ROS). Features which may distinguish non-wilderness standards from wilderness standards are discussed, as are some of the legislative, administrative, and informational factors which may impede the development of non-wilderness standards. Despite these impediments, existing tools such as the Limits of Acceptable Change (LAC) process may be easily fit to standard-setting for non-wilderness recreation resources. A key feature of these efforts must be participation by all affected user groups, including those which may not be easily reached through traditional visitor contact methods.

INTRODUCTION

During the quarter-century since passage of the Wilderness Act, considerable effort has gone into creating management standards for the quality of wilderness settings. Less attention has been given to standards for non-wilderness settings, even though the latter are used much more heavily by recreationists. Other contributors to this proceedings describe how much has been learned about developing and implementing wilderness management standards. In this paper, we will consider how knowledge acquired
in wilderness can be adapted for non-wilderness management.

In some cases, the technology transfer from wilderness to non-wilderness may be accomplished quite easily; in others, it may be necessary to first discard biocentric biases which are built into many wilderness standards. Legislative or institutional barriers may complicate the task. Even so, 25 years of wilderness management research provides a head start which can only help make the job much easier.

Several factors contribute to the growing need to develop management standards for non-wilderness recreation areas. Standards for both wilderness and non-wilderness recreation lands are needed to guide monitoring programs required under national forest planning legislation. Congress increasingly has required federal agencies to maintain or enhance recreation quality in non-wilderness areas, although the mandates written into the newer bills are rarely as forceful as the language of the Wilderness Act. The condition of non-wilderness settings can also affect experiences in adjacent wildernesses, as wildland ecosystems invariably cross designated wilderness boundaries.

Our focus in this paper is on the undeveloped settings which tend to characterize the middle range of the Recreation Opportunity Spectrum (Clark and Stankey 1979). Although we agree that standards are no less important for developed settings, two factors directed our attention toward dispersed-recreation areas. First, evidence suggests that much of the recent growth in outdoor recreation is occurring in undeveloped settings. The number of recreation visitor-days recorded on federal lands grew by 2.4 percent between 1978 and 1986 (Betz and Cordell 1989), yet use of developed fee sites outside the national parks actually fell by 17 percent during that period. And while use of the federal wilderness system is growing, most of that growth can be attributed to expansion of the system itself (Lucas and Stankey 1989).

Second, federal recreation programs have tended to direct manpower and financial resources toward developed facilities or wilderness, while the quality of dispersed recreation has been left somewhat to chance. Recreationists in dispersed settings often report being attracted to such settings because of a lack of regimentation and control associated with areas having a more visible management presence (Clark et al., 1984). Yet without some management attention, quality is more likely to decline. Standards can be used to help forestall such decline.

What Is a Non-wilderness Standard?

A "standard" can be defined as a measurable aspect of the physical, social, or managerial setting which serves as an indicator of the quality which must be maintained to preserve values that include, but need not be limited to, outdoor recreation. Certain characteristics of wilderness standards will be equally applicable to non-wilderness settings, but there may also be features unique to non-wilderness.

Common features include several outlined by Stankey et al. (1985). A standard must be more than an idealistic goal; i.e., a condition that managers feel can be achieved over a reasonable period of time. Standards should be stringent enough to be meaningful, but not so stringent that they cannot be attained. They should be set using a judgmental process by which managers must choose a proper measure of resource quality and then faithfully use that measure to guide management practices. Rather than routinely reflecting existing conditions, they may be written to require modification toward a more natural state or - especially in non-wilderness - may allow for greater change than has presently occurred.

When developing standards for non-wilderness areas which may cover a wide range of experience opportunities, a logical gradation of conditions should be followed as one moves across the ROS spectrum. This "stab-casing" of standards insures that the character of the area will not drift below acceptable levels and protects against a "homogenizing effect" on the quality and diversity of the resource, recreation opportunities, and other human uses (Haas et al., 1987). On occasion, a standard might be shared by two or more opportunity classes; however, it is not necessary that if two classes share a standard for one indicator, they cannot have different standards for another indicator.

A unique feature of non-wilderness standards is that they may sometimes be bounded at both ends of the spectrum; i.e., they may have limits which not only prevent the setting from becoming too badly disturbed, but also from not being disturbed enough. For example, users of a dispersed camping area in the Roaded Natural ROS class may define their limits of acceptable change such that campsite access roads should not be improved beyond a primitive standard, but at the same time should not be allowed to deteriorate so as to be impassible. Non-wilderness standards may occasionally be more restrictive than wilderness standards; e.g., directional signs are acceptable in wilderness if made of native materials in subdued colors, while users of dispersed camping areas may believe no sign is acceptable because signs
may attract so many new users that the carrying capacity of an undeveloped setting is easily exceeded.

DIFFICULTIES OF CREATING NON-WILDERNESS STANDARDS

Vague or Conflicting Legislative Mandates

The need for wilderness standards is underscored by the legislative mandate contained in the Wilderness Act of 1964, which requires managers to ensure that the land is preserved and protected so as to be left "unimpaired" for its future use and enjoyment as wilderness. Concern about the Forest Service's ability to provide such protection has led to new emphasis from Congress on management standards (General Accounting Office, 1989). Recreational quality has increasingly been mandated in laws governing non-wilderness lands as well, but the bills sometimes fail to clearly define the values and qualities that must be maintained.

The only agency with a basic legislative mandate to maintain recreational qualities of its lands is the National Park Service. Such a mandate is implied for the Forest Service by the National Forest Management Act (NFMA), which calls for comprehensive planning and subsequent monitoring to protect recreation along with other primary outputs of the national forests. The Bureau of Land Management is required under the Federal Land Policy and Management Act (FLPMA) to "provide for outdoor recreation and human occupancy and use," but the law doesn't include recreation on its list of values to be protected.

Further legislative impetus for developing non-wilderness standards can be found in various special-designation bills enacted in the past 15 years. The Wild and Scenic Rivers Act requires agencies to "protect and enhance" the values that led to inclusion in the river system. Recreation is usually one of those values. Similarly, bills establishing national recreation areas have contained specific language stating that recreation quality must be maintained or enhanced. However, since these areas are the product of separate legislation, written and introduced by different members of Congress for different purposes, there may be differences in the kinds of recreation values which are to be protected.

For example, lawmakers hoping to address the needs of a broad range of constituents sometimes include non-wilderness recreation area designations in omnibus wilderness bills. Where the legislative intent was to provide primitive or semi-primitive non-wilderness recreation, as in the White Rocks (Vermont) and Hells Canyon (Idaho-Oregon) national recreation areas, wilderness standards may be easily applied with only slight revisions. In other places, however, standards may be subject to constraints unlike those in wilderness management.

Chief among these constraints is the need to provide for motorized recreation or other activities which may be considered detrimental to recreation quality by some users. The California Desert Conservation Act specifically requires that the BLM manage for off-road recreational vehicle use. Similarly, the needs of snowmobilers were recognized in the act establishing the Mount Baker (Wash.) Recreation Area. In the Arapaho National Recreation Area (Colo.), provision is made for mining, timber harvest, and grazing activities where it will not "substantially impair the purposes for which the recreation area is established."

Another potentially contradictory feature of some of these bills is language that requires not only protection of recreation values, but also improvement. The enabling legislation for the Arapaho NRA calls for the "conservation and development of the scenic, natural, historic, and pastoral values of the area" (italics added). Similarly, managers of the Winding Stair Mountain NRA in Oklahoma must "ensure the conservation and protection of certain natural, scenic, historic, pastoral and fish and wildlife values and ... provide for the enhancement of the recreation values associated therewith ...." Unfortunately, enhancement of some values can detract from others; for example, it may be difficult to improve fishing access without adversely affecting natural or scenic values.

Other Difficulties

Legislative ambiguity is not the only impediment to creation of non-wilderness management standards. A more basic problem, especially for undeveloped settings, may be a general lack of attention. Shifting management focus to these areas would affect the allocation of fiscal and manpower resources within the overall recreation program. Management of both fee sites and wilderness tends to be labor-intensive, requiring on-site presence of agency personnel and, at the high-development end of the ROS, capital expenditures. Studies by the General Accounting Office (1989a, 1989b) have suggested a need for increased expenditures to address wilderness deterioration problems and trail construction backlogs. In an era when large budget deficits are likely to force serious federal belt-tightening, it is unclear where new
funds could be found to address needs in undeveloped non-wilderness settings.

Another barrier to development of non-wilderness standards is the relative lack of baseline information about dispersed recreation settings and the recreationists who use them. This situation is unlikely to change dramatically as long as management emphasis and research funding priorities continue to focus on wilderness areas or on settings which have the best tourism promotion potential. Still, considerable progress has been made in studying the preferences of dispersed forest recreationists in the Pacific Northwest and Alaska (Clark et al., 1984; Clark and Downing 1986; Christensen et al., 1987). Researchers have also begun to examine the relationships between experience preferences and settings in the middle range of the ROS (Virden and Knopf 1989, Yuan and McEwen 1989). This work offers a good starting point, but more information is needed if managers are to deftly apply standards to non-wilderness areas.

A GOOD HEAD START

Those who would develop non-wilderness standards are not starting with a blank slate, however. The Forest Service's RIM Handbook, while generally lacking specific standards, nonetheless offers facility classifications, maintenance guidelines, and other measures that can provide a basis for such standards. Similarly, RIM inventories could serve as a template for monitoring programs, especially in developed settings where fee collectors, maintenance staff, campground hosts, and other personnel are already present and informally monitoring facility conditions. It will be possible in many cases to take advantage of the years of research and practical experience on wilderness standards, much of which can be applied with little or no revision. This is especially the case where wilderness-like values are associated with legislative direction and desired recreation experiences, i.e., areas where users prefer that evidence of human presence is minimized, or where ecological values were an impetus for congressional designation.

An example of how wilderness methods can be adapted for a non-wilderness setting comes from a 1989 plan prepared by the Department of Recreation Resources and Landscape Architecture at Colorado State University (Alden et al., 1989). The plan applied the Limits of Acceptable Change wilderness management model (Stankey et al., 1985) to the Poudre Wild and Scenic River in north-central Colorado. In conjunction with Forest Service personnel, a proactive management strategy was developed for campsites and day use areas, all of which were within the Roaded Natural ROS designation. Indicators were chosen based on their significance, reversibility, responsiveness to management control, sensitivity to social and resource factors, measurability, feasibility, reliability, and cost-effectiveness. These indicators were: amount of vegetative cover; tree damage (including soil compaction and physical damage); area of bare ground; user modification (fire rings, log or stone seats, tent pads, etc.); amount of litter and wastes; amount and severity of vandalism; and existence and/or extensiveness of access trails.

Each indicator is one which has been used successfully in LAC applications to wilderness. In general, standards for the Poudre River were set at levels similar to those for more heavily used wilderness areas. For example, the vegetative cover standard was set by first defining five classes of cover percentage (0-5, 6-25, 26-50, 51-75, 76-100), and then defining the acceptable limit as no more than one difference in class between the recreation site and the adjacent non-impacted area. Similarly, the access trails standard allows one discernible (but not well-developed) unplanned trail per site.

What fits the Poudre River corridor, however, might not work elsewhere. Often at dispersed sites where fishing is a major attraction, an entire network of access trails has evolved linking the best fishing holes. At such places, having more than one discernible access trail may not exceed user standards at all. Instead, the trails may be welcomed, both by newcomers who appreciate being directed to prime angling spots, and by repeat visitors who use the access trails to avoid entangling rods and tackle in dense underbrush.

USER PARTICIPATION

It is especially important in non-wilderness settings for user groups to be able to help guide the standard-setting process. As the above example suggests, visitor preferences may not always fit the biocentric paradigm that guides management of wilderness, where evidence of human disturbance is defined as undesirable both by law and by users' personal inclinations. To further complicate matters, settings like the one described in the preceding paragraph may occur in the same Roaded Natural ROS class as the Poudre sites.

This is one reason why the task of setting non-wilderness standards may be more complex than the
same task in wilderness. The ideal resource condition for wilderness is legislatively defined. Moreover, user norms for wilderness settings are more likely to be shared by different user populations than are norms for non-wilderness settings (Shelby 1981).\(^1\)

For non-wilderness visitors, a setting’s position along a primitive-urban continuum may not be directly related to preferences for a recreation experience. Virden and Knopf (1989) found differences in experience preferences between participants in different activities who preferred using the same ROS class. Meanwhile Yuan and McEwen (1989) found little difference in experience preferences among campers using three different ROS classes. Thus it will be difficult for managers to infer users’ standards for one setting based on standards for another setting in the same ROS class. Instead, site-specific visitor input must be solicited.

The importance of the link between public participation and management standards is recognized in various methods which have been developed for setting standards, including Limits of Acceptable Change (Stankey et al., 1985), Carrying Capacity Assessment Process (Shelby and Heberlein 1986), and Visitor Impact Management (Graefe, Kuss, and Loomis 1985). It may not always be easy to contact certain types of users whose activity patterns tend to disperse them throughout a setting (e.g., small game hunters, rockhounds, etc.), but the need to do so is underlined by the wide variety of recreation activities that take place on non-wilderness lands and the relative lack of research on many of those activities.

CONCLUSIONS

We have proposed that the techniques developed for setting standards of wilderness quality can be imaginatively applied to non-wilderness settings. We have also seen that there may be barriers to application, ranging from legislative ambiguities to institutional priorities to research inadequacies. The need for non-wilderness management standards appears to be growing, however, and there is little doubt that recreation users will benefit from the effort as they have benefited from the development of management standards for wilderness. The task can be completed with careful attention both to legal mandates in the appropriate enabling legislation and to the preferences of users invited to participate in the standard-setting process. As Hammitt and Cole (1987) pointed out, “the decision on where to draw the line [on changing resource conditions] must weigh policy, economic, and use considerations as well as ecological ones, especially in non-wilderness areas managed under a broader range of social and economic conditions.”

While the focus of this paper has been on undeveloped, dispersed recreation settings, this should not be interpreted as a suggestion that standards aren’t needed in developed recreation areas. In fact, while considerably more money is spent on developed settings than on dispersed settings, most of the funds are in the form of capital investment. Expenditures for maintaining recreation quality are often meager, and monitoring efforts are inconsistent at best. Deterioration of recreation quality is addressed reactively rather than proactively. It is clear that a systematic program based on clearly articulated standards would be more efficient than simply making ad hoc responses to glaring deficiencies.

We have made several references to the relative lack of research data on dispersed non-wilderness recreation. The most crucial research need may not be another set of visitor surveys, but a compilation of observed behavior and practical knowledge which surely exists among field managers. Recreation professionals in the field are undoubtedly testing innovations that can help them meet forest plan monitoring requirements. Inquiries have been made of the LAC authors regarding application of the method to non-wilderness settings (George Stankey, pers. comm.). Surely much has already been learned by managers who have adapted existing tools to meet specific needs. In discovering what has and has not worked so far, we may be able to more clearly define a direction for non-wilderness management.

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BEYOND STANDARD STANDARDS:
INCORPORATING NON-RECREATIONAL VALUES INTO WILDERNESS MANAGEMENT

Robert E. Manning

Abstract: Contemporary thinking about wilderness management suggests that we must define more clearly the wilderness conditions we wish to create and/or maintain. "Standards" are evolving as the focus of such efforts. To date, most wilderness management standards have focused on recreational values. The thesis of this paper is that we must become more comprehensive in our consideration of wilderness standards; standards must reflect the multiple values that wilderness serves in society. A spectrum of wilderness values is outlined and briefly described in this paper. Sample standards are suggested for purposes of illustration, and several issues are described relating to the formulation of standards for multiple wilderness values.

