

WILDERNESS MANAGEMENT PRINCIPLES: Science, Logical Thinking or Personal Opinion?

by David N. Cole, Ph.D.

Recreational use adversely affects the ecological integrity of wilderness. Wilderness managers face the challenge of keeping this loss of ecological integrity to minimal levels, a task that must be accomplished primarily through management of wilderness visitors. For the past 30 years, researchers have assisted managers by assessing problems associated with recreational use of wilderness and by identifying solutions to these problems. They have conducted empirical studies—the traditional scientific approach in which conclusions are derived from observation and experimentation. They also have developed conceptual frameworks and made logical deductions about the likely consequences of alternative actions, and they have offered their personal opinions about appropriate kinds of management. Along with the experience of managers, these efforts have contributed significantly to a substantial body of knowledge and opinion about how to manage wilderness. This knowledge is best encapsulated in the two editions of the book, *Wilderness Management*, written by three pioneers of wilderness management research, John Hendee, George Stankey and Bob Lucas.

All recently developed bodies of knowledge are bound to contain substantial amounts of dogma, defined in my dictionary as ideas that are put forward despite insufficient examination of their underlying premises. Wilderness management is no exception. This follows from the fact that there has not been sufficient time and effort expended on empirical studies to test all the tenets of wilderness management. Science advances through the questioning and objec-

tive evaluation of established tenets. Over time, as empirical evidence accumulates, many ideas that might be characterized as dogma are substantiated, while others are shown to be oversimplifications or falsehoods. Therefore, in a field as new as wilderness management, it is important to distinguish theories, logical deductions and authoritative opinions that have been empirically verified from those that have never been tested.

In this article I want to examine critically two generally accepted principles of wilderness management which have had a tremendous influence on how wilderness managers, particularly in the U.S. Forest Service, have grappled with recreational impact problems. These principles have been stated in various ways but generally involve some adaptation of the wording provided by Hendee, Stankey and Lucas in *Wilderness Management* that (1) “direct (management) techniques should be applied only after indirect techniques have done as much as they can to solve management problems” and (2) “the direct rationing of use (limiting the number of users) should be a last resort after every other appropriate approach has been exhausted.” My intent is twofold.

First, in the spirit of constructive criticism, I want to argue against strict adherence to these principles. Second, I want to point out how easy it is for research concepts to be distorted as they are translated into management principles.

Empirical Research

These two principles can be applied to the management of a variety of problems associated with

recreational use of wilderness. For illustrative purposes, I will use concern about the ecological impacts of camping as an example. Researchers have been studying impacts on wilderness campsites since the work, in the early 1960s, of Dale Thornburgh in the North Cascades of Washington and of Sid Frissell in the Boundary Waters Canoe Area of Minnesota. Their studies and subsequent ones have quantified the effects of camping on vegetation and soil, described how campsite impacts change over time, and identified how amount of campsite impact is influenced by characteristics of use and the environment. This information allows us to describe ecological impact problems and to suggest some potential solutions to these problems. Potential solutions include both indirect and direct management techniques, including the limitation and rationing of use.

But how does one decide between alternative solutions to campsite impact problems? This is the question that the two principles address. One obvious criterion is effectiveness. If everything else is equal, managers should select the most effective techniques. Unfortunately, empirical research on the effectiveness of alternative management techniques is extremely limited. Another obvious criterion is the effect of the technique on visitor experiences. If everything else is equal, managers should select techniques that contribute to “primitive and unconfined” types of experiences, because the Wilderness Act directs managers to provide opportunities for these types of experience. Again, there has been little empirical research on this topic. What has been studied are visitor opinions

about the desirability of alternative management techniques. However, there may be little congruence between visitor preferences and techniques that promote “primitive and unconfined” experiences.

Direct Vs. Indirect Techniques

Beginning with Al Wagar’s conceptualization of recreational carrying capacity in the early 1960s, and perhaps before, researchers have identified a wide variety of techniques for managing visitors and their ecological impacts. In 1972, in

lated. In 1978, with the publication of *Wilderness Management*, this classification became the fundamental distinction between management techniques, although the terminology was changed to direct (regulatory) and indirect (manipulative) techniques.

Early descriptions of these techniques provided objective discussions of the techniques without attempting to generalize about their relative desirability. In *Wilderness Management*, however, Hendee, Stankey and Lucas

the indirect techniques were light-handed, subtle and not restrictive of freedoms. Moreover, they stated that managers should not implement direct techniques until they had tried indirect techniques and found them to be inadequate. This requires the implicit assumption that the effect of the technique on visitor freedom is more important than its effectiveness in dealing with a problem such as ecological impact.

