Managing Impacts of Ecotourism Through Use Rationing and Allocation

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Introduction

Preceding chapters of this book clearly demonstrate a range of environmental (and related social) impacts that can arise from ecotourism. These impacts require management to ensure that significant natural and cultural resources of destination areas are protected, a fundamental principle of ecotourism (Lindberg et al., 1998). Moreover, degradation of natural and cultural resources may undermine the quality of visitor experiences, and this, too, may ultimately threaten the concept and practice of ecotourism.

Recreation Management Practices

Theoretically, there are many practices that might be applied to managing environmental impacts of ecotourism. It is useful to organize these management practices into classification systems to illustrate the broad spectrum of alternatives available. One classification system defines alternatives on the basis of management strategies (Manning, 1979). Management strategies are basic conceptual approaches to management that relate to achievement of desirable objectives. Four basic strategies can be identified for managing outdoor recreation as illustrated in Figure 1. Two strategies deal with supply and demand: the supply of recreation opportunities may be increased to accommodate more use, or the demand for recreation may be limited through restrictions or other approaches. The other two basic strategies treat supply and demand as fixed,
and focus on modifying either the character of recreation to reduce its adverse impacts or the resource base to increase its durability.

There are a number of sub-strategies within each of these basic management strategies. The supply of outdoor recreation areas, for example, can be increased in terms of both space and time. With respect to space, new areas may be added or existing areas might be used more effectively through additional access or facilities, such as trails and campsites. With respect to time, some recreation use might be shifted to off-peak periods. Within the strategy of limiting demand, restrictions might be placed on the total number of visitors that are allowed or their length of stay. Alternatively, certain types of use that can be demonstrated to have high environmental and/or social impacts might be restricted. The third basic management strategy suggests reducing the environmental or social impacts of existing use. This might be accomplished by modifying the type of character of use or by dispersing or concentrating use according to resource capability or user compatibility. A final basic management strategy involves increasing the durability of the resource. This might be accomplished by hardening the resource itself (through intensive maintenance, for example) or developing facilities (such as boardwalks or tent pads) to accommodate use more directly.

A second system of classifying management alternatives focuses on tactics or actual management practices. Management practices are actions or tools applied by managers to accomplish the management strategies described above. Restrictions on length of stay, differential fees, and use permits, for example, are management practices designed to accomplish the strategy of limiting recreation demand or rationing. Management practices are often
classified according to the directness with which they act on visitor behavior (Gilbert et al., 1972; Lime, 1977; Peterson and Lime, 1979; Chavez, 1996). As the term suggests, direct management practices act directly on visitor behavior, leaving little or no freedom of choice. Indirect management practices attempt to influence the decision factors upon which visitors base their behavior. A conceptual diagram illustrating direct and indirect recreation management practices is shown in Figure 2. As an example, a direct management practice aimed at reducing campfires in a wilderness environment would be a regulation barring campfires and enforcement of this regulation. An indirect management practice would be an education program designed to inform visitors of the undesirable ecological and aesthetic impacts of campfires and encourage them to carry and use portable stoves instead. A series of direct and indirect management practices is shown in Table 1.

A growing body of research has focused on selected recreation management practices and their potential effectiveness. Much of this research has examined two of the most common management practices: (1) use rationing and allocation, and (2) information and education. This chapter addresses the former, while the next chapter addresses the latter.

**Use Rationing and Allocation**

Substantial attention has been focused on the management strategy of limiting the amount of use that parks and related ecotourism areas receive. Use rationing is controversial and is often considered to be a management approach of "last resort" because it runs counter to the basic objective of providing public access to parks and related areas (Hendee and Lucas, 1973, 1974; Behan, 1974; Behan, 1976; Dustin and McAvoy, 1980). However, limits on use may be needed
to protect the integrity of critical park and ecotourism resources and to maintain the quality of the recreation experience.