INTRODUCTION

The contemporary focus on standards is an important development in our attempt to operationalize wilderness quality. In our historic struggle with wilderness management issues, such as "crowding," "resource impacts," and "carrying capacity," we have come to realize that we must define more clearly the wilderness conditions we wish to create and maintain.

"Standards" are evolving as the focus of such efforts. Indeed, formulating management standards is at the heart of many contemporary wilderness management models (Stankey et al., 1985; Shelby and Heberlein 1986; Graefe et al., 1990).

In defining desirable wilderness conditions, standards must reflect the values that society derives from wilderness. To date, most wilderness research and management attention has focused on formulation of recreation-related standards. Trail and campsite encounters, signing intensity, group size, mode of travel, and extent of litter are familiar foci in the
wilderness research literature and are increasingly the central focus of wilderness management plans. Even seemingly resource-related wilderness standards, such as trail erosion, vegetative decline at campsites, proliferation of campsites and fire rings, and human-caused bacterial water pollution, are largely recreation issues. They are generally of concern to wilderness researchers and managers because they are seen as diminishing the quality of the recreation experience.

The thesis of this paper is that we must become more comprehensive in our consideration of wilderness standards. Standards must reflect the multitude of values that wilderness serves in society. We must go beyond the standard standards we are developing in wilderness management. While recreation is perhaps the most obvious, direct and tangible value of wilderness, it is certainly not the only value. The following section of this paper suggests multiple wilderness values for which standards should be considered. A final section suggests several potentially important issues in formulation of standards for multiple wilderness values.

MULTIPLE VALUES OF WILDERNESS

Passage of the Wilderness Act by Congress in 1964 symbolized a remarkable revolution in American attitudes toward nature. In the minds of Americans wilderness had evolved from a source of fear and evil to a resource to be at first exploited, then later appreciated, conserved and, finally, preserved. Congress punctuated this revolution boldly and emphatically when it wrote into law that it shall be the policy of the United States to "secure for the American people of present and future generations the benefits of an enduring resource of wilderness."

Wilderness has played a leading role in American history from the very beginning of settlement (Nash 1982, Huth 1972, Marx 1964, Smith 1950). Burdened with the cultural baggage of their European heritage, the Pilgrims stepped from the Mayflower in 1620 on to the shores of "a hideous and desolate wilderness" (Nash 1982). These religious settlers and their direct descendants thought the wildness of nature threatened not only their physical safety but also their spiritual well-being. In the conservative tradition of Judeo-Christian teachings, wilderness was viewed as the antithesis of the Garden of Eden and other heavenly graces. Cotton Mather, the fiery puritan preacher of colonial America, held forth to his congregation that the American wilderness harbored Dragons," "Droves of Devils," and "Fiery Flying Serpents" (Nash 1982). It was the Christian duty of each member of the congregation to clear away the evil wilderness.

Soon after the fringes of wilderness were cleared for settlement, American interest in nature turned exploitative. Nature was seen as a resource of raw materials to enhance the physical standards of life and to enable the fledgling nation to compete economically on world markets. Virgin timber was cut, wildlife harvested, minerals mined, water harnessed, and the soil plowed and planted. All of these efforts were conducted on a massive scale and often in a wasteful manner for the material resources of nature were seen as "superabundant" (Udall 1963).

By the end of the nineteenth century the natural environment of the United States had been altered dramatically and civilization had spread across the continent. The census of 1890 confirmed that there was no longer an American frontier; much of the wilderness had been removed from the American wilderness. This led to a more appreciative view of nature based on a romantic nostalgia. Along with the growing affluence of American society came the leisure to appreciate nature . . . but nature was disappearing.

Nature was taking on another important scarcity value as well. The raw materials provided by wilderness had been the source of much of America's prosperity. But these resources were now seen as finite and in danger of being depleted. The conceptual foundation of the Conservation Movement of this period was to use these resources more thoughtfully and wisely so as to extend their availability indefinitely. As a consequence, millions of acres of public land, once slated for disposal into private hands, were retained in government ownership to foster a stewardship ethic.

More recently, conservation has grown to include preservation. The environmental movement born in the 1960s has popularized the science of ecology and the interrelationships among living things. Human survival is seen as ultimately dependent on maintaining environmental quality. One of the most effective methods of protecting the environment is seen as preserving large areas of nature as wilderness.

It is clear that Americans now value wilderness. The National Wilderness Preservation System, established by the Wilderness Act, has grown to more than 80 million acres. Many more areas are now being studied for wilderness designation. Not quite as clear, however, is why we value wilderness so highly. The Wilderness Act itself is suggestive where it states that "wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use." Apparently wilderness can serve a number of diverse values.
Recreation Value

Wilderness is used extensively for a variety of outdoor recreation opportunities. Some of these opportunities appear to be especially dependent upon natural environmental conditions (dark and Stankey 1979; Manning 1986; Driver et al., 1987). Psychological research indicates that, like most other human activity, outdoor recreation is goal directed: people participate in outdoor recreation to satisfy certain motives. Driver and associates have conducted extensive tests of recreation motives using Recreation Experience Preference scales (Driver 1976; Driver and Cooksey 1977; Driver and Knopf 1976; Haas et al., 1980). A number of the motives found important to selected samples of recreationists are closely associated with wilderness conditions (see, for example, Brown and Haas 1980; Driver et al., 1987; Knopf and Lime 1984; Schreyer and Roggenbuck 1978). Examples of such motives include enjoying nature, physical fitness, reduction of tensions, escaping noise/crowds, outdoor learning, independence, introspection, achievement, and risk taking. Without wilderness recreation opportunities, people seeking to satisfy these motives may be unfulfilled.

Spiritual Value

Although fundamentalist interpretations of western religious teachings have suggested to some that wilderness is without spiritual meaning or value (indeed, as noted above, wilderness has been suggested by some as the physical and spiritual opposite of the Garden of Eden and other heavenly graces), more contemporary interpretations suggest that spiritual inspiration and insight can be obtained through contact with the natural environment (Stankey 1989; White 1967, Nash 1982, Bratton 1986, Graber 1976). The transcendentalist philosophy of Henry David Thoreau, John Muir and others, in particular, suggests that the natural environment is God’s most pure creation and that contact with wilderness may reveal higher, spiritual truths.

Cultural Value

Following the lead of Frederick Jackson Turner (1920), some historians believe that our frontier experience with the wilderness has marked the American personality and culture with distinctive characteristics of independence, rugged individualism, and love of freedom. Indeed, these characteristics have been incorporated into our distinctive form of democratic government. Moreover, many of America’s first and finest cultural contributions have been inspired by and celebrate the nation’s wilderness resource. For these reasons, wilderness represents an important museum of our cultural heritage.

Therapeutic Value

Some observers believe experience with wilderness can have both physical and therapeutic value. Regular or extended experience in the natural environment may produce a physical conditioning effect (Marshall 1930). Moreover, periodic experience in wilderness may prevent or relieve mental dysfunctions believed caused by repressed desires forced upon us by pressures and constraints of modern society (Burton 1981; Ewert 1983; Driver et al., 1987; Levitt 1982; Barcus and Bergenson 1982; Gibson 1979). The growing popularity of Outward Bound-type programs is a manifestation of these values.

Aesthetic Value

Wilderness has not always been considered beautiful. However, the Romantic Movement in the arts in the seventeenth and eighteenth centuries began to invest in nature a distinctive aesthetic quality—the sublime—based on the awe and power inspired by the natural environment (Burke 1757, Nash 1982). Today, this beauty of selected types of natural environments is a widely shared social value. There is evidence that elements of society are beginning to extend aesthetic values to different types of wilderness environments, such as deserts, bogs, and swamps (Terrie 1985).

Ecologic Value

Because ecology is a relatively new science, recognition of ecological values in wilderness is a comparatively recent phenomenon (Odum 1959). However, as public understanding and appreciation of ecological interrelations grows, so do social values of ecological functions of the natural environment. Appreciation of society’s ultimate reliance on maintaining vital ecological processes appears to have grown to be a dominant social value ascribed to wilderness (Nash 1982). Closely related to this concept is the growing social concern for preserving biological and genetic diversity found in wilderness due to its potential usefulness to society (Myers 1979, Ehrlich and Ehrlich 1981, Myers 1983).
Scientific Value

It was noted above that the science of ecology is relatively young. This means, among other things, that there is much more to be learned about the natural world. Only by preserving elements of the natural environment in wilderness will society maintain the opportunity to derive as much knowledge as possible about our world. Moreover, wilderness holds special value for developing certain kinds of scientific theory and knowledge. Wilderness provides the only place, for example, to effectively study large scale ecological processes such as forest succession and watershed function and to study wildlife such as grizzly bears and wolves which have extensive home ranges.

Economic Value

Although it may seem paradoxical at first, wilderness is seen by some as having substantial economic value. Indeed, the above outline of wilderness values suggests that it is reasonable to assume that such values might be measurable, at least theoretically, in traditional economic terms. Some wilderness values are relatively straightforward and tangible. Wilderness recreationists, for example, incur costs for travel and equipment and these costs constitute a minimum economic value of wilderness for recreation. Irrigation and drinking water which flows off wilderness watersheds is often assigned a dollar value. The biotic and genetic diversity preserved in wilderness is increasingly used in a wide variety of commercial and medical applications. Other wilderness values are less tangible and relate to unique values associated with preservation of natural environments. Decisions to develop natural environments are often irreversible. By preserving such areas as wilderness we may be creating and capturing what have become known as option, existence, and bequest values (Krutilla 1967; Walsh et al., 1984). By avoiding the irreversible decision of development, wilderness remains available as an option for those who do not now use wilderness but may wish to do so in the future. Alternatively, some people may have no expectation of using wilderness directly, but value the knowledge that such areas exist. Finally, some people may be imbued with a sense of social altruism and derive satisfaction and value in knowing that future generations have been endowed with or bequeathed wilderness.

Intellectual Value

Some writers have suggested that the wilderness environment is the ultimate source of intellectual freedom or creativity (Thoreau 1893, Leopold 1966, Nash 1982). Unfettered by human influence, wilderness provides the purest form of objectivity from which original thoughts might be derived. Much intellectual and cultural activity - painting, music, sculpture, photography, poetry, for example — find their inspiration, setting, and/or medium in the wilderness.

Moral and Ethical Value

Most of the wilderness values discussed thus far focus on human use of wilderness and how humans might benefit from such use. An emerging notion suggests that wilderness and its component parts may have intrinsic value that we have a moral and ethical obligation to support. Aldo Leopold was an early proponent of such a land ethic" (Leopold 1966). Leopold recognized that humans were part of a larger ecological community. Just as we express moral and ethical obligations to other members of our human communities, so should we extend such rights to members of our ecological community. Intrinsic rights of nature is a relatively new and evolving concept (Elliot and Gare 1983, Regan 1983, Rolston 1986, Rolston 1988, Stone 1987, Wilson 1984). Some environmental philosophers suggest that the environmental movement is evolving from its "shallow" anthropocentric traditions to a new deep biocentric philosophy (Devall 1980, Devall and Sessions 1985, Naess 1973). To those who believe in the intrinsic rights of nature, preservation of wilderness is an expression of humans' moral and ethical obligations to the natural environment.

BEYOND STANDARD STANDARDS

A close reading of the Wilderness Act suggests that Congress expected wilderness might have several values in contemporary society. The brief survey of wilderness values outlined above confirms and even expands this expectation. Wilderness advocates, philosophers, and researchers have identified numerous and diverse ways in which preservation of wilderness can serve the needs of society now and in the future.

The multiple values of wilderness suggest that more comprehensive consideration be given to development of wilderness standards. The central purpose of standards is to define appropriate wilderness conditions which will ensure that the special values of wilderness will be forthcoming to society. Preliminary thinking about standards and their application to the multiple values of wilderness suggests several potentially important points.
Additional research and management attention should be focused on standards for non-recreational values of wilderness. As noted earlier in this paper, most existing and evolving wilderness standards relate directly or indirectly to recreational values of wilderness. Progress in this area has been good and certainly more work is needed. However, more comprehensive wilderness standards are also needed which address the multiple, non-recreational values of wilderness. By studying wilderness recreation, we have identified important indicators of wilderness quality and set appropriate standards for these indicators. Similar research and effort is needed for other wilderness values.

Development of standards for non-recreational values of wilderness is likely to be an evolutionary process, moving from initial, broad values and concepts to more explicit and quantitative measures. Contemporary recreation planning processes (see, for example, Stankey et al., 1985; Shelby and Heberlein 1986; Graefe et al., 1990) may be a good model. These processes suggest development of management objectives, followed by identification of indicators of quality and, finally, the setting of standards. Management objectives are broad, visionary statements describing the type of visitor opportunity to be provided. Indicators are specific, measurable variables which operationalize management objectives. Standards define the quantitative and measurable conditions of each indicator. The multiple values of wilderness discussed above might provide an appropriate starting point. These values might be restated into management objectives. Indicators might then be extracted and standards set. An illustration of this process is shown in table 1 for selected wilderness values.

Multiple publics must be involved in the formulation of comprehensive wilderness standards. Wilderness research and management planning efforts often rely solely or primarily on direct user groups for data and information gathering. Surveys of wilderness recreationists are probably the predominate means of public input in formulation of wilderness standards. However, some wilderness values accrue to society at large, or to groups who may not use the wilderness directly. These segments of society should be incorporated into research and management planning for wilderness standards.

Some wilderness values — and, therefore, the standards which emanate from them - may conflict. Recreational use of wilderness, for example, can cause environmental impacts and this may diminish the value of wilderness for scientific, spiritual, or other purposes. As the multiple, less tangible values of wilderness become more widely appreciated and incorporated into wilderness standards, these conflicts are likely to grow into intense management issues. It seems likely that conflicting wilderness standards will require a "zoning" approach to wilderness management. Certain wilderness areas, or zones within larger wilderness areas, will have to emphasize selected wilderness values and standards over others. Perhaps a broadened version of the Recreation Opportunity Spectrum might provide an appropriate model for this management approach, ensuring that all wilderness values received some minimum level of management attention.

In a related manner, standards arising from the multiple, less tangible values of wilderness may be more restrictive of human and, therefore, recreation use than has been traditional. Historically, environmental impacts of recreation have been tolerated in wilderness to the point where they are adversely perceived by recreationists. However, some wilderness values, such as maintenance of ecological processes for scientific purposes, may require more limited human impact. Indeed, some wilderness values, such as the exercise of moral and ethical obligations to other living things, may dictate no human use at all in some areas.

Many of the multiple, less tangible wilderness values appear to rely heavily on preservation of the natural environment. Perhaps more importantly, these wilderness values define environmental preservation more appropriately in terms of an evolving emphasis on natural processes as opposed to natural artifacts. Wilderness recreation has traditionally been dependent upon the physical and biological elements of nature. Examples include selected animal species to hunt or fish, scenic views, mountains to climb, and rivers to raft. Wilderness standards based on these recreational values prescribe the maintenance of these discrete environmental entities. Less tangible values of wilderness, on the other hand, often require no direct human use of wilderness. In this way, the physical and biological manifestations of nature are less important than continuance of natural processes. As noted above, this may lead to conflicts between selected wilderness values and their expression as management standards. The role of fire in wilderness is an example of this type of issue. Natural fire may be seen as detrimental to recreation values, but necessary to ecological and other values. Management standards operationalizing these values are likely to conflict.