There are alternative opinions about direct and indirect techniques, however. Leo McAvoy and Dan Dustin argue that direct, regulatory actions, rather than restricting freedoms, actually expand them by reducing conflict. I have argued elsewhere that some direct techniques may be more light-handed, unobtrusive and acceptable to visitors than some indirect techniques. For example, it would not be unreasonable to suggest that requiring all visitors to pass an entry test that proves their camping skills (a commonly mentioned indirect technique) is much more authoritarian than implementing a direct technique such as a limit on group size. Moreover, even the little bit of empirical data that does exist shows that, among rationing options, charging an entrance fee (the indirect option) is more strongly opposed by visitors than the direct option of limiting permits through a mail reservation system

The issue of effectiveness is also important. Few writers have ever suggested that indirect techniques are likely to be as effective as direct techniques. As George Peterson and Dave Lime note, direct techniques aggressively enforced should change the behavior of all but the most ignorant and determined, while indirect techniques may only increase the likelihood that people will behave in desired ways. For example, in a recent study of the effectiveness of alter-



Alternative techniques & managing campsite impacts range from indirect techniques to direct techniques, including limitations on amount of use.

a paper on controlling overuse in the Boundary Waters Canoe Area, German Gilbert, George Peterson and Dave Lime listed alternative control measures which they classified as either regulatory or manipulative controls. For example, to reduce use in an impacted area, managers might only allow a certain number of visitors into the area (a regulatory control or they might charge an entrance fee in the hope that this would deter use (a manipulative control). In one case, amount of use is regulated directly; in the other it is indirectly manipu-

advanced their personal opinion that indirect techniques are preferable to direct techniques. They argued reasonably that “the concept of wilderness as an undeveloped, free, open and unconfined place accentuates the desirability of a management philosophy that is as indirect, unobtrusive and subtle as possible.” But then they conferred these desirable characteristics on all the techniques that had been classified as indirect. They argued that the direct techniques were heavy-handed, authoritarian and restrictive of freedoms, while

native techniques designed to keep people on trails and off of sub-alpine meadows in Mount Rainier National Park, the primary deterrent was the presence of a uniformed employee. Other studies have arrived at the same conclusion. Most people know what they are supposed to do, but many choose to do otherwise unless regulations are in place and enforced.

Despite lack of empirical support for the use of indirect management techniques, many wilderness management plans promise to apply direct techniques only after indirect techniques have been found inadequate. Many of these plans state that substandard conditions will not be tolerated; but even where numerous violations of acceptable condition standards are documented, managers are unwilling or unable to attack these problems aggressively. A major cause of this paralysis is strict adherence to the principle that indirect techniques need to be given a chance to work first. How long must we wait to be certain that a low impact educational program is inadequate to solve an impact problem at a particular campsite? Unfortunately, ecological impacts occur rapidly and impacted sites recover slowly. By the time it is clear that indirect techniques are inadequate, impact problems may be so widespread that the only likely solution to problems will be closure of large areas for decades (or relaxation of impact standards to accept higher levels of impact).

The fundamental principle, as Hendee, Stankey and Lucas state, is that "only the minimum regimentation necessary to achieve established management objectives is justified." Therefore, managers should select management techniques that are effective in solving impact problems and that do not unnecessarily restrict visitor freedoms. This may mean applying an

indirect technique; it may mean applying a direct technique. The problem comes with the attempt to develop general rules about what is necessary and about the relative restrictiveness of different techniques.

I hypothesize that as the specificity and intensity of problems increase, the need for direct management also increases. Visitor education (instilling a low-impact ethic) is a favorite example of an indirect technique because it has few negative effects on visitors. Education occupies one extreme on a spectrum of management techniques that is defined by the specificity of the problems being addressed and the time required for the technique to succeed. We should not expect education to solve specific problems in the short term. We should have wilderness visitor education programs, but these programs should not be confused with management programs targeted at specific problems in specific places. We need both. Indirect techniques, which generally involve manipulating access, facilities and information, are more narrowly focused on specific problems than education. Indirect techniques are likely to be most effective as proactive management techniques. Once specific kinds of impact problems are widespread at particular locations, direct attacks on these problems are most likely to succeed.

Use Limitation as a Last Resort

Since at least the 1960s it has been clear that some wildernesses are being overused, at least in some places. Starting in the early 1970s, managers of some of the most heavily-used wildernesses responded by limiting recreational use. Research has contributed to these efforts by studying the relationship between amount of use and amount of impact, by explor-

ing conceptually the advantages and disadvantages of alternative means of rationing limited use, and by assessing visitor support for use limits and these rationing alternatives. In a paper written in 1974, John Hendee advanced his opinion that "wilderness managers should regard across-the-board rationing of wilderness use as a last resort when all other measures have failed to control unacceptable impacts."