Rationing and Allocation Practices

Five basic management practices have been identified in the literature to ration and allocate recreation use (Stankey and Baden, 1977; Fractor, 1982; Shelby et al., 1989; McLean and Johnson, 1997). These include (1) reservation systems, (2) lotteries, (3) first-come, first-served or queuing, (4) pricing, and (5) and merit. A reservation system requires potential visitors to reserve a space or permit in advance of their visit. A lottery also requires potential visitors to request a permit in advance, but allocates permits on a purely random basis. A first-come, first-served or queuing system requires potential visitors to “wait in line” for available permits. A pricing system requires visitors to pay a fee for a permit which may “filter out” those who are unable or unwilling to pay. A merit system requires potential visitors to “earn” the right to a permit by virtue of demonstrated knowledge or skill.

Each of these management practices has potential advantages and disadvantages, which are summarized in Table 2. For example, reservation systems may tend to favor visitors who are willing and able to plan ahead, but these systems may be difficult and costly to administer. Lotteries are often viewed as eminently “fair,” but can also be cumbersome and costly to administer. Although relatively easy to administer, first-come, first-served systems may favor visitors who have more leisure time or who live relatively close to a park or related areas. Pricing is a commonly used practice to allocate scarce resources in free-market economies, but
may discriminate against potential visitors with low incomes. Merit systems are rarely used, but may lessen the environmental and social impacts of use.

Several principles or guidelines have been suggested for considering and applying use rationing and allocation practices (Stankey and Baden, 1977). First, emphasis should be placed on the environmental and social impacts of recreation use rather than the amount of use *per se*. Some types of recreation use may cause more impacts than others. To the extent that such impacts can be reduced, rationing use of recreation areas can be avoided or at least postponed. Second, as noted above, rationing use should probably be considered a management practice of last resort. Less direct or "heavy-handed" management practices would seem more desirable where they can be demonstrated to be effective. Third, good information is needed to implement use rationing and allocation. Managers must be certain that environmental and/or social problems dictate use rationing and that visitors are understood well enough to predict the effects of alternative allocation systems. Fourth, combinations of use rationing systems should be considered. Given the advantages and disadvantages of each use-allocation practice, hybrid systems may have special application. For example, half of all permits might be allocated on the basis of a reservation system and half on a first-come, first-served basis. This would serve the needs of potential visitors who can and do plan vacations in advance as well as those whose jobs or lifestyles do not allow for this. Fifth, use rationing should establish a linkage between the probability of obtaining a permit and the value of the recreation opportunity to potential visitors. In other words, visitors who value the opportunity highly should have a chance to "earn" a permit through pricing, advance planning, waiting time, or merit. Finally, use-rationing practices should be monitored and evaluated to assess their effectiveness and fairness. Use rationing for
recreation is relatively new and is likely to be controversial. Special efforts should be made to ensure that use-rationing practices accomplish their objectives.

*Fairness.* A critical element of use-rationing and allocation practices is “fairness” (Dustin and Knopf, 1989). Parks, outdoor recreation areas, and others ecotourism sites administered by federal, state, and local agencies are public resources. Use-rationing and allocation practices must be seen as both efficient and equitable. But how are equity, fairness, and related concepts defined? Several studies have begun to develop important insights into this issue. These studies have outlined several alternative dimensions of equity and measured their support among the public.

One study identified four dimensions of an overall theory of “distributive justice” (Shelby et al., 1989). Distributive justice is defined as an ideal whereby individuals obtain what they “ought” to have based on criteria of fairness. A first dimension is “equality” and suggests that all individuals have an equal right to a benefit such as access to parks and outdoor recreation. A second dimension is “equity” and suggests that benefits be distributed to those who “earn” them through some investment of time, money, or effort. A third dimension is “need” and suggests that benefits be distributed on the basis of unmet needs or competitive disadvantage. A final dimension is “efficiency” and suggests that benefits be distributed to those who place the highest value upon them.

Insights into these dimensions of distributive justice were developed through a survey of river runners on the Snake River in Hell’s Canyon, Idaho, USA (Shelby et al., 1989). Visitors were
asked to rate the five use allocation practices described above – reservation; lottery; first-come, first-served; pricing; and merit – on the basis of four criteria: perceived chance of obtaining a permit, perceived fairness of the practice, acceptability of the practice, and willingness to try the practice. Results suggest that visitors use concepts of both fairness and pragmatism in evaluating use-rationing practices. However, pragmatism – the perceived ability on the part of the respondent to obtain a permit – had the strongest effect on willingness to try each of the allocation practices. These findings suggest that managers have to convince potential visitors that proposed use allocation practices are not only “fair,” but that they will provide them with a reasonable chance to obtain a permit.