Wilderness researchers and managers should monitor more closely societal perceptions and meanings of wilderness. The outline of wilderness values presented...
Table 1--Illustrative Evolution of Standards for Recreation and Non-recreation Wilderness Values

<table>
<thead>
<tr>
<th>Wilderness Values</th>
<th>Management Objectives</th>
<th>Indicators</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreation</td>
<td>Provide visitor opportunites high in naturalness and solitude</td>
<td>Degree of ground cover disturbance at backcountry campsites</td>
<td>Area of bare ground should not exceed 50 square feet at backcountry campsites</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Group encounters along trails</td>
<td>Group encounters along trails should not exceed an average of three per day</td>
</tr>
<tr>
<td>Scientific</td>
<td>Areas should serve as a &quot;living laboratory&quot; for research on special or unique natural features and/or processes</td>
<td>Number of on-going research studies focused on areas</td>
<td>An average of two scientific studies per year funded or facilitated by the area</td>
</tr>
<tr>
<td>Ecological</td>
<td>Area should maintain vital ecological processes and preserve indigenous biological and genetic diversity</td>
<td>Presence of indigenous, indicator or endangered species</td>
<td>No known extirpations and/or extinctions</td>
</tr>
<tr>
<td>Therapeutic</td>
<td>Encourage opportunities for a variety of therapeutic uses of the area</td>
<td>Amount of use for various therapeutic purposes</td>
<td>At least five percent of total visitation by Outward Bound, Vision Quest or other therapeutically-oriented groups</td>
</tr>
<tr>
<td>Moral/Ethical</td>
<td>Provide sanctuary for the natural environment from human influences</td>
<td>Percent of area undisturbed by presence of humans</td>
<td>At least 30 percent of are unvisited by humans</td>
</tr>
<tr>
<td>Economic</td>
<td>Ensure the economic values of area exceed the costs of preservation and management</td>
<td>Conduct comprehensive benefit-cost analysis</td>
<td>Benefit-cost analysis should exceed 1</td>
</tr>
<tr>
<td>Cultural</td>
<td>Educate public on the influence of wilderness on American society</td>
<td>Percentage of visitors reached with appropriate interpretive programs and/or media</td>
<td>At least 50 percent of visitors contacted through appropriate interpretive programs and/or media</td>
</tr>
</tbody>
</table>

in this paper suggests that such values are evolving. American attitudes toward wilderness have undergone a remarkable revolution in a relatively short period of time. Wilderness values have clearly expanded beyond recreation. As wilderness becomes ever more scarce, many of these values are likely to grow in importance. Other values of wilderness, perhaps, have yet to be discovered. As ironic as it may seem, wilderness is ultimately a cultural phenomenon. It is defined by the values society ascribes to it and it must be managed accordingly. This will require evolving wilderness standards in concert with a changing society.

Finally, it should be noted that formulation of wilderness standards is not an easy task. Inclusion of multiple wilderness values only exacerbates this problem. Over the past two decades, wilderness researchers and managers have made considerable progress in formulating wilderness standards which serve to substantially enhance the quality of wilderness for recreation. Similar progress can and should be made for non-recreational wilderness values. Only in this way can wilderness realize its full potential to society.

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DEBATE
A CASE FOR NATIONAL STANDARDS FOR WILDERNESS MANAGEMENT

Joseph F. Higgins

ABSTRACT: The author argues for uniformity in wilderness standards based on conditions called for within the Wilderness Act. Uniform standards will provide managers with established guidelines for maintaining wilderness quality and help insure a consistent experience for visitors. Additional advantages of having national standards are discussed.

The Wilderness Act of 1964 (P.L. 88-577) established a "National Wilderness Preservation System." Webster defines a system as a set or arrangement of things so related as to form a unity or organic whole," or as a set of facts, principles, rules, etc. classified or arranged in a regular, orderly form so as to show a logical plan linking the various parts." Therefore, a wilderness system would be expected to be composed of units that are related by an orderly, logical plan linking the various parts. Taking this a step further, the people using any particular wilderness in the system should expect a unifying management concept that links the individual wilderness with the wilderness system. They should be able to expect, to the extent not limited by the size or physical makeup of the wilderness, the opportunity to find the experience defined by the Wilderness Act.

Managers of wilderness can help assure a consistency of experience opportunity through the use of standards. Where possible, there should be common standards for physical and biological conditions, social interaction, and managerial practices. In the Wilderness administered by the USDA Forest Service some standardization is provided through policies and procedures in the Forest Service Manual FSM Section 2320 and the Wilderness Management Handbook (FSH 2309.19). For example, there is direction in FSM 2324.33f that states "Conform to standards and guidelines for wilderness signing" which, in part, are
"when signs are required to manage visitor use, letter size should be as small as possible and yet be visible from a normal viewing distance. Trail junction signs should generally show only one major destination in each direction. This will require the elimination of most secondary destinations and all trail numbers" (FSH 7109.11 - 52.81.3). Visitors to all National Forest Wildernesses should be able to expect that level of signing within each unit of the system and be prepared with adequate maps that help them interpret and define the travel route between signs.

Existing standards are helpful in defining the type of experience a visitor can expect when visiting any wilderness. The problem is that there are many important elements that are critical to a "wilderness experience" that are not covered by any standard. For example, there are no national standards for items such as: party size; numbers of people or groups to be encountered; campsites visible or audible from each other; campsite set back strips from lakes, meadows, or trails; size of bare soil disturbance at campsites; numbers of ranger contacts to be expected; and trail difficulty levels. As a result of this lack of standards, visitors going from one wilderness to another could find conditions that range from:

Complete solitude at a naturally vegetated campsite set back 200 feet from the edge of a lake, after meeting only two other groups with less than 20 people on an 18-inch wide trail where there were no ranger contacts, to

A lake completely ringed with campsites which are completely devoid of ground vegetation, where 10 to 15 other groups can be seen and heard at all times of day and night, found after traveling along an 8-foot wide trail where they encountered 20 to 25 various sized groups and had their mandatory wilderness permit checked 3 times by rangers.

It can be argued that the latter condition is not wilderness; yet this author has encountered conditions closely approximating this situation in many wildernesses across the country. Also, I have received verbal and written complaints from many wilderness visitors who found similar situations and expressed dismay that those conditions did not meet their expectations of wilderness. I firmly believe there must be national standards for a variety of key indicators to assure the on-the-ground conditions in any given wilderness truly represent the letter and intent of the Wilderness Act and to narrow the band of conditions our wilderness visitor can anticipate encountering.

National standards need not always be set in absolute numbers, but some situations could reflect an appropriate range. For example, campsite set-back strips from lakes, meadows, and trails may be established at a minimum of 200 feet while the party size allowed may be stated as a range from 10 people or pack animals to 30 people and/or pack animals depending on the soils, vegetation conditions and rainfall in that particular wilderness. Exceptions would be allowed to national standards where the deviations have gone through the Agency land and resource or wilderness planning process and local, Regional, and national interest groups have participated in the decision.

Some advantages of national standards are:

- They help articulate the type of experience we are trying to provide to the public.
- They help the public understand the type of experience they can anticipate.
- They help the public evaluate the experience they actually received.
- They focus attention on quality of opportunities and environments rather than on numbers of users or visits.
- They can be measured against; thus they provide benchmarks that can be used to measure progress, explain deviations, articulate problems, monitor programs, spot failures, and measure successes.
- They may be used to create "crises situations" that lead to management response and budget priority. Conversely, they can be used to spot failures and prevent them from escalating into a crisis.
- They place attention on desired conditions and give field managers focus for their activities.
- They help wilderness managers and the public express and sharpen their wilderness philosophy.
- They are essential to assuring national quality control.

Some people equate standards, or limits of acceptable change, with management objectives, i.e., a desired condition to managed for so that we hit them right on the bulls-eye. I do not view standards as desirable targets; rather, I see them as formally established limits to be managed within. Standards define the playing field. It is not only acceptable, but desirable, to have management objectives for a wilderness or a
portions of a wilderness, that are within the tolerances allowed by the standard. The standard merely identifies a point beyond which the experience provided no longer meets the managing agencies definition of wilderness. Therefore, standards themselves do not encourage greater impact or degradation of all portions the wilderness. **Misapplication** of standards as desired management objectives will result in deterioration of all portions to the maximum condition allowed by the standards.

Standards are frequently opposed by managers seeking more "flexibility" to manage local situations. However, my experience indicates that "flexibility" is more often used to avoid confronting a difficult or controversial management decision that to allow for a truly different management situation. I have observed, and continue to observe, situations where a single wilderness is managed by two or more line officers. In these wildernesses the on-the-ground evidence of overuse and the complaints by recreation users about the crowding and deterioration of natural conditions is essentially the same. Yet, different managers will take entirely different approaches to handling the situation. Those managers who tend to avoid responsibility, controversy and confrontation will avoid establishing standards and monitoring. Those managers with a more active style will use standards, either existing or newly established, monitor for compliance and take action to bring use within the acceptable range. Thus, my experience has led me to believe that management style rather than different local conditions is the most predictable indicator of a managers acceptance of standards.

I think of standards as valuable tools that will help me assure the Wilderness Visitor outstanding opportunities for solitude or a primitive and unconfined type of recreation experience in each and every Wilderness they visit.
DO WE REALLY WANT WILDERNESS MANAGEMENT STANDARDS TO BE UNIFORM?

Jerry M. Mitchell

ABSTRACT-The author argues that wilderness management standards should not be uniform, that they should be developed on a case by case basis, to meet the specific needs of the public and ecosystem, using the Wilderness Act as the unifying management concept. It is argued that standards serve as the tool used to determine when management action is needed in order to assure attainment of a management objective and that the value of management objectives and standards is in their providing both guidance for management and monitoring and the basis for management action, not uniformity.

INTRODUCTION

It is my contention that standards should not be uniform for the entire wilderness system. I do not believe it is possible to meet the needs of all areas with a single set of standards. Standards should not be suitable averages or ranges that attempt to meet the needs of all wilderness areas in the nation.

It may be a matter of coming to agreement on terminology, but I consider standards to be the tool used to determine when management action is needed in order to assure attainment of a management objective. I agree that standards should not serve as desirable targets—it is not a justification for allowing conditions to degrade. I also agree that standards are established limits within which to manage, but I believe that when we establish those limits they must have real meaning. For example, what is the proper social environment for which wilderness should be managed, in terms of numbers of encounters? How do we meet the needs of our visiting public? By meeting the needs of the average visitor, or the majority of visitors, are we failing to meet the needs of a great many more? Solitude is a personally defined thing. Needless to say, some visitors may encounter more people than they prefer; others may be tolerant of many more encounters. The significant
point is, all individuals will want to assure that an opportunity exists to enjoy solitude as they would define it. This might be taken care of with a management objective and standard for a low enough level of contact that we at least make certain that ALL groups are assured of not encountering too many other parties. I fear the opposite scenario, however; the development of a management objective and standard that might be adequate for some areas, but in others left most of the visitors disappointed that solitude or their preferred experience had alluded them. Others may feel that there is no where to go to find areas managed with their interest in mind. Our obligation is to base standards on public expectations of social environment, even if that means making several different provisions in order to assure that various needs are met.

I believe that the unifying management concept for the wilderness system is provided by the Wilderness Act, and that the act provides us with adequate institutional guidance, opportunity to develop appropriate standards and burden of responsibility. It is true that the wilderness system was established as a "system," or a whole, but its elements are unique parts that should be managed to retain their singular values. Without standards those values stand to degrade; if managed by standards that suggest they are all the same, some areas stand to become something they are not, and potentially changed in unnecessary or nonsensical ways. In striving to develop uniform standards I believe that we would run the risk of making decisions that would essentially be arbitrary for some ecosystems-and make us comfortable with our management and thus blind to the on-site values at risk. For example, it may seem to make sense to adopt a national standard for the distance that camps must be setback from a river, stream or lake, until that standard is applied to desert areas. In some of these areas, greater impacts are likely to occur in the less resilient desert scrub communities. Without an understanding of ecosystem tolerances, it would be easy to contribute to long-term impacts that might prejudice future management of the area. However, impacts in the more resilient riparian areas could be more easily managed and "retrieved" through management action. I am concerned that the management routine that would result from applying a uniform standard would be one that contributes to degradation of the integrity of the area or system. I suggest that we recognize these very different pieces of the system, manage them in related but specific ways, and enhance the various pieces of the system, in a dynamic way.

I believe standards should be used primarily to assure quality of experience and environment rather than uniformity. I recognize that many would say that uniformity equates to assuring consistency, and that consistency should equate to protection of the quality of experience and environment; however, I am not sure that one necessarily follows the other. I believe that we need to get the public (and our wilderness managers) to understand the differences between the individual wilderness areas, and the specific needs and tolerances of ecosystems. Once that occurs, there is the potential that wilderness users would depart wilderness areas not just having complied for compliance's sake but because they understood. To emphasize my point, let us consider criteria for campsite selection, strategy for dealing with campsite impacts, and standards for campsite condition, all of which I would argue should be based on local conditions. In some environments it is possible to limit impacts by spreading out camping activities. This might be because the plant community is resistant, frost heaving will eliminate soil compaction, or some other ecosystem variable assures that impacts, if light, would not be enduring. However, impacts in other areas (pinon-juniper communities, for example), once established even slightly, are enduring; thus it is easy to make the value judgement that it would be better to have a few highly-impacted, designated sites than a proliferation of light to moderately impacted sites.

With the Wilderness Act's guidance, standards should be developed on a case by case basis to meet the needs of the public and ecosystem and to assure that management of wilderness values has foundations in public preference, ecosystem tolerances and scenic quality.

DISCUSSION

Please allow me to present a few examples for further discussion and explanation of my positions on the above points. There could be, of course, any number of standards that we could define to better manage the wilderness environment; the following represent some central themes but do not necessarily represent all of the matters that should receive consideration in developing management objectives and standards for wilderness management. But, should those listed be defined on a case-by-case basis or should they become national standards?

Number of People/Parties to be Encountered

To continue a discussion begun above, consider establishing a standard for an appropriate number of daily contacts. What is best? Two or three parties
encountered in a day or during the course of a trip; possibly four, five or more, or a high probability of none? Those who desire a high probability of making zero contacts should have places where they have an opportunity to do so. And likewise, many people's definition of solitude may not necessarily be that of having zero contacts. Which do we choose to manage for? A low number of contacts that meets the needs of a majority of visitors, or a high probability of zero contacts to assure that almost all needs are met? The price of enforcing one standard, and making assurances on a system-wide basis may be that of restricting use levels to the degree that access must be denied to great numbers of people-people within the range of the norm and who may be tolerant of several contacts over the duration of a day or trip. I would propose that management of some wildernesses be such that both opportunities are provided, if desired by the public. For example, the backcountry at Grand Canyon National Park is zoned to meet various visitor preferences. In Wild Zones, we are managing to assure a high probability of 1 contact or less per day, while in Primitive Zones the number of likely contacts increases to as many as 5 parties. In the Corridor Zone, where we have backcountry campgrounds (Phantom Ranch, Indian Gardens and Cottonwood, which were not included in our proposed wilderness) and the greatest demand for permits, one can expect to have large numbers of contacts. And the message to visitors is clear, if you wish to have a high degree of solitude, avoid the Corridor and choose one of the areas managed under other zoning. Should all wilderness areas be managed like Grand Canyon? Probably not, because demand levels may not be as high and the range of visitor origins and preferences may not be as diverse. However, I would say also that Grand Canyon should not be managed like other wildernesses, especially one that is visited primarily by a less diverse group of people, from one geographic region, for example.

Party Size

I personally prefer small group sizes, and admit to being impacted by the presence of large groups; probably most wilderness users would say similar things. But do we all define large (or appropriate) group size the same way, using similar numbers? There is evidence of different ethnic and organizational groups having different preferences with regard to party size (i.e., some groups like to enjoy large, family or friendship assemblages). Do we know they do not seek and have a need for primitive America? We can use the sociological sciences and the public process to determine needs of the visiting public, and possibly manage some areas for tolerance, to some degree, of some of their preferences for larger group size (and not at the expense of wilderness values). But likewise, even though it might be appropriate to have areas where group sizes of let's say 15 are allowed, I would like to know there would be areas where I would be likely to find fewer contacts; and when contacts did occur, that they would be with groups sized within my own definition of un-impacting, which is no more than half a dozen. If no one standard meets their needs, zone to provide for a variety of compatible needs.