This sentiment and the "last resort" terminology was repeated in a paper by George Stankey and John Baden and in *Wilderness Management*. These authorities considered rationing to be a useful and sometimes necessary management option. However, they considered it to be the most restrictive of management options. Consequently, in line with the principle of minimum necessary regimentation, they concluded that rationing should be the last resort.

Again, there are alternative opinions about the onerousness of limiting use. Visitors generally express extremely high levels of support both for the notion of limiting use in overused places and for established use limitation programs. I would argue that restrictions on behavior, applied within the wilderness, conflict more with the intent of the Wilderness Act (with its concern for "unconfined recreation") than a limitation on amount of use, applied outside the wilderness. Individual freedom and spontaneity are greater in wildernesses with management programs that rely primarily on use limitation than in wildernesses with numerous restrictions on where you can go and what you can do. Perhaps use limits should be applied before it is necessary to implement numerous restrictions on behavior within the wilderness.

So far, strict adherence to the principle of limiting use only as a

last resort has caused few problems. Relatively few wildernesses have use levels so high that use limitation is warranted. However, problems may be on the increase. One recent trend, attributable to the reluctance to limit use, is the tendency to establish use limits only in those parts of the wilderness that are most crowded. This would seem to conform to the principle of minimum necessary regulation. The problem is that long-term consequences of this action are seldom considered. Where local limits have been established, problems almost always expand out from the original problem area in uncontrolled and unexpected patterns. Problems spread and internal restrictions on behavior increase until managers eventually adopt the wilderness-wide use limitation program they probably should have started with.

Lessons to be Learned

Managers of many wildernesses with widespread and well-documented impact problems are unable to adopt direct management techniques and use limits in particular, given the entrenched attitude that indirect techniques are best and that use limits should be the last resort. This has paralyzed many management programs. Direct actions and use limits are valid and necessary management approaches and should be given careful consideration by all wildernesses with well-documented impact problems. Management techniques should be selected on the basis of concern for both visitor freedoms and effective solutions to impact problems.

Any discipline as new as wilderness management is bound to contain a substantial amount of authoritative opinion that is subject to debate and that has never been substantiated. In both of the examples explored in this article, general

principles were advanced by pioneering researchers on the basis of a little empirical data, some solid conceptual and logical thinking and a heavy dose of personal opinion. These researchers should be applauded for trying to develop general management principles from minimal data. They were careful to state that the principles were simply their opinion and they were careful to include caveats, qualifications and exceptions. What more can scientists do?

First, scientists who advance authoritative opinions that have not been empirically substantiated can attempt to validate their opinions. For example, scientists advocating the use of indirect techniques could attempt to more objectively assess the obtrusiveness and restrictiveness of various techniques. They could test the correlation between these assessments of restrictiveness and their classification of management techniques. They also could test the effectiveness of alternative management approaches.

Second, other scientists can scrutinize these principles critically. Dustin and McAvoy did this in their article on direct and indirect techniques. The wilderness research community, of which I am a part, can be accused of too much dabbling and not enough depth. Too often one issue is studied, at one time, in one place. Several articles may be published from one limited study; a number of management implications may be advanced; and then the scientist moves on to another, usually unrelated, issue. Researchers rarely challenge the work and conclusions of their peers and they rarely attempt to confirm their own conclusions rigorously through alternative research designs or by studying the same issue at different times and in different places. There are many reasons for this, includ-

ing scarcity of research funds and a tendency to support highly site-specific and applied research. The result has been a tendency to generate dogma. In my opinion, wilderness researchers should continue the tradition of translating their empirical results into management implications; however, they should invest more energy in testing the validity of those conclusions and those of other researchers.

This problem is certainly not unique to the field of wilderness management. Daniel Doak and Scott Milk describe a similar situation in the rapidly developing field of conservation biology, where "some biologists have set forth central principles of conservation biology that are almost given the status of holy writ." They suggest that a major part of the solution to this problem is for scientists to accept the challenge of teaching complexity to managers instead of "snowing them with undefendable over-generalizations." Managers also need to recognize that the science of wilderness management, like the art of wilderness management, is in its infancy. Research on ecological impacts in wilderness will continue to build and help managers find better solutions to their problems. But managers need to read research reports more critically, paying particular attention to the distinction between empirically-supported research and authoritative but unsubstantiated opinion. Both managers and researchers need to be careful about translating complex ideas, full of qualifiers and caveats, into simple slogans. 🐾

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