

# Wilderness: a management framework

Wilderness cannot survive the draw-a-line-and-leave-it-alone philosophy

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**M**ANAGING wilderness to many people seems to be a paradox. Isn't a Wilderness<sup>1</sup> a piece of land with a line around it that is just left alone?

If this were true, life would be much simpler for the people responsible for managing Wilderness areas. Alas, it is not. The management required in Wilderness is different in many ways from resource management in situations outside Wilderness, but there exists a real management challenge if the objectives for which Wilderness was established are to be achieved.

Most public concern and controversy today surround classification of land as Wilderness, not its management. However, management cannot be ignored and Wilderness management issues postponed until the classification of new areas is finished. Change in Wilderness is too rapid to allow visitation to grow unmanaged and to let interference with natural ecological forces continue. Trying to correct damage is more difficult than preventing it. Furthermore, the classification process will take time—20 to 30 years or more. In addition, Wilderness<sup>1</sup> with a capital "W" refers to legally established Wilderness under the 1964 Wilderness Act; "wilderness" with a small "w" refers to wilderness in general.

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erness classification loses much of its meaning if management policies do not define, in effect, what classification actually accomplishes. Mere naming verges on empty symbolism.

The Wilderness Act sets objectives that define the results of Wilderness classification in general terms. But if management is ignored, there is no guarantee that even this general definition will actually still fit in the future as use pressures grow—the law is not self-enforcing. Society could very easily lose what it is trying to save.

The preoccupation with Wilderness classification at the expense of management is similar to the situation confronting us in the case of other resources, such as timber. We tend to be preoccupied with the *extensive margin* (how many acres are available) while often neglecting the *intensive margin* (what can be done to intensify management on the available acres to make them more effectively serve their intended purposes). Both margins are important, but ignoring the intensive margin seems unwise because ultimately the number of acres is fixed.

The overriding goal of Wilderness management is to permit natural ecological processes to work within a fairly large, unoccupied area. This follows the basic objective of the 1964 Wilderness Act (P. L. 88-577), which is "to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States. . . ."

Preservation of a sizable natural

community is not really an end in itself. Wilderness is kept unsettled and unmodified "to secure for the American people of present and future generations the benefits of an enduring resource of wilderness . . ." and areas "shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness. . . ." Wilderness is to be *used*, not locked up. The specific uses described in the Wilderness Act can be grouped into recreational, scientific, and educational activities.

There are also complications in Wilderness management arising from special exceptions in the law for existing private rights, emergencies, certain administrative activities, grazing, mining, and some other uses. However, these are side issues in a sense, and they will not be considered further here.

Managers must maintain natural processes and conditions as well as opportunities for solitude in the face of rapidly growing on-site use. The easy solution of banning visitation is ruled out. The act recognizes that visitation and outside influences make absolutely unmodified natural conditions unattainable. The ideal Wilderness, as defined in the act, "is an area where the earth and its community of life are untrammelled<sup>2</sup> by man, where man himself is a visitor who does not remain . . . , land retaining its primeval character and influence, without per-"  
<sup>2</sup>"Untrammelled" means uncontrolled or unfettered, not untrampled as is sometimes read.



Forest Service photo by James Hughes

manent improvements or human habitation. . . ." This ideal is qualified by the statement in the act that the Wilderness "generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable. . . ." Yet, this statement only reflects an acceptance of unavoidable departures from the ideal. Management still must seek to minimize departures rather than view this statement as a loophole endorsing deliberate change.

Unlike managers of most conventional resources, Wilderness managers must not seek to enhance productivity, but rather to let Mother Nature have her way. Nature is amoral. Particular species or processes are not inherently good or bad in Wilderness; thus many of our usual ways of thinking need drastic revision in the Wilderness management context (5). In Wilderness, for example, elk are no more important than woodpeckers, squirrels, or any other species.

The Wilderness resource is not just a composite of conventional resources (soil, vegetation, water, and wildlife), although these exist in Wilderness. Rather, it consists of naturalness and solitude, qualities that can only be found in unmodified, uncrowded land. Consequently, the Wilderness resource is not synonymous with the recreation resource.