Campsites Visible or Audible From Each Other

The proximity of one campsite to another may be somewhat tolerable in one area, while it may be quite intolerable in another, simply due to the presence of some degree of screening. There may be a lesser tolerance for any or a number of visible campsites in sparsely vegetated desert areas, compared to those in forested, montane areas where camps are likely to be partially obstructed by trees and foliage. In desert wilderness areas, it may be necessary to manage to assure a high probability of having zero additional campsites visible or audible from your camp, in order to assure that each party has their desired level of solitude; likewise, a degree of tolerance may exist for other campers if the other camp is partially obstructed from view, or if you feel your own activities are partially obstructed from view.

Campsite Setback

Campsite setback strips from lakes, meadows or trails are good tools. They preclude impacts to values at risk—such as water quality—and they limit numbers of contacts between backcountry visitors. The foundations for using such restrictions are very solid” especially for some environments. In a relative sense, the impact of a campsite or trail on a lake, riparian area or meadow might be one of great scale in some environments, compared to other potential impacts; thus, in these areas establishing setback requirements would be a good practice. However, in many desert areas, the perspective may be different. While a riparian area may not be as resistant as an adjacent desert scrub community, it may be more resilient. Once the desert scrub community has been disturbed it may require a great number of years for recovery. In terms of intensity of use, it might be best to keep use levels within levels of resistance for the desert scrub, and manage and localize the campsite impacts in riparian areas through any number of strategies, including some kind of hardening and limitations on the number and distribution of sites.
Size of Bare Soil Disturbance

Coming up with a value $X$ for bare soil disturbance is of course a "value" judgement, one that can be defended by saying it gives us a point at which management action is triggered; a reduction in use, rehabilitation of the site, or some other management action might be in order if the value is exceeded. But should this tool be used in the same way in all places, using a similar value $X$? Maybe; having such an objective indeed would prevent an increase in the size of impacted sites. But other variables such as precipitation intensities, runoff, soil texture, and types of prevailing activities might factor in to a justification to keep sites smaller in some areas while allowing activity areas to extend out in others.

Number of Ranger Contacts to be Expected

This could range from zero—possibly too few (if there are impacts due to some lack of compliance, for example)—to several a day—probably too many. It might be possible to settle on a maximum number of reasonable contacts, extraneous circumstances aside. But just as I propose that visitor needs may be different, it is probable that visitor education requirements differ also. Compliance levels surely vary from region to region, depending on the level of understanding and support for our programs. Unfortunately, this will probably always be the case.

Trail Difficulty Levels

Should we assume that access to all wilderness areas is to be by means of a developed trail with a common set of maintenance standards? What about routes? Do not some people desire a greater level of trail maintenance than others and as such seek to remain in those areas where they are most comfortable? And then again, do not some individuals desire to seek a greater level of primitivity and others something somewhere in between? I agree that a visitor should know what to expect in terms of the level of trail difficulty one will find in a certain area; perhaps a better solution would be a classification system (for use by visitors) for trails based on maximum grade, tread width or definition and level of development in areas such as water crossings. For each trail classification (which would serve as the management objective for that trail) a set of standards could be established.

Signage

There may be some standards deserving to be "norms" of the system, such as a low level of signing. But should all wilderness signs look the same and use similar phrasings? Or all use the same international symbols? Should there be great variability between those signs even found within one wilderness? We very much want our signage to appear professionally done, but sometimes construction style and materials are traditional for an area and certain signs or even construction styles may even be historic. Compare desert and forested areas in your consideration of signage; what may be rustic or appropriate in one area may be out of place and inappropriate in another.

CONCLUSION

Admittedly, allowing managers to determine standards locally places those standards subject to the management style of the manager as well as the whims of local issues and politics. But, standards should not substitute for managers taking seriously their responsibility for developing appropriate standards or dealing responsibly with the local publics and issues; it is their job. We cannot expect uniform standards to force action out of the manager who tends to avoid controversy and confrontation. We cannot expect uniform standards to create in a manager a bias for monitoring and taking management action, if that bias does not already exist. However, one of the dangers in implementing uniform standards lies in the risk to the viability of the program; i.e., it is just as likely that some managers (who would otherwise be accountable to monitoring and management action) would choose not to be accountable or responsible to the standard, having not bought into the program. They would not feel compelled to fund necessary monitoring, or enact discretionary management action in dealing with a tough issue. It is true that many managers like to retain their flexibility, which can lead to inaction in some cases, but I would suspect that it is equally true that managers have more motivation and are more effective when they have some influence over destiny of their own programs.

I believe that defined management objectives and standards should be developed by federal managers (through their professional staffs—and I am placing a large burden on these people) interactively with their constituents, following research on sociological and natural indicators and values. In developing standards that are specific to an area, standards should be truly significant indicators of the need to manage visitor use and critical resources. It is difficult to work with a
local constituency in taking a needed action, when that constituency played little or no role in developing the standard that has an influence on them.

If we need to move wilderness managers forward toward developing defined management objectives and standards, then it might be defensible to standardize a process of deriving standards, at least for a period. By pulling various professionals together to develop a list of indicators for the sociological and natural environments, as well as to develop a common ground for the state of the science, managers might begin to improve their wilderness areas simply by managing them with direction. And this is my primary point: the value of management objectives and standard is in their providing guidance and the basis for taking management action, not uniformity. Without standards, or the objectives that those standards are intended to characterize, wilderness management is not likely to be focused and monitoring can become very much a platitude that has no relationship to a decision/management action process.
EXAMPLES AND CASE STUDIES
THE GENESIS OF WILDERNESS
STANDARDS FOR THE PACIFIC NORTHWEST REGION

Bernard A. Smith and Joseph F. Higgins

ABSTRACT: The authors provide a brief history and justification for development of wilderness standards in the Pacific Northwest Region, detailing pitfalls such as agency resistance and a lack of baseline data. A discussion of how such problems were overcome is included.

The need for Region-wide standards for the management of Wildernesses in the Pacific Northwest Region National Forests was first identified in 1978. Dalton DuLac, who was the group leader for Wilderness and Bernie Smith who was a Wilderness management specialist, conducted a Wilderness activity review that year. The review findings, which were supported by many subsequent field visits, included:

1. Based on information obtained from Wilderness permits, Wilderness use throughout the Region still appeared to be increasing though the rate of increase was slowing.

2. A general degradation of the Wilderness resource was occurring. This was partly due to the increase in use, partly due to a lack of a good wilderness ethic among users, and partially due to management practices at that time.

3. Within the Region there was complete lack of baseline information on conditions in Wilderness, no agreement on the extent of acceptable change and no real strategy for identifying Wilderness values to be protected or preserved.

Also, each time a new manager moved to an area he/she would start with a slightly more degraded
mental picture of the baseline conditions in the wilderness with which he/she was working. There were no standardized approaches to measuring wilderness resource conditions or for documenting baseline conditions. In most areas, at that time, there were few reasons or incentives to try.

DuLac and Smith began a number of efforts to correct this trend. A Managers Guide for Promoting Wilderness Ethics was published and distributed to the Forests. The strategy was to develop management's sensitivity to the problem and to build a stronger Wilderness/land ethic within the organization.

They also began working with Forests and with other Regional Office Units which had interests in Wilderness to examine appropriate techniques for measuring baseline conditions and change that was occurring (Ecology, Research, Range etc.). Discussions of values to be preserved and biological, physical and social measures that could be used to monitor changes resulted.

At about that time a literature review was initiated which turned up some interesting ideas. Two of the most significant were an article by Sidney Frissel published in the Journal Of Forestry on a fledgling limits of acceptable change concept (a simple and easy to use condition classification system for inventorying and managing wilderness campsites) and the publication of the book Wilderness Management by Hendee, Stankey, and Lucas. The latter contained a chapter on "Some Principles of Wilderness Management" several of which dealt with the concept of nondegradation. Simply put, the nondegradation principal recognizes that conditions, especially naturalness and solitude, vary within and between Wildernesses. It calls for maintaining existing environmental conditions where they meet or exceed standards set for wilderness and for the restoration of conditions that have slipped below the standard.

Several groups of wilderness managers at that time had been struggling with the notion that a carrying capacity approach to the problem of overuse would help resolve the problem. These efforts were largely unsuccessful and often very frustrating. They tended to focus on finding the "magic" number of people that could use an area without degradation and to seek an indirect way to limit users to less than the magic number.

DuLac and Smith moved to resolve some of these problems by preparing a Forest Service Manual Supplement which focused on measuring impacts of recreation use but also attempted to look at measures of change relating to wildlife and fish and to grazing activities. The supplement was oriented at measuring the maximum allowable change acceptable in Wilderness by establishing standards against which change could be measured.

The original standards were developed by Wilderness managers using data collected from several sources and with some user involvement. Public participation generally came in the form of one-on-one or small group field exercises and data generally came from those areas using the Code-A-Site inventories (this process inventoried dispersed campsites and associated features) with radial transects that were an optional part of the Code-A-Site process. These transects measured ground cover lost from trampling around fire rings.

At the time the standards were first proposed some of the Wilderness areas in the Region had no baseline data to work with and interpolations had to be made. A variety of other problems were encountered as the supplement was developed:

1. Many District people displayed resistance to a Regional Supplement or standards. Often the rationale was that their situations were truly unique and that standardization within the Region was impossible.

2. Many individuals took exception to the social standards (encounter levels proposed for trails and campsites) and to the amount of denuded ground acceptable at campsites.

3. There was also some resistance from other functional areas, especially Range because there was concern that meeting the standards would require a reduction in the livestock grazing within Wilderness. Congress, at the urging of the livestock industry, also reaffirmed their position that grazing was an acceptable use of wilderness.

4. There was also some thought to using this Regional direction in the budgetary process though we weren't sure exactly how. This also caused much concern from Forests. A common complaint was "We've never trusted Recreation Information Management (RIM) data why would this stuff be any better."

Much of the resistance to the establishing of standards was overcome by pointing out the available research that supported social concerns. Studies by Lucas in 1964 and Lime in 1975 found that wilderness visitors to the Boundary Waters Canoe Area prefer relatively few encounters with other parties. In another study, Stankey (1973) found declining experience satisfaction...
associated with increased use levels. Further resistance was overcome by on-site discussions between Joe Higgins, who had replaced Dalton DuLac as Wilderness Group Leader, and Wilderness Rangers. These on-site discussions, where physical indicators such as bare soil, trees killed, vegetation trampled, could be observed, supported such standards as no more than 400 square feet of vegetative loss at any campsite in the primitive Wilderness Resource Spectrum (WRS) zone. Almost all of the resistance to the standards came from within the agency - the public was generally supportive of the process when it was explained to them.

Some adjustments in the standards took place as these discussions progressed and additional local information was collected and evaluated.

The maturation of the Recreation Opportunity Spectrum (ROS) also helped overcome much of the internal resistance to standards. The ROS users guide described three settings—physical, social, and managerial and described criteria associated with each setting. For example, physical setting criteria were remoteness, size, and evidence of humans. These criteria were then generally described in a table ranging from primitive to urban. The social setting criteria for the primitive ROS was "usually less than 6 parties per day encountered on trails and less than 3 parties visible at campsites." The social standards in R-6 Regional Supplement #81 for the primitive WRS were that there should be an 80 percent probability of encountering less than 7 other groups while traveling and an 80 percent probability of having 1 or fewer groups visible or audible from your campsite. Thus, there was an "in the ballpark" type agreement between two efforts that were developed separately.

In all, the Regional standard supplement development process took about 4 years from genesis to initial publication, 1978-1982. The Supplement was revised in 1986 to reflect minor changes that had been suggested through the years and to add standards for wildlife habitat effectiveness. If there was any surprise associated with the development of the standards Supplement, it was how long the process took and how involved the internal politics were. This may be have been a blessing in disguise because the same rationale used to support the standards with internal critics has been used to respond to questions from outfitters and guides and wilderness user organizations.

The standards have been very useful in developing Forest budget requests and supporting staffing needs. They have also played a major role in the development of Forest Plans and in developing associated implementation schedules though not all Forests have the latter yet. In general, Wilderness management plans in Forest Plans refer to the Regional Standards and supplement them with local standards where something more restrictive is needed. In several areas in the Region the standards have provided the framework for evaluating conditions and the need to reinstitute a Wilderness permit system. The standards by this time have become a routine part of the way we work - little of the original controversy still lingers.

REFERENCES


WILDERNESS MONITORING RESEARCH IN THE
BUREAU OF LAND MANAGEMENT

Michael Sestak and Alien Riebau

ABSTRACT: The BLM, in order to fulfill its mandate to manage its wilderness areas and wilderness study areas in a manner which would maintain their wilderness character, has developed the Baseline Wilderness Monitoring Study. This study has developed a procedure for producing monitoring plans, a set of monitoring protocols, tools for monitoring air and aquatic resources, and a data base management system; all of which are suitable for use at the field office level by BLM field staff.

BACKGROUND

The Wilderness Act of 1964 designated specific lands of the U.S. Forest Service, National Park Service, and the U.S. Fish and Wildlife Service as the National Wilderness Preservation System. The Federal Land Policy and Management Act of 1976 established provisions whereby lands administered by the Bureau of Land Management (BLM) also would be inventoried, studied for suitability, and eventually some portion thereof designated as wilderness areas. The BLM currently (August 1991) has 772 wilderness study areas (WSA) and 66 wilderness areas (WA). Under its interim management and wilderness management programs, the BLM is required to protect the wilderness character of these areas. To assist with this goal, the Baseline Wilderness Monitoring Study (BWMS) was begun in 1986. This project was designed to develop monitoring procedures and tools for use in assessing whether human-caused changes are occurring in these areas. BWMS has been conducted for the last 5 years as a national level research project in the BLM through the Research Development Tracking System (RDTS) as Project No 7700.016. The study is managed by the air resource specialists at the Wyoming State Office (WSO). This study has concentrated on four aspects of wilderness monitoring:

Michael Sestak is an Air Resources Specialist, Bureau of Land Management, Wyoming State Office
1. Developing a hands-on process for building a monitoring plan using staff at the District Office level.

2. Developing and/or cataloging a set of protocols for measuring specific biophysical, recreational, cultural, and other aspects of wilderness sites and how each should be used to support wilderness management.

3. Developing a data base management program to store, organize, and analyze the information obtained in a wilderness monitoring program.

4. Developing specialized monitoring packages for aquatic biota and aerometric sampling.

Thus far, these approaches and techniques have been tested in the Sand Dunes WSA in Rock Springs, Wyoming, and will be used at least in part in the El Malpais National Conservation Area in Albuquerque, New Mexico. A large portion of the developments from the BWMS will be applied to the Intermountain Wilderness Area Ecosystem Study, part of the BLM contribution to the U.S. Global Change Research Program.

INTRODUCTION

Currently, the BLM has responsibility for 772 WSA and 66 WA established through the Federal Land Policy and Management Act (FLPMA) and through separate legislation. The Wilderness Areas must be maintained in their pristine condition by law and as confirmed in the BLM wilderness management program. As long as the WSA are being evaluated for inclusion in the National Wilderness Preservation System (NWPS), they must also have their wilderness character protected as specified under the BLM Interim Wilderness Management Program. Wilderness management has placed large new demands on the Bureau. The first problem is moving from having no wilderness responsibilities to having the largest responsibility of any Federal agency in terms of number of locations and one of the largest in terms of area. Another challenge is the small size of most BLM WA and WSA with the resultant greater chance of outside impacts. Those managing BLM areas also have to contend with more historical nonconforming uses (usually grazing) than other wilderness managers. Finally, the ecological and topographic diversity of these areas is much greater than those currently in the NWPS.