A second series of studies has examined a more extended taxonomy of equity dimensions that might be applied to provision of a broad spectrum of park, recreation and ecotourism opportunities (Crompton and Lue, 1992; Wicks and Crompton, 1986, 1987, 1989, 1990; Wicks, 1987). Eight potential dimensions of equity are identified as shown in Figure 3. A first dimension is compensatory and allocates benefits on the basis of economic disadvantage. The second two dimensions are variations of equality and allocate benefits to all individuals equally or ensure that all individuals ultimately receive equal total benefits. The fourth and fifth dimensions are based on demand and allocate benefits to those who make greatest use of them or those who advocate most effectively for them. The final three dimensions of equity are market-driven and distribute benefits based on amount of taxes paid, the price charged for services, or the least-cost alternative for providing recreation services.
These dimensions of equity were described to a sample of residents in the U.S. state of California, and respondents were asked to indicate the extent to which they agreed or disagreed with each dimension of equity as a principle for allocating public park and recreation services (Crompton and Lue, 1992). A majority of the sample agreed with only three of the dimensions. These dimensions were, in decreasing order, demonstrated use, price paid, and equal benefits.

Visitor Attitudes and Preferences. Despite the complex and controversial nature of use rationing and allocation, there appears to be considerable support for a variety of such management practices among visitors (Stankey, 1973; Fazio and Gilbert, 1974; Stankey, 1979; Lucas, 1980; McCool and Utter, 1981; Utter et al., 1981; McCool and Utter, 1982; Shelby et al., 1982; Schomaker and Leatherberry, 1983; Lucas, 1985; Shelby et al., 1989; Glass and More, 1992; Watson, 1993; Watson and Niccolucci, 1995). Research suggests that even most individuals who have been unsuccessful at obtaining a permit continue to support the need for use rationing (Fazio and Gilbert, 1974; Stankey, 1979; McCool and Utter, 1982). A study of visitors to three wilderness areas in the U.S. State of Oregon found that support for use restrictions was based on concerns for protecting both resource quality and the quality of the visitor experience (Watson and Niccolucci, 1995). Support by day hikers was influenced most strongly by concerns with crowding, while support by overnight visitors was influenced by concern for both crowding and environmental impacts.

Preferences among alternative use rationing practices have been found to be highly variable, based on both location and type of user (Magill, 1976; McCool and Utter, 1981; Shelby et al., 1982; Shelby et al., 1989; Glass and More, 1992). Support for a particular use-allocation
practice appears to be related primarily to which practices respondents are familiar with and the extent to which they believe they can obtain a permit. A study of river managers found that first-come, first-served and reservation systems were judged the two most administratively feasible allocation practices and were also the most commonly used practices (Wilke, 1991).

In keeping with the generally favorable attitude toward use limitation described above, most studies have found visitor compliance rates for mandatory permits to be high, ranging from 68% to 97% with most areas in the 90% range (Lime and Lorence, 1974; Godin and Leonard, 1977; Van Wagtendonk and Benedict, 1980; Plager and Womble, 1981; Parsons et al., 1982). Moreover, permit systems that have incorporated trailhead quotas have been found to be effective in redistributing use both spatially and temporally (Hulbert and Higgins, 1977; Van Wagtendonk, 1981; Van Wagtendonk and Coho, 1986).