Recreationists must take Wilderness as it is. Their activities must harmonize with the maintenance of natural conditions as well as with the retention of opportunities for solitude. Often this means managers must pass up chances to enhance recreation

opportunities. Wilderness will not always or necessarily be as beautiful or offer the best possible fishing or hunting. It definitely will not be as convenient and comfortable as recreation management could make it. Deliberate management to enhance recreation attractions would shortchange those seeking what Wilderness is meant to offer—the fascination of the natural scene, the observation of natural processes at work, and the challenge of essentially undeveloped land.

The philosophy that wilderness recreation involves taking wilderness "straight" has evolved over the past 40 years. An early proponent of wilderness, Bob Marshall (13), saw the need for two types of roadless areas: one managed primarily for primitive, dispersed recreation; the second managed to perpetuate natural ecosystems as unmodified as possible. However, a program providing for these two types of areas was never implemented. As a result, managers tended to drift toward the recreation area concept.

Then, passage of the Wilderness Act in 1964 called for the natural ecosystem type of area in which recreation is on the Wilderness' terms, rather than the dispersed recreation type of area. Not all people agree that this is the primary objective of the act, but it is the basis for the following discussion of Wilderness management.

#### Management Principles

Wilderness management has two major aspects: ecological and social. The ecological aspect can be subdivided into (a) maintaining as much

of the integrity of basic ecological processes as possible, and (b) controlling visitor impacts.

#### Maintaining Ecosystem Integrity

If ecological processes operate essentially uncontrolled within the Wilderness frame of reference, the results, whatever they might be, are desirable by definition. The object is not to stop change, nor to recreate conditions as of some arbitrary historical date, nor to strive for change favorable to big game or scenery. The object is to let nature "roll the dice" and accept what results with interest and scientific curiosity.

Civilization has affected many ecological processes in wilderness, but fire is probably the most altered natural influence to date (4). Looming on the horizon is the possibility of modifying weather—a basic ecological factor that could be as major an alteration as fire. Insects, disease, windstorms, avalanches, geological erosion, and so on are also important factors (not disasters as they would be called outside Wilderness), but modern man has changed these forces less than fire. Man has introduced both insects and diseases, but some of the more serious—white pine blister rust, chestnut blight, Dutch elm disease, gypsy moth, and larch casebearer, for example—affect species that are uncommon in most Wilderness areas. In any case, man's ability to undo these kinds of man-caused damage is much more limited than in the case of fire. However, for fire, there are management options and alternatives. Fire was a major force in the natural eco-

system, producing what the first explorers found in most places (4, 1). During the last 40 years, firefighters armed with radios, airplanes, parachutes, gasoline engine pumps, bulldozers, chemical retardants, infrared scanners, and other technological aids have greatly reduced fire's effect as an ecological force. This is reflected by encroachment of trees on meadows and brush fields and by reduction of some wildlife populations, particularly deer and elk, in a number of Wildernesses (15).

Excluding fire has unnatural ecological effects, but a hands-off approach to fire control in Wilderness is also unrealistic (4, 7, 5). Danger to lives and adjacent areas requires some degree of control in some places. There is also the contention that today's Wilderness areas are too small and valuable a remnant of primitive America to risk letting large portions burn at one time. Finally, where fire has been excluded for many decades, fuels may have accumulated to the point of setting the stage for an unusually severe fire, particularly in those plant communities having histories of frequent light fires.

Research and management are developing the ability to let fire approximate its natural role. We are learning how to control fire's undesirable effects, while reintroducing it to the ecosystem in a limited way. Wilderness managers need better knowledge of fuels, natural fire barriers, fire-danger rating, weather behavior, and new control methods in order to let some natural fires burn freely with less risk than presently. This is being done experimentally by the National Park Service in Sequoia-Kings Canyon and several other National Parks (7) and by the Forest Service in the Selway-Bitterroot Wilderness. The constraints inherent in letting natural fires burn could lead to prescribed burning as a means of supplementing natural fires.