In 1986 it was recognized that a wilderness monitoring program was required in the BLM and that such a program was potentially more complicated than previous Bureau monitoring has been. Therefore, the Baseline Wilderness Monitoring Study was established. BWMS is a Bureau level research project established by the Air Resources Specialist at the Wyoming State Office (WSO) to determine monitoring protocols and procedures for use in managing WA and WSA by BLM. The intent of this project is to cover all ecosystem/resource components which affect the quality of wilderness values such as water quality, air resources, aquatic plants and animals, vegetation, wildlife, cultural resources, and recreational resources. The protocols and procedures developed will be designed to be usable in the variety of ecosystem types found in the Bureau wilderness resources. These techniques are also being designed to be implemented at the BLM field office (District and Resource Area) level. While State Office and Service Center involvement often will be required in the early phases (inventory and monitoring plan development), it is expected that ongoing monitoring will be the responsibility of the field offices.

OVERVIEW OF BWMS

In 1986, BLM began a program to design monitoring procedures and tools for assessing the magnitude of any changes which may be occurring on Bureau wildlands. This project was started after the Forest Service began a research study to develop protocols for assessing the impact of acid deposition to high alpine wilderness areas (Fox et al., 1987). The WSO Air Resource Specialist suggested that it would be beneficial to BLM to borrow from this project and try to adapt it to BLM lands. The Washington Office wilderness staff recommended the project to the Field Committee with the amendment that it should be broadened to include other resources and other ecosystem types. Thus began RDTS Project No. 7700.016, the Baseline Wilderness Monitoring Study.

The BWMS is now in the 5th year of its 5-year planned life span, though an amendment to extend it 3 to 4 years is in the process of being approved. The project has been broken down into four areas:


2. Development of protocols for monitoring specific wilderness attributes.

3. Development of a data base management system for storing and analyzing the results of a wilderness monitoring program.

BUILDING THE PLAN

The first step in actually accomplishing wilderness monitoring is to develop a plan specific to the WA under consideration. The Wilderness Act of 1964 says that the wilderness character of such areas should not be altered. The Act gives some general indications of what wilderness qualities might be, such as opportunities for solitude; unique plants, animals, or communities thereof; and the opportunity for natural processes to continue undisturbed. For wildernesses designated after the 1964 Act, the specific legislation often mentions what characteristics recommended that area for wilderness designation, though still generally in broad terms. A procedure is necessary for identifying properties which can be measured, but which are related to the broad wilderness characteristics which must be protected. Only on this basis can a wilderness monitoring plan be developed.

Component/Feature/Attribute Strategy

As part of the BWMS, a simple technique was developed for proceeding from broad wilderness characteristics to related properties which can be measured (Marlatt et al., 1989). This is called the Component/Feature/Attribute (CFA) approach (see figure 1).

Components are the broad or large-scale characteristics of WA which are mentioned in the Wilderness Act or specific enabling legislation. Examples of Components are Clean, clear air; good water resources; quality wildlife habitat; and opportunities for solitude. These components are appreciated in the abstract by people, but there is no way to measure them specifically.

Features are parts of components that can be identified as individual entities. These are usually, but not always, physical in nature. They can be counted, but no one measurement characterizes them. Examples of features of the water resource component are streams, lakes, and ponds. Examples of features of the solitude component are areas without man-made objects and areas without other people.

Attributes are measurable characteristics of an individual feature. Each feature has many attributes. If lakes are being monitored, some example attributes are pH, alkalinity, total dissolved solids, and sodium ion concentration.

The job of developing a wilderness monitoring plan is to determine which components, features, and attributes would be affected by likely threats to the character of a particular WA. For each attribute chosen, a monitoring technique must then be chosen. Before these decisions can be made, an inventory of wilderness components and features present in the WA or WSA must be made. Then, potential sources of impacts must be determined. Next, based on the above information and the relative importance of each of the components/features found, a list of features/attributes which are important to the specific wilderness should be made. To be important to the wilderness, the feature and its attributes must, of course, be present in that area. The feature, and maintaining or restoring its wilderness character, must also be part of the management goals for the area. The specific attributes chosen are those for which levels of acceptable change (LAC) can be set, which will indicate whether the management goals for that feature are being met.

Choosing goals and setting LAC which are appropriate to meet them can best be done in the form of a scientifically testable hypothesis regarding the attribute and how the management of the area is expected to affect it. For instance, total suspended solids shouldn't be measured in streams just because it is a common measurement which everyone does as...
an indicator of stream quality. Rather, if an hypothesis is stated such as, "Excess use of stream margins by wilderness campers and hikers produces increased turbidity, reducing stream productivity and thus the overall riparian community, then reduction of this use can improve this situation and a simple way of monitoring its success is by tracking total suspended solids." Then, as this management strategy is applied, one can test the hypothesis, and how well the management goal is approached. Part of the full description of the hypothesis would be how many measurements would be required to disprove the hypothesis, thus establishing a clear time frame for each management action. If the hypothesis is validated, then a basis for only making measurements of the attributes tested will have been established. Hypotheses which are not validated must be replaced, but there will have been established a basis for discontinuing these measurements.

This procedure for establishing wilderness monitoring plans directly incorporates the LAC process used in recreation monitoring in many areas, but with two main modifications. The first is obvious; this process is applied not only to recreation, but to developing all wilderness monitoring guidelines, especially for biological and physical indicators. The second change is to alter the concept of public or affected groups. Ultimately, it is the general public for whom the wilderness areas have been established. However, scientific values have been specifically recognized as important to wilderness in terms of biological and physical characteristics. Therefore, it is an interdisciplinary team of scientist, from government, universities, and the private sector which serves as the primary focus group in establishing attributes to be monitored and the LAC to meet the management goals (in conjunction with the land managers). This procedure of using an interdisciplinary team to establish goals and establish the attributes which must be monitored without duplicating other monitoring efforts, is also directly comparable to the Coordinated Interdisciplinary Resource Management (CIRM) process being developed for all resource monitoring in the BLM. Thus, the final monitoring plan is developed based on the attributes chosen; the available monitoring techniques; the sensitivity, reliability, and cost of the measurement techniques; the management goals to be pursued; and the hypotheses to be used to test both progress toward these goals and the choice of attributes used to monitor them.

Hands-on Approach

This process was developed as a hands-on interactive approach between BLM field staff, BLM managers, and an interdisciplinary team of BLM, university, and private scientists. This team approach was chosen because it involves the field staff who will ultimately be doing the monitoring, and it encourages issues to be brought up involving interactions between resources. A feature or attribute, which may not itself be very sensitive to direct impact, may be sensitive to indirect impacts from changes in other components. This technique has been tested in the production of the monitoring program for the Sand Dunes WSA in west-central Wyoming.

The first step in this process for developing a monitoring plan is to put together an interdisciplinary team which will perform the inventory, evaluate potential sources of impacts, choose the CFA to be measured, and select the monitoring techniques to be used. As indicated above, this team should include field staff since they will be responsible for the actual monitoring and can determine what is practical. Some managers should be included so there will be an indication of what management options the office is committed to. Higher level (State Office or Service Center) BLM and outside scientists should be included to provide expertise in areas not available at the field office level.

The inventory is conducted to determine what wilderness components are present, and within each component, what features are present. For each of these, an attempt should be made to count the occurrences of at least the most common features. If certain features are known to be very sensitive indicators of some type of human impact or are very rare, they too should be counted.

Sources of impact must be evaluated to determine the importance of various wilderness components found by the inventory. If there is little or no known potential for the features of a particular component to be impacted by human activities, then it is probably not a wise use of resources to do a lot of monitoring of attributes of those features. Conversely, if potential sources of impact are known to be nearby, or even within the WA (such as recreational use), monitoring attributes of these features is essentially required.

Once the area has been inventoried and any potential sources of impact have been identified, the management goals, in terms of levels of acceptable change, must be set. These goals will also be specific to the area. For an area which is distant from any sources of impact, which is now pristine wilderness,
preservation of this state with no change might be the goal. For an area which has historically been impacted, but which is now designated wilderness, mitigating past impacts might be the goal, rather than preserving the current state. Other areas will have other goals. These goals, together with the known possible impacts, can be used to set priorities as to which CFA found in the inventory should be monitored on a regular basis. For each combination of management goal and attribute to be measured, a scientifically testable hypothesis should be developed. These hypotheses should allow the land managers to determine whether a given management strategy is producing results, how long to proceed with a particular strategy before a conclusion can be made about its worth, and which measurements to maintain for long term monitoring. From these priorities, hypotheses, and the monitoring protocols developed in the BWMS for each of the CFA, a wilderness monitoring plan is built specific to situation and management requirements of each area.

MONITORING PROTOCOLS

One of the key documents to be produced by the BWMS is a book of guidelines or protocols for monitoring specific attributes. This book will not specify where or which measurements should be made. Those decisions are made through the process described in the previous section. This guidebook will contain detailed instructions on how to take samples, when to take samples, how to have samples analyzed, and any other information required by a field staff member who is responsible for implementing the monitoring plan. This protocols document also serves a secondary purpose. Since no such book could contain all possible attributes that one might want to measure, the attributes in the guidebook should be considered to be the preferred attributes. When there is more than one attribute or technique which will provide a particular piece of information, the protocols will provide the relative sensitivity, reliability, and cost estimates for each, from which information a choice can be made. In general, however, if an alternative attribute might provide similar information, the protocols will specify only one method signifying that the one in the book is to be preferred. The data base program which is being developed for storing wilderness monitoring information will be able to store monitoring data from observations of any attributes described in the protocols book.

MONITORING SYSTEMS

In some areas of natural resources monitoring, such as vegetation and hydrology, the Bureau has a substantial amount of expertise. In other areas, expertise, personnel, and equipment are all lacking. This situation is particularly true for two areas: aquatic biology and air resources. Since the problems in these two areas became apparent fairly early in this study, an early objective of the study became the development of packages of equipment which would allow existing BLM specialists to monitor these resources.

The air resource or aerometric package (Smith, Marlatt, and Riebau 1990) will be a station capable of monitoring for impacts due to acid deposition, ambient air pollutants, and visibility degradation, along with simple climate factors which might be associated with these problems. The station will be capable of unattended operation for one month, and servicing it will only require the changing of sample bottles, self-contained filter cartridges, and datalogger memory modules.

The limnology package consists of all the materials necessary to take samples of aquatic vegetation and animals, and field measurements of water quality related to health of aquatic organisms. In particular, the package contains means for sampling ponds and streams for type and productivity of phytoplankton, macroinvertebrates, aquatic vertebrates, and dissolved nutrients.

INFORMATION MANAGEMENT SYSTEM

Another important problem discovered by the BWMS early in its history was that monitoring alone is not enough. Once observation information has been collected, it must be stored in a form which is permanent, can be easily accessed by others, and from which analyses and reports can be easily obtained. For this reason, it was decided to add the development of a data base management system to the project (Riebau et al., 1989). This data base is the Wildland Resources Information Data System (WRIDS). This data base program was designed to operate on the most common computers available in the BLM: IBM PC-AT compatible computers with 640 KB memory, a 40 MB hard disk drive, and high resolution CGA monochrome or better graphics. The program was required to be compatible with the dBase III Plus standard for microcomputer data bases in the BLM, but be a compiled program so no other software or license fees were required to use WRIDS.
Fox Pro and DGE Graphics were used to write the data base program. WRIDS was designed in a modular fashion so that a field office need only install the sections for which it is actually doing monitoring. This same modularization aids in data security as individuals can be given different levels of access to various parts of the data base. For example, a hydrologist may have complete access to (be able to read, write, modify, delete, and view) the water quality information, but have only view access to the rest of the data base. WRIDS is designed in the same CFA style as the monitoring plan design guidebook and the monitoring protocols guidebook.

The components WRIDS is currently designed to handle are:

- Hydrology
- Aerometric
- Limnology
- Vegetation
- Cultural
- Recreation
- Wildlife
- Administrative

Each component contains sections for defining monitoring sites (features), entering monitoring observations (attributes), and making reports and graphs from the observations which have been entered.

REFERENCES


CASE STUDY
MANAGEMENT STANDARDS FOR THE COLORADO RIVER
WITHIN GRAND CANYON NATIONAL PARK

Jerry M. Mitchell

ABSTRACT: Management Objectives, with measurable standards, were added to the Colorado River Management Plan in 1989. The standards are intended to define current management and provide the foundations for developing monitoring programs that indicate the point at which to implement resource and visitor management actions. The paper discusses the evolution of the plan and its management objectives, and outlines the development of programs to monitor on-river and attraction site encounters. In its initial implementation, during the 1989 season, monitoring suggested that the characterization of current management was relatively accurate and that the management objectives were generally being met.

INTRODUCTION

The use of standards in managing the Colorado River through Grand Canyon, and the white-water recreational users drawn to it, has evolved since the first Colorado River Management Plan in 1979. Public demand, controversy and research have all contributed to the changes in degree of definition found in the management objectives of the plan. The first version had a program developed around an objective environment of "wilderness", the second that of a "high quality, rewarding river running experience", and the most recent revision attempts to define the sociological and environmental variables of the management environment using standards that are measurable.

This stretch of the Colorado River is one of the longest lengths of whitewater in the world and offers one of the most sought after river trips in the United States. Public interest in running the 277 miles of river within the park has increased dramatically in the
past 25 years. Before 1953, fewer than 200 people had run the river (USDI NPS, 1979). In 1967, 2100 people ran the river and by this time river running was becoming a thriving business. By 1973, 22 commercial boating companies and noncommercial river runners carried over 15,000 people down the river, an increase of almost 700 percent in 6 years. The number in 1972 alone exceeded the combined totals for the 100 years from 1869 (John Wesley Powell’s trip) through 1968.

Recreational use along the Colorado River is concentrated within the riparian zone and on beaches. The time and location of visitor use in the river corridor is uneven, causing high-density levels at certain locations throughout the river corridor (such as at the Little Colorado River confluence. Elves Chasm, Deer Creek and Havasu Creek). Crowding and congestion at attraction sites not only results in impact to resources but also influences the river-trip experience for many visitors. Popular sites include geologic features, side canyons, archeological and historical sites, caves, waterfalls, and unusual vegetation. The attraction sites are marked by trampling, trampled vegetation and compacted soils.

There are over four hundred camping beaches within the river corridor, but the majority of river runners use fewer than one hundred of them. At each of the more desirable sites, 30 to 40 people camp almost every night during the high-use period of the year. Prior to initiating operating requirements for river runners, such as requiring firepans, human waste containers and drop cloths (for the camp kitchen), the high level of use had resulted in the accumulation of human waste, charcoal and litter at these sites.

Flows from Glen Canyon Dam, which has operated as a peaking power facility, fluctuate on a daily basis. This causes erosion of sediment deposits (including camping beaches), leaching of soil constituents and other impacts to the riparian community. These flows are also not seen as "natural" (Bishop et al, 1987) by the whitewater rafter.

HISTORY OF THE COLORADO RIVER MANAGEMENT PROGRAM

Prior to the influx of river runners and the advent of dams, the river required very little active management by the National ParkService (NPS). However, by the early 1970s it was apparent that a comprehensive river management plan was needed. In 1973 a user-day allocation concept (a user day is defined as any portion of a day a river user spends on a river trip) was implemented to manage visitation levels and the NPS initiated a research program and planning process leading to the development of the Colorado River Management Plan (CRMP) in 1979.

