

INDICATORS TO MONITOR THE WILDERNESS RECREATION EXPERIENCE

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ABSTRACT. Mere designation of an area as Wilderness does not insure that desired wilderness conditions will be achieved. Managers seeking to document how much change is occurring in wilderness conditions have increasingly looked to the use of indicators, which are defined as specific elements of the wilderness setting that change in response to human activities. Physical, social, and managerial setting attributes can be used to indicate the quality of the wilderness recreation experience. However, even the most ambitious monitoring program will only be able to include a limited number of indicators. Nine criteria, which reflect important characteristics indicators should possess, are presented in this paper to help guide indicator selection. Eighteen potential indicators are identified which could be used to reflect the ability of the wilderness area to provide visitors with the opportunity to feel close to nature, see unmodified natural environments, and experience solitude, intragroup intimacy, challenge, health, and freedom of choice. Managers are encouraged to select indicators tailored to their particular area by first interviewing visitors to determine which specific setting attributes really enhance or detract from the experience.

In many ways, wilderness is a state-of-mind--a feeling about a place rather than anything physical (Nash 1978). The experience has long been an integral component of wilderness as evidenced in Bob Marshall's definition:

Wilderness is a region which contains no permanent inhabitants, possesses no possibility of conveyance by any mechanical means and is sufficiently spacious that a person in crossing it must have the experience of sleeping out. The dominant attributes of such an area are: First, that it requires any one who exists in it to depend exclusively on his own effort for survival; and second, that it preserves as nearly as possible the primitive environment (Hendee, Stankey and Lucas 1978).

The need for managers to pay as much attention to the experience component of wilderness as to physical and biological components became legally mandated with passage of the Wilderness Act (PL88-577). The Act directs managers to protect and manage wilderness to provide visitors with outstanding opportunities for solitude or a primitive and unconfined type of recreation. However, mere designation of an area as Wilderness does not insure this goal will be achieved. Recreation use, poorly located and maintained trails, livestock grazing,

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fire suppression, mining, exotic species introduction, air pollution, adjacent land uses and excessive visitor regulation threaten to destroy the very values wilderness areas were designated to protect (Vento 1988).

Managers seeking to monitor how much change is occurring in wilderness conditions have increasingly looked to the use of indicators, which are defined as specific elements of the wilderness setting which change in response to human activities. Indicators can be viewed as a means of reducing a large amount of information down to its simplest form while still retaining the essential information needed to make decisions (Ott 1978). Ideally, indicators can be used to present information in an understandable form that is easily communicated, serve as a tool to examine trends and highlight problems, and act as an early warning system to predict future conditions (Ott 1978, Walker and Norton 1982). Just as lichen species composition is used to reflect air quality or the crime rate is used to reflect city life quality, the number of groups camped within sight or sound of each other can be used to reflect the quality of the wilderness experience. Because managers clearly cannot monitor every aspect of the wilderness setting, there is a need to select a limited number of indicators. However, no one indicator constitutes a comprehensive measure of the overall quality of the wilderness experience, thus managers will need to select a bundle of complementary indicators to adequately assess overall quality. When compared with standards set for acceptable limits of change, indicators can signal the need for corrective management action, evaluate the effectiveness of various management actions, and provide quantitative documentation on whether management objectives are being achieved.

THE NEED TO EVALUATE INDICATORS

Even the most ambitious monitoring program will only be able to include a limited number of indicators, thus managers must select the indicators that will provide the most meaningful information. Criteria that reflect important properties can help managers select the best indicators. Table 1 presents nine criteria which can be used to guide indicator selection. These criteria could be weighted in terms of their importance to managers to tailor indicator selection for a particular wilderness.

Table 1. Criteria to guide indicator selection.

Quantitative - Can the indicator be measured?

Correlation - Does the indicator detect a change in conditions caused by human activities?

Feasible - Can the indicator be measured by field personnel using simple equipment and sampling techniques?

Reliable - Can the indicator be measured reliably (i.e. with training, will different observers collect the same information)?