Deliberate, planned action—for example, modified fire control or fire management—is essential to offset the unintentional or unavoidable effects of civilization. The alternative, usually called "preservation," is self-defeating because preserving the status quo is impossible. The preservation alternative leaves out important natural forces, especially fire. It is therefore bound to produce sure, steady

change to something very different from the original North American wilderness and unlike the environment specified as an objective in the Wilderness Act. Of course, the goal of an unmodified ecosystem is not 100 percent attainable, but this is no reason for not trying.

The policy choice is really between unintentional, accidental, inescapable man-caused change away from natural conditions on the one hand and deliberate planning to reduce and offset man's impact on the other hand. Noninterference is not one of the available choices. The mistaken belief that it is poses a real threat to perpetuation of the wilderness as a natural ecosystem.

#### *Controlling Visitor Impacts*

Visitor impacts on wilderness—loss of vegetation and soils (primarily at campsites and trails), possible water pollution, littering and vandalism, and conflicts with wildlife—constitute the second ecological management issue. Research indicates that even light use can produce large ecological changes (2). However, some change seems acceptable under provisions of the Wilderness Act.

Control of visitor impacts in most developed recreation areas involves such practices as "hardening" sites with asphalt or cement, constructing facilities, or fertilizing, irrigating, and planting. These are generally inappropriate in Wilderness. Their use only trades more of one kind of unnatural, man-caused change for less of another. However, there may be cases where the gain from such practices outweighs the loss, or where alternatives are lacking. This could be especially true for some nonstructural remedial practices—for example, planting and fertilizing species severely affected by overuse or reintroducing a native animal eliminated by man. Usually, visitor impacts need to be minimized by managing visitors, however.

The growing numbers of visitors render visitor management increasingly difficult. From 1950 to 1970, reported visits to the national forest wilderness and primitive area system grew from less than 250,000 to over 2 million. Administrators also report substantial increases in use of similar lands managed by other federal agencies. This increase has taken place

on an area that has remained essentially constant at about 14½ million acres since the late 1930s. (For comparison, 14½ million acres is about one-fourth the area of Wyoming.) Projections of Wilderness use also point to large potential growth (14, 18), although limited capacity could cut off the increase.

Visitor management might include modifying numbers of visitors, length of visits, timing of use, geographical distribution of use, party size, method of travel, and behavior. Uses having heavy impacts need to be replaced with uses having less impacts, which would enable the manager to reduce impacts or to allow more use for a given level of impact.

Although our knowledge is far from adequate, a tentative ranking (from high to low) of impacts of different types of parties has been suggested by John Hendee: (1) large parties with horses, (2) small parties with horses, (3) large hiking parties camping overnight, (4) small hiking parties camping overnight and building wood fires, (5) large parties of day hikers, (6) small hiking parties camping overnight using campstoves and not building wood fires, and (7) small parties of day hikers.<sup>3</sup> Hendee also pointed out that the objective is to ration the environmental expense of use, not just use per se.

#### **Social Management**

The social aspect of Wilderness management relates both to protecting and enhancing the quality of the visitor's experience. This ties directly to ecological problems, especially visitor impacts, because ecosystem deterioration also affects the visitor's experience. Dimensions under potential management influence include use levels, types of use, patterns of use, visitor behavior, level of development, education-information efforts, and kinds of regulations imposed. Four concepts seem particularly important in managing experience quality: (1) developing the opportunity spectrum, (2) managing the wilderness periphery sensitively, (3) respecting visitors'

<sup>3</sup>This is a slightly revised version of a ranking presented in several public lectures on "Principles of Wilderness Management" by John Hendee, Pacific Northwest Forest and Range Experiment Station. I have reservations about the implication that short stays are preferable to longer visits, but the list illustrates the basic idea.

freedom, and (4) providing opportunities for solitude.

### *Developing Opportunities*

Wilderness provides only one part of a broad spectrum of recreational experiences. Present management programs tend to be polarized. The emphasis is at the two ends of the spectrum—Wilderness at one end and developed areas at the other end—at the expense of intermediate opportunities. In particular, intermediate, semiwilderness areas managed for roadless recreation need more emphasis (11).