The research program that led to the development of the 1979 CRMP emphasized investigations of human uses and interrelationships between sociological, biological, physical and chemical parameters of the riverine ecosystem (Johnson 1977). In some situations, environmental degradation exceeded the system's capacity to adjust and therefore irreversible changes were occurring. Impacts were a result of the increasing numbers of river recreationists and, primarily, the altered riverine regime produced by the operation of Glen Canyon Dam (the flow of the river became regulated when Glen Canyon Dam was constructed; the dam was completed in 1963). Major environmental impacts identified included: scouring and loss of natural river bed; loss of beaches through erosion; spread of exotic plants and vertebrates; trail proliferation and vegetation trampling; incorporation of human litter, waste and charcoal into beach deposits; and wildlife utilization of artificial food sources.

Sociological analysis of river users revealed user attitudes, and background, crowding variables, and degree of wilderness perception. Most users perceived the canyon as uncrowded at the use levels of the time (Shelby and Nielson 1976). Private and commercial users differed on a number of background variables, with most users defining their trip in terms of wilderness through a preference of non-motorized travel.

Colorado River Management Plan, 1979

In addition to the results of the Colorado River Research Program, the plan was built on a public involvement process that culminated in the preparation of an environmental impact statement. The plan's management objectives were defined to provide for a type of experience, "wilderness". Its provisions included: phasing out motors; a summer season with two commercial and one private launch per day and a winter season with three launches per week; summer group size limit of 36 for commercial/15 for privates and a winter average of 60 people per week; restricted use of fires; a requirement that all trips haul out human waste, trash and litter; and a single trail would be designated and maintained from the river to points of interest and sensitive areas.

A monitoring program was outlined but it was not directly tied to management objectives or standards. Sociological indicators were monitored by Shelby and
Harris (1980) to form a baseline for future sociological monitoring.

The plan’s reduction of summer season use levels and elimination of motorized travel were controversial provisions. In 1980, the Hatch Amendment to the Interior Appropriations Bill prevented expenditure of NFS appropriations in that fiscal year for the implementation of the Colorado River Management Plan. The National Park Service decided to abandon the 1979 CRMP and write a new plan.

Colorado River Management Plan, 1981

This plan had two very general management objectives: protect the Colorado River and its riparian environment from the unacceptable change caused by river running activities; and, provide an opportunity for all visitors to enjoy a high quality, rewarding river running experience consistent with the magnificent setting of the Grand Canyon. This plan returned to using "user-days" for managing use, eliminated the reduction in use levels and instituted the user day ceiling presently in use: 150,076 total commercial and noncommercial user days in the summer; and 19,874 total commercial and noncommercial user days in the winter. Motorized rafts were allowed except during a non-motors season from September 16 through December 15. Environmental protection measures relating to human wastes, litter and fires were retained. Like the 1979 plan, a monitoring program was called for but was not tied to management objectives or standards; as a result any monitoring conducted was difficult to use in supporting any need for management action.

Colorado River Management Plan, 1989

In this revision of the plan the major issue was parity between commercial and private allocations of user days; demand for private launches had increased greatly since the last revision. [The course of action chosen was that of giving each sector (private and commercial) a similar means of gaining access to their user day allocation (to see if there was an equilibration in demand and waiting time between the sectors)]. Crowding levels on the river was the second greatest issue; however, commercial outfitters expressed reluctance to change weekly launch schedules (because of the potential influence on marketability of certain trips) when the NFS could not at that time articulate what it was managing for in terms of contacts and crowding on the river.

In the public process and in constituency meetings (which included members of the scientific community) a common theme in voiced concerns was that the plan did not have well defined management objectives. Monitoring was criticized as either nonexistent, undirected and not set up to drive management actions. In response to these comments, a set of management objectives was developed in a Limits of Acceptable Change format (Stankey et al., 1985). The management objectives developed were an attempt to define present management and provide the foundations and focus for future monitoring programs; however, even though these standards were given public review and comment, they were not interactively developed with the public. Various alternative means of assuring attainment, along with their relative impacts, were included. Monitoring programs for each management objective were developed.

By defining present management, even in terms of management objectives that characterized the status quo, it is believed that the NPS can ultimately demonstrate it has an understanding of what is happening on the river (through focused monitoring); these monitoring results will then be used future interactive planning.

DEVELOPMENT OF MANAGEMENT OBJECTIVES

This paper will concentrate on the development of management objectives related to contacts and crowding, as an example of the process that was used in the 1989 revision of the CRMP. However, management objectives, standards and monitoring programs were also established for the following: 1) Influence of recreational use on the natural environment (broken into influences on the new high water zone, old high water zone and desert zone); 2) Influence of Glen Canyon Dam on the natural environment; 3) Water quality; 4) Influence of man on cultural resources; 5) Trailing development; 6) Fisheries; and 7) Aircraft use.

Inventories of Sociological Indicators

Shelby and Nelson (1976) conducted the sociological work that formed the basis for the 1979 CRMP. Using observational data, their work projected contact crowding levels at several densities of visitor use along the river. Patterns of use on the river are very much the same, although there has been some change in marketing strategy for commercial outfitters (shorter trips for half the length of the canyon are common). It is possible that some users now opt to avoid the
Grand Canyon and allow themselves to become "displaced" (Shelby et al. 1989) due to increased use levels, rather than become dissatisfied. However, since the patterns of use are very much the same as that studied by Shelby and Nielson, their work was used as the foundations for defining current management (in terms of contacts and crowding levels, adjustments for crowding, attraction site visits and other trip attributes).

The pattern of visitation throughout the year was evaluated and three distinct opportunity classes were observed to exist under current management. The earlier plans established two seasons, a (high density) summer season and a (low density, and for half of the period oars only) winter season. The third opportunity class, or shoulder, was found to exist before and after the peak in the high density, summer season. Since it is apparently easier for the commercial companies to market trips during the summer (even with high contact levels), than on these shoulders or in the winter, it was assumed that the visitor that chose the summer might have a less defined set of expectations (or requirements) than visitors of the other seasons. To get a feeling for this hypothesis, several commercial guides were contacted; many agreed that repeat clients who wished to avoid the high density use would make shoulder season trips the second time around. It was decided that it would be more appropriate to preserve the experience found on the shoulders than to disperse use throughout the year (i.e., create a moderate use-period and a high use-period rather than one long period of relatively high use). All seasons (or opportunity classes) were given specific objective levels for contacts, even though the previous CRMP had only provided for a summer (high density) and winter (low density) management.

Selection of Critical Values (Indicators)

According to Shelby and Nielson (1976), different use levels have a pervasive effect on the character of the Grand Canyon experience, in terms of river and attraction site contacts. Use level had not affected campsite contacts, but had affected the number of adjustments for crowding made by trip leaders. With higher levels of user density, parties were likely to reduce the number of attraction sites visited. At low levels of downriver density (less than 2 contacts per day), they make very few changes (.08 per day) and stop at an average of 16 sites over the duration of their trip. At medium levels (2-5 contacts per day), adjustments increase to about one every other day (.43), but total number of sites visited drops only one to 15. At high levels of river encounters (5-10 contacts per day), adjustments are up to .60 and number of sites visited is down to 10. These responses—adjustments for crowding, and reduction of attraction site visits—were identified as indicators of public sensitivity and, thus, were selected by professional staff as the foundation for developing the management objective for each season.

Standards (Management Objectives)

Defining then present management (characterizing the status quo that had developed in the years leading up to the 1989 revision), management objectives were developed by professional staff using the indicator value (adjustments for crowding and resulting number of attraction site visits). Standards were developed around the contact levels that would need to be maintained on-river, at attraction sites, and at-camp in order to accomplish the management objective.

The objectives and standards were explained as "present management" during the public review process and comments were sought as to the appropriateness of these contact levels. The management objectives were widely supported. This possibly was more of an approval of the commitment made to defining objectives and structuring a monitoring scheme (that would drive future management action), than an approval of the described contact levels. In future refinements of the CRMP, the public should be more than just reviewers/commentors. It should be possible to make these contact levels more meaningful through more interactively involving the public in determining contact level alternatives.

Management objectives and standards by season are:

**Secondary (winter) Season (low use period)--10/1-4/30:** Optimum opportunity for experience with low density use. Low probability of either private or commercial boatmen reducing attraction site visits as a result of contact levels; opportunity for 16 or more site visits over the duration of a trip.

- **Launch limits:** 12 trips per week; 2 trips per day; 332 people per week.
- **Number of river contacts/day:** 80% probability of 2 or less contacts/day, twenty minutes or less in sight of 40 or less people/day.
- **Number of attraction site contacts/day:** 80% probability of contacts at 20% or less the destination sites.

**Primary Shoulder Season-5/1-5/30 and 8/15-9/30:** These use periods will be managed for medium use; levels at which neither private nor
commercial boaters make significant reductions in attraction sites visited. Approximately 14 site visits over the duration of the trip.

**Launch limits:** 166 people/day, up to 700 people in a week.

**Number of on-river contacts/day:** 80% probability of 4 or less contacts/day, and 40 minutes or less in sight of 65 or less people.

**Number of attraction site visits/day:** 80% probability of encounters at 50% or less of the sites visited.

**Primary (summer) Season (high use period)--6/1-8/15:** This period will be managed for higher density use, managed below those thresholds at which private and commercial boatmen reduce number of attraction sites visited to less than 10 sites, due to crowding and contacts.

**Launch limits:** 166 people per day, 1000 people per week.

**Number of river contacts:** 80% probability that a party will make contact with 7 or less parties per day, with up to one and one half hours in sight of less than 125 total people.

**Number of attraction site contacts:** 80% probability of contacts at less than 70% of the sites visited.

**Means of Assuring Attainment and Their Relative Impacts**

Alternatives were identified in the CRMP for assuring attainment of the management objective, should monitoring indicate that management objectives relative to contacts and crowding are not being met. These included, in step-down order: 1) voluntary compliance with "no layovers" stipulations and suggested attraction site stop durations (these were proposed and decided upon in a "preferred alternatives" document prior to the arrival of the author at Grand Canyon); 2) establish a ceiling on number of trip launches per week; 3) equalize the distribution of trip launches throughout the week; 4) computerize launch schedules, with no two groups of the same trip length/itinerary leaving on the same day [this scheme was indicated by a wilderness simulation model (Underbill et al., 1986) as a means of reducing contacts on the river]; 5) same as previous alternative, with the addition of a first day and midpoint designated checkpoints or campsites; 6) same as previous alternative, with designated campsites for the entire river corridor; and 7) reduction in the number of trips per week allowed to launch.

This step-down process outlines management from least to most restrictive. Public involvement processes for the CRMP have indicated that users, especially concessioners, are not especially desirous of restrictive management; they would prefer to maintain their options relating to trip attributes such as rate of travel, campsite selection and duration of attraction site visits. There is a possible work-ability of this process to the park, public, and concessioner: Users, if they wish to keep management at a relatively unrestricted level, can work with us to attain a given management objective by using such strategy as spacing. Then again, if the management objective is not attainable at the low level of restriction, and if users support what is to be accomplished by the management objective, they will possibly support stepping down to the next step of management.

**DEVELOPMENT OF SUPPORTING MONITORING PROGRAM**

For each management objective, including those relating to contacts and crowding, a monitoring program was established. The management objective itself served as the foundation for monitoring by providing the standard against which impacts or conditions would be measured. The CRMP established monitoring programs, and for each it specified the objectives of monitoring, the desired form of results, the means of evaluating the results and the relationship between the monitoring program and the means of assuring attainment.

For contacts and crowding, the objective of monitoring is to indicate whether the number of attraction site visits and the contact levels on the river, at attraction sites and at campsites are within objective ranges (within a standard) for all use periods. The desired form of results is as follows: 1) A mean value for contacts on the river, at destination sites, and at camp; and, 2) Mean value for number of attraction sites visited during the use period. In evaluating results, a sample mean within +/- 10% of the mean, at an 80% confidence level is desired. A value outside satisfactory limits is intended to initiate use of the next regulatory level for that use period.

**Methods**

For attraction site monitoring, observers are placed for a one week period at a location where they can observe actual arrival and departure of trips (Jalbert 1990). Although various activities are recorded at each site, the number of specific contacts are not always recorded, but certain assumptions are made based on the nature of the activity, time of arrival and time of departure. The time of arrival is the time the
The trip actually moored their boats. The time of departure is when the boats leave the mooring area. The activities while at the attraction site include hikes of lengths from 100 yards to five miles away from the mooring site. Certain assumptions are made for calculating the number of people contacted at the attraction site. A trip arriving or departing at the time of another group's arrival or departure is recorded as a contact. All people at the attraction site upon the arrival of a given group are counted as a perspective contact regardless of whether it can be established that an actual contact is made.

For the river contact survey, commercial guides and private party leaders are asked to fill out a survey form (OMB approved) during the course of their trip, recording the following: on-river contacts with other groups, nights where they were in sight or sound of another camp; and all attraction sites visited. Following the first year of monitoring, the results were reviewed by and commented on by a number of sociologists; as a result of their recommendations, the choice of respondent for commercial trips will change (to either a passenger or volunteer).

**PROGRAM MANAGEMENT**

In managing to assure the attainment of the management objectives outlined in the CRMP, some monitoring programs will be conducted every year for all three opportunity classes. However, other monitoring programs (for trailing impacts, for example) will be conducted annually, but individual sites will be monitored on a cyclic basis; i.e., there are so many established trails and photo-points in our monitoring program that (at present funding levels) we can visit each one only every other year or so. In the attraction site monitoring program, we hope to conduct a week of on-site monitoring for two years, at each of several high-density, indicator attraction sites, such as Havasu Creek, Elves Chasm, Deer Creek and Little Colorado River. We can re-initiate this program if a higher level of managing launches is initiated; or conduct the program on a periodic basis (once every 5 years) to detect changes in visitation patterns.

The on-river monitoring program will be conducted each year, during each season, by distributing questionnaires to private boaters and possibly concession passengers. Respondents will be asked to record contacts made during the course of each day. This alternative was chosen over that of placing our own monitoring on river trips, for the following reasons: 1) finances—at current levels of funding we can not afford to hire monitors; and 2) public involvement—we want to make the private boatman, commercial guide and commercial outfitter all feel part of the process and part of the solution. Changing the respondent from commercial guide to commercial passenger may not eliminate this benefit.

**CONCLUSION**

In the revision process for the 1989 CRMP, those members of the public speaking out for how the river was to be managed, instead of for whom it was to be managed, asked that the National Park Service define its management as it related to visitor experience and environmental conditions. They wanted to see management based on objectives, and action supported by monitoring. Although management objectives were written to define the then current management of the river, these were "status quo” by their very nature. However, monitoring is now ongoing. Work done from 1989 through 1991 suggests that the characterization of "current management” was relatively accurate and that these management objectives are generally being met. Some management actions will likely take place in the near future, based on the non-attainment of some standards; one possibility is that of distributing launches throughout the week during the Shoulder Season in order to retain moderate levels of encounters. However, the greatest result of monitoring may occur with the next revision of the plan; at that time, monitoring results will be used in working with the public to refine the management objectives and standards to improve management of the Colorado River.

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MATCHING IMPACTS WITH STANDARDS
IN THE DESIGN OF WILDERNESS PERMIT SYSTEMS

Mark Brunson, Bo Shelby, and Jay Goodwin

ABSTRACT: Use-limiting permit systems may be necessary to maintain
opportunities for solitude in high-demand wildernesses. Such systems, if instituted,
should not only limit numbers of users but also achieve the underlying goal of
reducing encounters enough that visitors' norms for social impacts are no longer
exceeded. This paper examines a new permit system in Washington state, focusing
on the linkages between permit rules, management standards, and social impacts.
Interactions between users and the permit system are discussed, as well as ways to
fine-tune permit system rules to better achieve wilderness management objectives.