Responsive - Does the indicator detect a change in conditions which is responsive to management control?

Sensitive - Can the indicator detect a change in conditions which occurs within one year?

Integration - Does the indicator reflect the condition of more than itself?

Early Warning - Does the indicator act as an early warning, alerting managers ability to deteriorating conditions before unacceptable changes have occurred?

Significance - Does the indicator detect a change in conditions which persists for a long time (e.g. 5 years), disrupts ecosystem functioning, or reduces the future desirability of the area to visitors?

PSYCHOLOGICAL BENEFITS FROM THE WILDERNESS EXPERIENCE

Managers seeking to monitor whether their area is truly providing outstanding opportunities for visitors to obtain a wilderness experience must ask--what conditions am I trying to achieve? To answer this, managers must first understand what draws people to visit wilderness. Numerous studies have been conducted to determine the psychological outcomes which recreationists seek on wilderness trips. Six broad psychological outcomes can be identified from these studies (Converse 1981, Brown and Haas 1980, Manfredo et al. 1983, Lucas 1985):

1. Solitude / Escape Pressures
 - get away from crowds
 - experience peace of mind, spiritual rejuvenation
 - reflect on personal values
2. Closeness to Nature
 - seeing unmodified natural environments
 - learning about nature
 - observing beauty in nature
3. Freedom of Choice
 - to do things your own way, independence, self-reliance
 - to feel free of society's restrictions
 - to feel control over your social environment
4. Challenge
 - develop skills
 - to find out what you can do
 - adventure, thrills
5. Intragroup Intimacy
 - to get to know friends better and share common experiences
 - develop trust and bonds between group members
6. Health / Exercise
 - keep physically fit
 - breathe clean air

Managers cannot manage the wilderness experience directly; however, they can control the type of activities permitted and setting attributes to provide the opportunity for visitors to obtain desired psychological outcomes (Driver and Brown 1975). Wilderness activities typically include hiking, camping, horse riding, canoeing, ski touring, snowshoeing, hunting and fishing. Wilderness settings are characterized by unmodified natural environments, low interactions between visitors and few, if any, developments. Monitoring the type of wilderness activity visitors participate in does not appear to offer any insight into the quality of the experience. However, wilderness setting attributes have been found to either enhance or detract from the visitor's experience, and thus can be used to indicate the quality of the experience (McCool 1983).

WILDERNESS SETTING ATTRIBUTES

Setting attributes can be classified as either physical, social, or managerial. Managers should not concentrate solely on social setting attributes, for physical and managerial setting attributes also contribute to the quality of the wilderness experience and may prove to be a valuable source of indicators.

Physical Setting Attributes

Physical setting attributes found to enhance the wilderness experience for visitors include the presence of wildlife and fish, streams, clean water, wide views, rugged terrain, trailless areas, and remote lakes (Manfredo et al. 1983, Lucas 1980). Clean air and clear vistas have also been found to contribute significantly to visitors' wilderness experience (Malm et al. 1984). Physical setting attributes that detract from the wilderness experience include campsite vegetation and soil impacts, the presence of domestic animals, trail deterioration, and structures (Manfredo et al. 1983, Hoover et al. 1985, Lucas 1985).

Social Setting Attributes

Stankey (1971) and Al-Hoory (1973) recognize four aspects of the social setting which affect the visitor's experience: amount of use, encounter type, encounter location and group behavior. Campsite privacy is one of the most desired aspects of the wilderness experience, thus the lack of encounters while camping significantly enhances the wilderness experience (Lucas 1985, Stankey and McCool 1984). Social attributes that detract from the wilderness experience include groups that violate no-trace camping ethics (especially by leaving litter), contacting other groups, and outfitter groups (Manfredo et al. 1983, Womble et al. 1980). Backpackers often report that seeing horse groups and manure on trails and campsites detracts from the experience (Lucas 1985). The noise of motorized equipment detracts from the wilderness experience because it conflicts with values such as solitude and tranquility.