Many constraints with which Wilderness managers must deal would be lifted in the roadless recreation area or backcountry as it is often called. It could be managed to enhance scenery, fish and wildlife, and forage for recreational stock. It could, at least in part, be made more comfortable and convenient than Wilderness through greater development of simple facilities (bridges, toilets, water supplies, trail shelters, horse corrals, drift fences, etc.). At the same time, management could increase other outputs that are possible without roads, such as water, grazing, and perhaps even some timber harvesting by new technologies using helicopters.

Backcountry areas could provide a quality primitive recreation experience desired by many people, for example, good hike-in fishing, which Wilderness provides somewhat incidentally and not always well (6, 17.) If people seeking this type of opportunity could find it better outside Wilderness, this could help free Wilderness to serve its own function.

Wilderness should be managed for those users truly dependent on experiencing the Wilderness setting of natural ecosystem and solitude. However, discouraging or turning away users seeking other experiences not dependent on Wilderness will be difficult and inequitable without developing alternative areas for them.

Intermediate backcountry areas could also accommodate substantially more people per acre than Wilderness, especially if they were managed well. In addition, expanded recreational trail systems need to be developed and maintained outside special areas such as Wilderness or backcountry. People who just want to hike should not almost be forced into Wilderness or

related areas (11).

### *Managing the Wilderness Periphery*

Wilderness does not exist in a vacuum and cannot be managed in one. Management decisions for lands adjacent to Wilderness must consider their effects on Wilderness. Access is particularly critical. Roads close to attractions within Wilderness can drastically affect the amount and type of use and resulting impacts, as can many types of developments, such as large campgrounds and resorts near Wilderness accesses. In many situations a zone between road's end and the Wilderness boundary managed as an intermediate backcountry recreation area could relate well to use patterns and visitor desires.

### *Respecting Visitors' Freedom*

It is especially important in Wilderness to try to preserve the independence, spontaneity, and freedom from regimentation that are major parts of the Wilderness experience. Authoritarian controls must be avoided if possible. Assigning routes of travel, for example, may achieve desired distribution patterns; but doing so may also trade one adverse impact for another.

Two management approaches seem helpful in achieving this more subtle control of use:

1. Apply necessary controls at the access point, for example, restricting the numbers of visitors, methods of travel, and party size at the times and trailheads where needed, but allow any visitor admitted the freedom to roam within the Wilderness. Knowledge of visitor traffic flow patterns within Wilderness areas would make it possible to keep use at any location close to a desired level.

2. Do not use controls if decisions can be influenced by information, education, and persuasion. High educational levels typical of Wilderness visitors and our knowledge of their motivations and attitudes make this a potentially useful, inoffensive approach.

Study after study has shown extremely uneven distribution of use, spatially and temporally (9, 12), yet a degree of solitude is important to many visitors (16, 17). Simply informing potential visitors of crowded and uncrowded times and places might substantially redistribute use. If backcountry areas were developed and the differences between these and

Wilderness were explained, a good deal of use might be voluntarily diverted. Furthermore, much abuse of Wilderness results from a lack of knowledge of proper behavior. I found that two-thirds of the visitors to the Spanish Peaks Primitive Area in Montana did not know the accepted way to handle their unburnable garbage (pack it in, pack it out).

The subtle approach to visitor control requires more knowledge of Wilderness visitors and their behavior and ideas than does authoritarian regulation. The advantages of such an approach seem well worth some extra effort to acquire the additional information. One of the most valuable sources of essential management information would be a mandatory visitor permit, which would also be necessary for any real control of use.<sup>4</sup>

### *Providing Opportunities for Solitude*

Solitude is an essential quality of Wilderness. The law defines a Wilderness, in part, in terms of solitude, and most visitors consider it an important characteristic (16, 17, 6, 10). But solitude will not continue to exist in the face of rapidly growing use without a major management effort.