INTRODUCTION

Opportunities for solitude are a fundamental output of
any wilderness management system, but often become
more scarce as recreation use increases. When use
levels grow large enough that visitors' encounter

norms are consistently exceeded, a use-limiting permit
system may be the best way to restore such
opportunities (Shelby and Heberlein 1986).

After a decade in which wilderness managers
emphasized less direct means of controlling recreation
impacts, increasing pressures on popular wilderness
areas have brought renewed interest in use limits in
the Pacific Northwest. The Forest Service established
its first permit system for a Northwest wilderness in
1987, and has announced plans to limit use in three
other Northwest wildernesses by the mid-1990s.
While wilderness use nationwide seems to be leveling
off (Lucas and Stankey 1989), rapid growth may
continue in some places, especially those within

Mark Brunson, at the time of this paper, was a Graduate Research
Assistant, Dept. of Forest Resources, Oregon State University; currently he is an Assistant Professor, Utah State University, Bo
Shelby, Professor, Dept. of Forest Resources, Oregon State
University; Jay Goodwin, Master's Candidate, Dept of Rangeland
Resources, Oregon State University.
relatively easy reach of fast-growing urban areas (Ewert 1990). Support for use rationing in such high-demand settings may increase as well.

Wherever rationing is used, permit systems should be designed to keep use levels within written standards for social impacts. They also should be able to achieve the underlying goal of reducing encounters so that visitors’ standards for encounters or other social impacts are not exceeded. It is possible to accomplish one without the other.

This paper uses a case study approach to examine linkages between social impacts, management standards, and permit rules. Analysis of the Forest Service’s first use-limiting permit system in the Pacific Northwest shows that management standards are exceeded much less often since its establishment. However, fine-tuning could help the system fully achieve its ultimate goal of enhancing opportunities for solitude. Potential problems and solutions in the design and operation of permit systems are discussed.

BACKGROUND

Limits on recreational use were imposed in 1987 in a section of the Alpine Lakes Wilderness known as "the Enchantments," a high alpine plateau on Washington’s Wenatchee National Forest (fig. 1). The area has long been popular among hikers, campers, climbers, hunters, anglers, and ski tourers. The plateau is reached by two trails which require climbs of 4,390 feet in six miles or 5,820 feet in 11 miles. Because of the relatively strenuous hike, many visitors spend the first night at mid-elevation camping areas at Stuart Lake, Colchuck Lake, or Snow Lakes. These outlying areas are covered by the permit system along with the Enchantments "core." Use estimates of the overall area rose from about 500 visitor days in 1964 to nearly 50,000 visitor days in 1978, before declining to a level of about 20,000 visitor days in 1982.¹ By 1985, visitor encounters exceeded the standards set in the Alpine Lakes Management Plan during more than 40 percent of the peak use season. Those standards are:

- Snow Lakes: No more than seven encounters per day.²


²The term "encounters" was not defined in the management plan but has been interpreted by managers as referring to impacts in camp rather than on the trail, and to encounters with parties rather than with individuals.

Under the rules adopted for the permit system, all visitors must obtain permits during the peak use season of June 15-Oct. 15. Quotas are imposed for overnight camping at each of the four "zones" within the permit area (fig. 1), but there are no limits on the numbers of people who may enter an area for day use. Permits may be reserved by mail or in person for a fee of $1 per day. There is no fee for permits issued on the day of entry. Persons hoping to reserve a permit are asked to list their anticipated entry and exit points, preferred camp location, and three preferred entry/exit dates in priority order. Reservations are processed in order of receipt until each day’s quota has been met. About 25 percent of permits are set aside for persons who apply on a first-come, first-served (queue) basis. If reserved permits are not picked up by 9 a.m. on the day of departure, these also are made available to queue applicants.

The overnight quotas limit the number of parties that can set out each day for a given destination, and are set to reflect average party size and length of stay. The quotas are:

- Snow Lakes and Stuart Lake: Five parties per day.
- Colchuck Lake: Four parties per day
- Enchantments core: 60 PAOT, with entry limited to 20 persons per day.
1988 USE OF PERMIT SYSTEM

A study was conducted in 1988 to examine how people were using the permit system (Shelby, Goodwin, Brunson and Anderson 1989). Permits were issued that year to 5,671 persons in 2,232 parties (including both reserved and queue permits). Only 30 of the completed applications for reserved permits were rejected, and none of the unsuccessful applicants ultimately were able to visit anyway by changing their preferred dates or campsites.

The extremely high success rate appears largely due to visitors' ability to manipulate the system to their best advantage, often with the help of ranger station personnel who are naturally interested in meeting the needs of their recreation "customers." In effect, the permit system has redistributed use within the permit area. Although the Enchantments core has traditionally been the primary destination for most visitors, only 41 percent of the permits issued in 1988 were for the core area. Instead, many visitors opted to camp at one of the outlying lakes, where permits are more readily available, and to take advantage of the rule allowing unrestricted day hikes into the core area.

The effect of this redistribution can be seen by examining data gathered by wilderness rangers in the Enchantments core. In 1985 the standard was exceeded 45 percent of the time, by an average of 55 people. This was most likely to occur on weekends, or anytime during August. By 1988, the 60 PAOT standard largely was met at night, but use levels during the day exceeded the standard by a rather wide margin (table 1) due to the addition of persons who camped in outlying zones. Overnight use exceeded 60 PAOT less than 10 percent of the time except in August (26 percent) and September (17 percent). However, day use exceeded 60 PAOT on at least 25 percent of the days in every month except June, and on 87 percent of the days in August. Day use levels exceeded 60 PAOT for at least part of every weekend from mid-July until October, and on more than half of the weekdays until mid-September. Use figures are not available for Stuart, Colchuck, or Snow Lakes, but daytime use is almost surely greater in these outlying zones since nearly all day-use-only permits are issued for those zones and all Enchantments core visitors must pass through at least one other zone.

<table>
<thead>
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<th>Time</th>
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<tr>
<td></td>
<td>Nights</td>
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<tr>
<td>June 15-30</td>
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<tr>
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<td>3%</td>
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<tr>
<td>Aug. 1-31</td>
<td>26%</td>
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<tr>
<td>Sept. 1-30</td>
<td>17%</td>
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<tr>
<td>Oct. 1-15</td>
<td>7%</td>
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TABLE 1-Comparison of Impacts and Standards, Enchantments core, 1988

EVALUATING PERMIT SYSTEM SUCCESS

Success of a permit system may be judged differently depending on what managers expect it to be able to do. Is such a system's purpose solely to keep use within written standards? Or should it be able to keep social impacts within the evaluative standards of wilderness visitors?

Given little direction from the Alpine Lakes Management Plan, managers of the Enchantments have focused on reducing impacts occurring in camp, and have interpreted the encounter standard as applying to overnight visitors only. Their choice made good sense. Camp impacts are likely to be of greater management concern than trail impacts, given that backcountry visitors tend to be more sensitive to encounters in camp than on the trail (Shelby and Heberlein 1986). It seems certain that camp encounters are far less frequent since use limits were imposed. From this perspective, then, the permit system appears to have been successful.

However, if management strategies focus solely on campsite impacts, it is possible to create a situation where camp encounters are within visitors' norms while trail encounters are not. Limited evidence suggests that this may be true for the Enchantments. Although our 1988 survey was not intended to measure trail and campsite impacts and standards, responses to questions on the overall Enchantments experience suggest that social impacts remain higher than visitors think they should be.

Responses to a nine-point perceived crowding scale showed that one-fourth of visitors felt at least...
"moderately crowded" in the Enchantments, and 56 percent felt at least "slightly crowded." The crowding item has been administered in dozens of recreation settings over the past 15 years, and the level reported for the Enchantments exceeds that in any previous study of a backcountry hiking and camping setting (Shelby, Vaske and Heberlein 1989). One potential explanation is that unacceptable levels of trail encounters are occurring.

Respondents were also given a set of five experience definitions which described the Enchantments in terms of degrees of social impacts, and were asked to choose the definition that best describes the experiences that are currently offered and should be offered. Although 72 percent of respondents chose low-impact definitions ("wilderness" and "semi-wilderness") for their preferred experience, only half used those terms to describe the current experience (table 2). Perhaps more significantly, 57 percent of respondents said that the experience which "should be offered" is one that would produce lower levels of social impacts than the current experience.

MATCHING IMPACTS WITH STANDARDS

In some ways, the Enchantments permit system is a wilderness manager’s dream. Encounter levels have largely been brought within management standards, yet nearly 99 percent of permit applicants have been ultimately able to visit the Enchantments despite the new limits on use. If repeat visitation is a sure sign of customer satisfaction, managers can be encouraged by the fact that 70 percent of 1988 visitors said they planned to apply for a permit again in 1989.

Nonetheless, fine-tuning of the permit system can benefit users whose encounter norms are still being exceeded. A case study of the Enchantments experience offers insights which may help managers of other wildernesses where use-limiting permit systems are being considered:

1. Standards are most useful if they are unambiguously worded, consistently applied, and leave no doubt about which types of social impacts they are intended to mitigate. In two of the Enchantments permit zones, the current standard is "no more than seven encounters per day for 50 percent of the season." This wording reflects the statement by Stankey et al. (1985) that standards "are often best expressed in terms of probabilities." The authors argue correctly that "the high degree of resource and social variability in a complex wilderness system often makes specific, absolute standards unrealistic." However, they do not specify a range of probabilities that can allow for variability without sacrificing the need to keep impacts within limits of acceptable change. A standard that can be exceeded half of the time, as at Stuart and Colchuck Lakes, is probably too flexible to be meaningful. This is doubly true if a standard does not indicate whether it refers to trail encounters or camp encounters, nor whether it refers to the sum of parties or of people who are encountered.

Managers' jobs can be made easier if the same measure of encounters is used throughout a permit area. A PAOT standard, as is used in the Enchantments core, may be simplest to administer. The number of permit holders in an area can be controlled more easily than the number of times those permit holders encounter each other. Monitoring is also simpler using PAOT measures, since backcountry rangers or mechanical devices can count persons more easily than they can count encounters. However, an encounter standard is likely to better reflect actual social impacts; from a visitor's perspective, opportunities for solitude are not limited by the number of persons with whom the wilderness is shared, but by the number of times those other visitors are seen and/or heard. Where feasible, then, an encounter standard seems preferable because of its greater sensitivity to visitors' concerns rather than managers' needs.

A related issue is whether permit quotas should be set in terms of PAOT, as in the Enchantments core, or parties, as in the outlying zones. The use of party-based quotas may be easier, since applications are made for parties rather than persons. PAOT quotas offer an opportunity to choose the best combination of party sizes to meet a PAOT standard, but this raises a fairness issue: As a quota becomes nearly full, applications from large parties may be rejected while permits are granted to smaller groups whose applications arrive later but which contain the right number of persons.

If party quotas are used, changes in party size should be closely monitored, as well as

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<tr>
<th>Description</th>
<th>Current</th>
<th>Preferred</th>
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<tr>
<td>Wilderness Complete solitude is part of experience</td>
<td>7%</td>
<td>21%</td>
</tr>
<tr>
<td>Semi-wilderness Complete solitude is not expected</td>
<td>42%</td>
<td>1%</td>
</tr>
<tr>
<td>Undeveloped recreation Seeing others sometimes expected</td>
<td>32%</td>
<td>21%</td>
</tr>
<tr>
<td>Scenic recreation Seeing others expected often</td>
<td>18%</td>
<td>7%</td>
</tr>
<tr>
<td>Social recreation Seeing others is part of experience</td>
<td>1%</td>
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discrepancies between actual party size and the numbers listed on permit applications. Nationwide trends suggest that wilderness party size is declining (Roggenbuck and Watson 1988). However, McCool and Utter (1982) found that whitewater boaters who had been denied permits often joined the parties of successful applicants, leading to higher-than-reported party sizes. Conversely, if applicants list all of the persons who might participate in a trip, their actual party may be smaller than reported.

2. Permit systems that limit overnight use without addressing day use may not be entirely successful in maintaining social impacts within users' standards. Nationwide, a typical wilderness visit lasts one day or less, and average stay lengths appear to be getting shorter even in the large wilderness areas of the West (Roggenbuck and Watson 1988). Trail encounters therefore may increase faster than camp encounters at many settings. It may be best to set two standards, one for camps and one for trails, especially in outlying zones of larger wildernesses which may function both as travel corridors and as destinations in their own right. Trail (or daytime) standards should almost certainly be less strict than camp standards; to be most effective, they should be set in accordance with visitors' norms and their evaluations of current impacts. Data-gathering can be done relatively inexpensively through interviews conducted in the course of normal ranger patrols, or by conducting a "pulse" survey in which visitors are contacted at exit points on a few heavy-use days. For periodic monitoring, those methods can be used, or a one-page questionnaire can be mailed to a random sample of permit-holders (whose names and addresses will be already on file).

3. If zoning is part of a permit system, managers should try to anticipate how use may be redistributed as applicants seek to maximize their chances of visiting. Zoning can be a useful tool for redistributing use as well as meeting site-specific needs within a larger wilderness (Haas et al., 1987). However, managers must be able to predict how visitors will use zones to achieve their recreation objectives. The Enchantments experience shows that visitors who are unable to obtain overnight permits for a preferred destination (or who believe that they will be unable to do so) may try to camp nearby and visit during the day. As a result, day use can exceed pre-permit levels even as overnight use declines unless both types of use are regulated.

4. Use estimates should not be the primary basis for decisions about permit systems. Just as restrictions should not be imposed simply because estimated use seems "too high," they should not be relaxed solely because of an apparent downturn in use. Lucas and Stankey (1989), after examining wide fluctuations in use data nationwide, concluded that large inaccuracies are so common that "they devastate professional management." The first two years of the Enchantments permit system saw visits drop to one-third of previous estimates, yet almost no permit applications were rejected. Perhaps use has declined as much as the numbers indicate, either because the mere existence of a permit system dissuaded many prospective visitors, or for some other reason unrelated to the permit system. However, it's also quite possible that the number of visits fell much less drastically, and the permit system simply offered a much more accurate way to count them.

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Roggenbuck, Joseph W.; Watson, Alan E. 1989. Wilderness recreation use: the current situation. In:

For a discussion on potential uses of "pulse" surveys, see Lee and Field 1988.


ABSTRACT: Standards for ecological and social conditions at campsites are an integral part of most wilderness management strategies. Data comparing the relative importance of the two would be useful but has not been sufficiently developed. Using evaluations from organized interest groups, this study suggests that site attributes associated with ecological and social impacts do not carry equal weight in judgments of campsite suitability. Findings suggest visitors place a greater value on social factors and that ecological impacts may serve to identify an acceptable site rather than discourage its use. Implications for setting management standards and the value of surveying user groups are discussed.

INTRODUCTION

Managers and researchers have monitored wilderness use patterns for years in an attempt to learn more about visitor preferences and standards for resource impacts. One common finding is that backcountry visitors repeatedly camp at sites with substantial resource damage (e.g., Heberlein and Dunwiddie 1979, Cole 1982, Hammitt and Cole 1987), often choosing these sites when others with less "wear and tear" are available. A fundamental question is, why? It may be that most campers simply do not perceive these conditions as unsuitable (Cole and Benedict 1983, Cole 1982), or that resource impacts are low priority considerations when compared to other site characteristics. But if site deterioration is not a deterrent to campsite choice, what factors override this particular component in the selection process? In short, which site features are most important to visitors when selecting a campsite?
This study examines the relative importance of ecological and social attributes of wilderness campsites and the relationship of these attributes to other campsite selection criteria. Recreation setting attributes can facilitate or diminish certain activities (McCool et al., 1985) and thus, are often the focus of planning and management. Managers can take steps to improve, ecological and/or social conditions, but different impacts require different strategies. Analysis of users’ priorities for impact problems can help provide a range of suitable management alternatives.