Managerial Setting Attributes

Managerial actions that enhance the visitor's experience include: restrictions on domestic livestock, general and no-trace camping information dissemination, restrictions on outfitters, restrictions on group size, and resource restoration (Manfredo et al. 1983, Lucas 1985). Primitive trails in good condition and bridges also enhance the wilderness experience (Lucas 1980). Managerial actions that detract from the visitor's experience include: restrictions on visitor use or route selection, and developments such as grated fireplaces and picnic tables (Manfredo et al. 1983, Lucas 1985).

POTENTIAL INDICATORS TO MONITOR THE WILDERNESS EXPERIENCE

The following indicators are intended only as suggestions of what aspects of the wilderness setting might be monitored to indicate the quality of the wilderness experience. Very few wilderness areas have monitoring programs which include indicators to monitor experience quality, thus most of the indicators suggested here have not been tested in the field. Additional indicators which could be included in a monitoring program can be found in Merigliano (1987). Managers should use this list of potential indicators only as a starting point. The best indicators will be those which are tailored to the particular area. This requires a thorough understanding of the specific attributes that draw visitors to a particular wilderness area.

Indicators that reflect the ability of the area to provide visitors with the opportunity to feel close to nature and see unmodified natural environments include:

1. Number of campsites above an acceptable impact index
2. Percent of visitors who report seeing wildlife
3. Range condition and trend
4. Air visibility - extinction coefficient or visual range
5. Litter quantity - number of pieces of litter per campsite or per trail mile; number of pounds of garbage packed out each season
6. Number of manager-created structures

Indicators that reflect the ability of the area to provide visitors with the opportunity to experience challenge, health and exercise include:

1. Number of signs per trail mile
2. Trail condition - length of multiple trail or number of trail miles with unacceptable problems to visitors (e.g. depth exceeding 8 inches, year-round muddiness)
3. Length of trail in areas managed as trailless
4. Fecal coliform/fecal streptococci ratio (drinking water quality)

Indicators that reflect the ability of the area to provide visitors with the opportunity to experience solitude and intragroup intimacy include:

1. Number of occupied campsites within sight or sound of each other or visitor report of number of groups camped within sight or sound
2. Number of violations of no-trace regulations
3. Percent of groups carrying a stove (not using a campfire)
4. Number of occurrences of unburied human feces
5. Number of occurrences of motorized noise per day

Indicators that reflect the ability of the area to provide visitors with the opportunity to experience freedom of choice include:

1. Percent of season wilderness rangers are out patrolling the area
2. Number of regulations that limit visitor use or restrict travel
3. Number of regulatory signs posted beyond trailhead

Indicators such as the number of visitors or groups per area are often suggested to monitor environmental impact and the ability of the area to provide solitude. While there is a positive relationship between the number of visitors in an area and the number of encounters between visitors, the amount of use does not indicate where the encounter occurs, the type of group encountered, or the behavior of the visitors encountered, all of which are critical in determining the quality of the experience. Furthermore, few studies have found a relationship between the amount of visitor use and the amount of environmental impact (Cole 1986). Until the relationship between visitor use and actual environmental and experiential conditions is better understood, indicators of visitor use appear to be of limited value.

Likewise, managers should avoid selecting indicators which incorporate visitor perception to try to monitor changes in the wilderness experience. Indicators such as perceived crowding and visitor satisfaction do not reflect an objective view of the experience but rather reflect visitors' perceptions of the experience. Because many variables influence how a visitor

evaluates the conditions encountered, it will be difficult to determine whether an actual change in the quality of the experience has occurred (Stankey and Schreyer 1987). However, this does not in any way imply that managers should stop talking with visitors. Visitor evaluation and preference plays a very important role in setting standards for acceptable limits of change. Visitor information is also critical in designing and implementing an effective education program.

Clearly, more research is needed to evaluate indicators in various settings and determine which indicators really provide managers with the best information. However, managers should not wait for definitive answers before beginning a monitoring program. Only by implementing monitoring programs in many wilderness areas now will we begin to learn how human activities impact the recreation experience.

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