Carrying capacity is often used loosely in connection with desirable Wilderness use intensities, but it is a poor term. The analogy with the carrying capacity of a range in terms of animal unit months (AUM) is misleadingly simple. In Wilderness the carrying capacity depends both on (a) avoiding excessive impacts on soil, vegetation, water, etc., and (b) protecting the quality of solitude in the visitor's experience. Compared to grazing, where each AUM is reasonably comparable and usually constant from day to day, Wilderness use encompasses a fluctuating mixture of users having substantially different impacts. No magic number of users constitutes capacity. Instead, numerous effects of use must be kept within limits of acceptable change (3).

Solitude is a particularly complex factor (19, 8). It is not absolute. The Wilderness Act speaks of "outstanding opportunities for solitude" rather than guaranteed solitude everywhere at all

<sup>4</sup>There is extensive discussion of permit systems in an article, "Mandatory Wilderness Permits: A Necessary Management Tool," by John C. Hendee and Robert C. Lucas, *J. Forestry* 71(4): 206-207. 1973.

times. Solitude is not even quite the right word, for it implies one person isolated from others, and almost all Wilderness visitors are in groups. Solitude really means that a group will not encounter other groups or at least not too many other groups.

The number of other groups met is only one determinant of "too many." Also important is the type of group met, especially its size and method of travel, and the place of encounter (16, 10). Large parties have an adverse effect on the experience of others (16). Horseback parties adversely affect hikers more than other hikers do. The negative impact of motorboat, trailbike, or airplane use (mostly outside the Wilderness system) on nonmechanized travelers is particularly severe (10, 16). This has important implications for backcountry policy. Campsite solitude is more critical than freedom from encounters on the trail. In general, the types of users that have a more severe impact on the physical environment also tend to have a greater impact on the visitors' experience, particularly the solitude component.

Management to protect a degree of solitude must be visitor management. Ultimately, rationing use will be necessary. It is needed now, at least in sections of some heavily used Wildernesses. There will be difficult decisions in choosing the right mix of possible rationing techniques from a wide range of possibilities, such as reservations: first-come, first-served (used in several National Parks in 1972); lotteries; fees; tests of knowledge and skill; etc. Decisions on rationing techniques would also benefit greatly from better knowledge of visitors. However, in most areas skillful management based on better knowledge of Wilderness users could increase capacity and reduce the need for rationing. This could be done largely through management to encourage uses that have less impact on the environment and the visitors' experience, such as fewer horses, smaller parties, more gas stoves, fewer wood fires, and through redistributing use to less-used places and times.<sup>5</sup> The man-

<sup>5</sup>This does not mean numbers of visitors should be uniform everywhere. Diversity is desirable because resource capabilities and visitors' desires vary. Maintaining the "outstanding opportunities for solitude" mentioned in the Wilderness Act also requires some lightly visited areas.

ager can also reduce the need for rationing through programs to improve visitor behavior by increasing their knowledge of wilderness skills and etiquette.

### The No-Management Myth

The draw-a-line-and-leave-it-alone philosophy of Wilderness management is a myth. Neither the ecosystem nor the social system of Wilderness use can survive such neglect. The management of use is particularly essential.

What place does this leave for the skills of the soil, plant, or animal scientist? Their contributions are urgently needed. Some management decisions must be based largely on physical factors. For example, where should a new or relocated trail be built to minimize erosion or adverse impacts on wildlife? Decisions aimed at maintaining a natural ecosystem need to be based on knowledge of physical and biological processes. How much of what type of erosion is natural in a particular situation? What types of soil movement might result from a modified fire policy?

Furthermore, many use controls depend on knowledge of underlying physical factors. For example, an opening date for allowing horse use depends on knowledge of the timing of soil moisture changes and the relation of levels of soil moisture to the physical impact of churning hooves. How does physical impact vary as a function of party size or length of stay at the same site? What is the human waste absorptive capacity of different soils, at different elevations?

Wilderness management is a complicated, fascinating challenge that requires the skill of many professions. Few disciplines have cause to worry about unemployment because of wilderness classification. Drawing the Wilderness boundary line is only the beginning, not the end of planning, decision-making, and management.

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