An essential element in developing standards for recreation settings has been to obtain information about visitor use patterns and preferences, but the task of setting campsite standards is difficult if groups of users have different preferences for resource conditions. This study looks at evaluations of organized interest groups for fifteen elements of a wilderness campsite. Backcountry user groups provide valuable feedback on resource issues and consulting them is an effective method of assessing visitor preferences (Shindler 1990, Hansen 1990). The investigation of groups allows documentation of similarities and differences among identifiable segments of the wilderness constituency. If results indicate differences exist, managers can better address user concerns and conflicts; if there is agreement among groups, the findings represent a cross section of the user population.

Although the emphasis here is on visitor preferences, resource managers have also been included in the sample. A widely held view is that the perspectives of managers and users are different (Hendee and Pyle 1971, Lucas 1979, Downing and dark 1979), but comparing these opinions continues to provide useful information. As the staffing infrastructure of the Forest Service changes over time, it is important for managers to assess where their values line up with those of users; particularly since planning practices dictate that the views of users be incorporated in the process. It is generally agreed that a synthesis of managers' perceptions with those of the user public will lead to better management decisions.

BACKGROUND VARIABLES

Attributes

Studies of campsite choice usually assess the influence of specific site attributes on the selection of one location over another. Attributes are described by dark and Stankey (1986) as the characteristics or qualities of a site, such as the opportunity for solitude or the presence of trees, wildlife, or scenery. From the user's point of view, site qualities are judged on the extent to which they contribute to a desired activity or experience. From a managerial standpoint, attributes also serve as indicators of wilderness quality, suggesting that they can be useful in setting standards for acceptable limits of resource change (Merigliano 1990).

Clark and Stankey (1986) organized the attributes of recreation settings for several purposes. In one approach, they classified site attributes as either facilitators (attractors) or constrainors (detractors), acknowledging qualities which either increase or limit visitor satisfaction. Although the assessments are made by each recreationist, one can readily visualize features that fit these descriptions. Attractors could be good scenery, solitude, or a flat tent site, while detractors might be polluted water, lack of privacy, or resource damage. Clark and Stankey (1986) employed two additional categories to help describe the relative importance of site characteristics in the choice process. They used the term requisite attributes to describe those features which are essential to the recreation activity. Examples cited include flat ground for camping and water for boating. Other features which are desirable but not required for the recreation activity, are called supplementary attributes. The premise is that this latter group of attributes may influence the choice process, but to a lesser degree because they are not critical to the activity itself.

Brunson and Shelby (1990) carry the requisite-supplementary concept a step farther. In a search for common elements among campsite attributes, they compiled a typology of site features from studies of nine different dispersed recreation settings. Their findings resulted in a classification system of 15 common attributes based on the purpose served: necessity attributes such as a flat tent site provide minimum camping requirements, experience attributes such as screening from others facilitate preferred outcomes like solitude, and amenity attributes such as availability of firewood provide for activities which are less central but enrich the overall experience. This research suggests a hierarchy of attribute importance which provides the basis for campsite selection.

Interest Groups

Although they are a significant part of the wilderness user population (Hendee et al., 1968), the opinions of organized interest groups are not well documented. Researchers and managers have typically gathered
user information from individual visitors at specific sites (Manning 1986), which tends to limit the degree to which the data can be generalized to other settings or to a range of visitors. Surveying members of backcountry activity clubs and conservation organizations may help close this gap. Interest group data addresses the issue of whether different standards exist for the variety of publics managers must consider. Although organized groups have become a functional part of the public planning process (Lunch 1987, Dennis and Zube 1988), the opinions of these groups are usually represented by a few individuals in leadership roles. Collecting responses from entire organizations is a way to identify the norms and preferences of the true membership of these clubs and groups.

HYPOTHESIS

There are certain campsite attributes over which resource managers have more control because of their ability to manipulate wilderness conditions. These include ecological characteristics (i.e., the presence of bare ground or fire rings), and social factors which allow opportunities for privacy such as the location of camps in relation to the trail or other sites. Other physical/structural and experiential attributes (e.g., flat place for sleeping, view of scenery) are part of every campsite setting, but these generally are elements over which managers have little control. This study addresses 15 specific campsite attributes and attempts to place them in a hierarchical perspective.

Research in behavioral psychology lead to the hypothesis that social criteria are more important than ecological criteria in campsite selection. In studies of wilderness values, Kaplan and Talbot (1983) determined that meeting new acquaintances or socializing with other groups was not central to a backcountry experience; the primary source of visitor satisfaction was the wilderness environment itself. The cost which involuntary contacts place on solitude suggests that the need to attend to interactions with others may diminish enjoyment of the natural surroundings (Hammitt 1982, Stankey 1989). Other research examples imply that perceived crowding is a temporal-spatial assessment which may constrain the individual’s specific activity objective (Hammitt 1983). Finally, in a summary of wilderness studies, Lucas and others (1985) reported that campsite satisfaction declines as the presence of others goes up. It would follow that freedom from social impacts will be viewed as important to the visitor's camping experience.

Although campsite resource impacts would seem to generate similar dissatisfaction, previous research indicates otherwise. Numerous studies (e.g., Hendee and Pyle 1971, Cole 1982, Kama 1986) show wilderness campers often choose deteriorated or heavily used sites, even though others may be available. Perhaps this is because worn sites are easily identifiable, but Brunson and Shelby (1990) reported results more specific to preferences for dispersed campsite attributes. Using a system which categorizes common campsite features, their findings showed that social impacts (identified as experience attributes) were rated more important than ecological impacts (amenity attributes).

METHODOLOGY

Data used in this study were a subset of results obtained from a larger project comparing interest group evaluations of wilderness campsites. Members of five interest groups concerned with backcountry use were surveyed regarding ecological and social impacts, site attributes, management policies, and travel experiences. Included were clubs of hunters, horse riders, hikers, Explorer Scouts, and conservationists (Sierra Club) from Western Oregon. The same survey was given to resource managers. Each user group was surveyed during a portion of a regular membership meeting, while managers were surveyed at a meeting on Forest Service backcountry issues. Total sample size was 326.

To assess the importance of campsite attributes in site selection, group members used a four point Likert-type scale to rate 15 elements of a wilderness campsite (scale values: 1=not important, 2=somewhat important, 3=important, and 4=very important). Six attributes were included as representative of ecological and social attributes:

**Ecological Attributes**
- amount of bare ground
- size and appearance of fire ring

**Social Attributes**
- good distance from trail
- screened from other sites
- out of sight/sound others
- no evidence of litter

The remaining nine attributes were either physical/structural or experiential in nature:

**Other Attributes**
- view of scenery
- available firewood
- sheltered from weather
- dry and well drained
- water for aesthetic reasons
- flat place for sleeping
- close to good fishing
- logs and rocks for seating
- close to drinking/cooking water

Mean ratings for each attribute were calculated for each group.

RESULTS

Mean importance ratings for the attributes are reported in table 1. Analysis of variance testing (P<.05) showed few differences among groups. There were four attributes where differences did occur: screened from others sites, out of sight and sound of others, availability of firewood, and being close to good fishing. The first three differences most likely reflect practical distinctions. Less importance placed on screened from others by horse riders and being out of sight and sound by horse riders and scouts, may be related to their general pattern of traveling with larger groups. Similarly, a greater preference for the availability of firewood among hunters, horse riders and scouts seems to indicate a stronger interest in the traditional campfire. The lower rating of this attribute by hikers, Sierra Club members and managers might reflect a changeover to campstove use or the higher level of wilderness day use which was reported by these groups. The fourth difference, being close to good fishing, suggests there were fewer anglers among the hiker and Sierra Club groups. Regardless, this attribute is so activity dependent and low rated overall, that it does not seem to be an important consideration. In summary, there was agreement on 202 (90%) of 225 possible comparisons between all groups, and a high (97%) agreement among nonmanagers for the 10 most important attributes. It made sense to combine the group scores and look at rankings for the sample as a whole. Aggregate ratings are presented in figure 1. The attributes are listed in descending order of overall ranking (grand mean), which reflects a weighting toward the Sierra Club and managers because of their larger sample sizes. The results show ten of the attributes were considered "important" or "very important," with mean scores above the scale midpoint of 2.5. The hypothesis predicted that social attributes would be rated more important than ecological attributes. The attributes which were considered social in nature, screened from others (3.2), out of sight and sound of others (3.1), no evidence of litter (3.1), and distance from the trail (2.6), were all rated as important site selection criteria. The ecologically based attributes, amount of bare ground (2.3) and size and appearance of fire rings (2.3), were ranked further down the list, below the scale midpoint.

DISCUSSION

This paper examined the relative importance of wilderness campsite selection criteria with special emphasis on attributes associated with social and ecological impacts. An intent was to determine if one or both of these attribute types was a significant contributor to campsite choice. By studying interest groups we were also able to explore the similarities and differences in site standards for a cross section of the user population and compare these with the views of managers. On average, social impact attributes were judged more important than ecological impact attributes. This result is consistent with previous research showing that freedom from social contact and encounters at campsites is an important aspect of a wilderness experience (Stankey 1973, Lucas 1980, Shelby 1981), while resource impacts have continued to go either unnoticed by campers or are reported as insufficient reasons for rejecting a site (Heberlein and Dunwiddie 1979; Lucas 1986; Shelby et al., 1988).

The current findings extend previous research by providing a direct comparison of interest group preferences for social and ecological attributes in the same data set. All study attributes which were considered social in nature received ratings indicating they are "important" or "very important" to users. These results match those of Brunson and Shelby (1991) who obtained similar ratings for these social attributes in a recent survey of visitors to the Alpine...
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Mean Scores&lt;sup&gt;1&lt;/sup&gt;</th>
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<tbody>
<tr>
<td></td>
<td>Grand Mean (n=326)</td>
</tr>
<tr>
<td>Flat place to sleep</td>
<td>3.5</td>
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<tr>
<td>Dry and well drained</td>
<td>3.4</td>
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<tr>
<td>View of scenery</td>
<td>3.3</td>
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<tr>
<td>Screened from other sites</td>
<td>3.2&lt;sup&gt;abc&lt;/sup&gt;</td>
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<tr>
<td>Out of sight and sound</td>
<td>3.1</td>
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<tr>
<td>No evidence of litter</td>
<td>3.1</td>
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<tr>
<td>Close to drinking water</td>
<td>3.0</td>
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<td>Sheltered from weather</td>
<td>2.8</td>
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<tr>
<td>Distance from trail</td>
<td>2.6</td>
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<tr>
<td>Water for aesthetics</td>
<td>2.6</td>
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<tr>
<td>Available firewood</td>
<td>2.3</td>
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<tr>
<td>Amount of bare ground</td>
<td>2.3</td>
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<tr>
<td>Size/appearance of fire ring</td>
<td>2.3</td>
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<tr>
<td>Logs/rocks for seating</td>
<td>2.0</td>
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<tr>
<td>Close to good fishing</td>
<td>1.8</td>
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<sup>1</sup> Scores based on four point scale: 4 = very important, 3 = important, 2 = somewhat important, 1 = not important.

<sup>abc</sup> Means with different superscripts are significantly different at *P < .05.
Lakes Wilderness in central Washington. In the present study, the two ecological attributes were rated only as "somewhat important." Again, Brunson and Shelby (1991) found similar ratings, as did Harris (1983) while studying visitors to Oregon's Mt. Jefferson Wilderness. Harris's respondents rated bare ground 10th and fire rings 11th in a ranking of eleven campsite selection criteria. In addition, the current research shows the relative importance of social and ecological attributes in the overall sample also held within each of the six study groups.

In Clark and Stankey's (1986) attribute rating system, social attributes would probably rank as requisite, while ecological attributes would rank as supplemental. Similarly, in Brunson and Shelby's (1990) system, social attributes were experience attributes, while ecological attributes were less important amenity attributes.

More support for the social versus ecological hypothesis comes from responses to specific survey questions about acceptable contact levels at wilderness campsites. Regarding how often campers should be able to see other parties from their site, 87 percent answered "not at all" or "only occasional glimpses." Similarly, 95 percent felt they should hear other parties only "occasionally" or "not at all." There were no significant differences among groups in these responses, suggesting a strong concern overall about social impacts.

Two interesting points emerge from these results. First, heavily used sites simply are where they are for good reason. In addition to being substantially altered, these sites most probably are flat and dry, provide good scenery, are close to water, and are well situated in relation to trail systems and wilderness attractions. Because of this, the sites will continue to be popular unless resource conditions become so intolerable that campers avoid them altogether (i.e., until deterioration begins to detract from other attributes, such as soil compaction causing trees to die). In the meantime, it appears that users are very tolerant of these conditions. In the larger study with these same respondents, the majority of users rated a series of sites with heavy and severe bare ground and fire ring impacts as acceptable for wilderness camping (Shindler 1990). This might suggest that management efforts will be most productive if directed at some of the social impacts of greater concern to users, rather than to resource changes which are less important from the user perspective.

The second point is that the ecological attributes studied here may serve another function. Bare ground and fire rings help identify an acceptable site for many campers (Lucas, Cole, and Stankey 1985). In the larger study, 87 percent of the sample stated they preferred a site with an existing fire ring or a previously established area of bare ground. Of these, 92 percent checked a response which said I prefer a site where these changes have already occurred and my presence creates no additional impact. It appears that most wilderness travelers are using campsites with an identifiable environmental impact and feel it is okay to camp there because they are not causing further resource damage. Considering that these sites are tied to locations with other desirable attributes, rehabilitation of these areas is probably a low priority for most backcountry visitors and continued demand for their use may make rehabilitation difficult or impossible.

An encouraging note for managers is the agreement among groups identified in the present research. The findings indicate that at least for the sample population, interest groups making up much of the wilderness constituency are aligned in their attribute preferences. This includes managers, whose preferences for site attributes were in substantial agreement with the clientele they serve. Results imply additional similarities in user group standards may exist; if so, managers may be able to address user needs through group consolidation or even as a single unit. Politically, there would still be the need to consider all groups, but the findings suggest some prediction of agreement or disagreement may be appropriate.

CONCLUSION

This study indicates that social and ecological impacts have different levels of importance for visitors. Knowledge of a range of attribute conditions and visitor preferences will assist managers in evaluating change that comes from backcountry use and their own management actions. Clark and Stankey (1986) recognized that such information on attributes is essential in developing strategies to prevent or mitigate undesirable impacts. It follows that user support of management programs may be closely linked with which attributes are affected and how.

Although a variety of groups presently use the wilderness resource, the research suggests there is substantial agreement among interest groups for the issues examined. Identifying where consensus exists can help managers find the most appropriate and publicly acceptable solutions for impact problems. The effectiveness of these solutions depends on
understanding the norms and preferences of both those who will set management standards and the users who will support or neglect them.

REFERENCES


Integral to maintaining wilderness quality is the implementation of ecological, social, and management standards. A substantial body of wilderness research and management experience exists nationwide as a common-pool resource for professionals with a specialized interest in incorporating standards into planning processes. In a 2-day interactive workshop, wilderness managers and researchers joined together to assess the current use of standards, summarize and integrate what has been learned, capitalize on the diversity of this work, and develop ideas about directions for the future. The 14 papers in this proceedings represent their collaborative efforts.

Keywords: Wilderness management, wilderness standards, management objectives, environmental impacts, environmental indicators, monitoring.

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Pacific Northwest Research Station
333 S.W. First Avenue
P.O. Box 3890
Portland, Oregon 97208-3890