Pricing. Among the use-rationing and allocation practices described above, pricing has received special attention in the literature. Pricing is the primary means of allocating scarce resources in a free-market economy. Economic theory generally suggests that higher prices will result in less consumption of a given good or service. Thus, pricing may be an effective approach to limiting use of parks and related ecotourism areas. However, park and recreation services in the public sector have traditionally been priced at a nominal level or have been provided free of charge. The basic philosophy underlying this policy is that access to park and recreation services is important to all people and no one should be “priced out of the market.” Interest in instituting or increasing fees at parks and outdoor recreation areas has generated a considerable body of literature that ranges from philosophical to theoretical to empirical (Anderson and Bonsor, 1974; Gibbs, 1977; Manning and Baker, 1981; Driver, 1984; Manning et al., 1984; Rosenthal et al.,
Studies of pricing have tended to focus on several issues related to its potential as a recreation management practice. First, to what extent does pricing influence use of parks and related areas? Several studies have found an inverse relationship between price and use (Richer and Christensen, 1999; Lindberg and Aylward, 1999; Schroeder and Louviere, 1999). For example, a study of day users at six U.S. recreation areas administered by the Army Corps of Engineers found that 40% of respondents reported they would no longer use these areas if a fee was instituted (Reiling et al., 1996). However, other studies have shown little or no effects of pricing on recreation use levels (Manning and Baker, 1981; Becker et al., 1985; Leuschner et al., 1987;
Rechisky and Williamson, 1992). The literature suggests that the influence of fees on recreation use is dependent upon several factors, including:

1. The "elasticity of demand" for a park or recreation area. Elasticity refers to the slope of the demand curve that defines the relationship between price and quantity consumed (or visitation). This issue is illustrated in Figure 4. The demand for some recreation areas is relatively elastic, meaning that a change in price has a comparatively large effect on the quantity consumed (or visitation). The demand for other recreation areas is relatively elastic, meaning that a change in price has a comparatively small effect on the quantity consumed (or visitation).

2. The significance of the recreation area. Parks of national significance, such as Yellowstone National Park in the U.S., are likely to have a relatively inelastic demand, suggesting that pricing is not likely to be effective in limiting use unless price increases are quite dramatic. Parks that are less significant are likely to be characterized by more elastic demand, and pricing may be an effective use-allocation practice.

3. The percentage of total cost represented by the fee. In cases where the fee charged represents a relatively high percentage of the total cost of visiting a recreation area, pricing is likely to be a more effective use-limiting approach. However, where the fee charged represents only a small percentage of the total cost, pricing is not likely to be an effective use-limiting approach.

4. The type of fee instituted. Pricing structure can be a potentially important element in determining the effectiveness of fees as a management practice. For example, a daily use fee
might be more effective in limiting total use than an annual pass that allows unlimited use opportunities for a flat fee.

A second issue addressed in the literature is the acceptability of fees to potential visitors. Again, study findings are mixed, though they often suggest that there is a substantial willingness to pay for park and recreation services (Williams et al., 1999; Vogt and Williams, 1999; Krannich et al., 1999; Bowker et al., 1999; Winter et al., 1999). However, research suggests that the acceptability of fees is at least partially dependent on several factors, including:

1. Dispensation of resulting revenues. If revenues derived from fee programs are retained by the collecting agency and reinvested in recreation facilities and services, then fees are often judged to be more acceptable to park visitors.

2. Initiation of fee or increase in existing fee. Public acceptance of new fees where none were charged before tends to be relatively low compared to increases in existing fees.

3. Local or non-local visitors. Local visitors tend to be more resistant to new fees or increased fees than non-local visitors. As described above, this is probably because fees represent a larger percentage of the total cost of visiting a recreation area for local visitors. Moreover, local residents are likely to visit a given recreation area more often than non-local residents.

4. Provision of comparative information. Visitor acceptance of a fee is likely to be greater when information is provided on the costs of competing or substitute recreation opportunities and when visitors are made aware of the costs of providing recreation opportunities.

A third issue concerns the potential for pricing to discriminate against certain groups in society, particularly those with low incomes and minority racial and ethnic groups. Once again, research
on this issue is mixed. For example, one study examined the socioeconomic characteristics of
guests to two similar outdoor recreation areas in the U.S. state of Virginia, one of which
charged an entrance fee, and the other did not (Leuschner et al., 1987). No differences were
found in income levels, suggesting the fee had no discriminatory effect. However, several
studies have found evidence of discriminatory effects (Mak and Moncur, 1998; Bowker et al.,
1999; Bowker and Leeworthy, 1998; Schneider and Budruk, 1999). For example, two studies of
willingness to pay recreation fees at state parks and Army Corps of Engineers day-use areas in
the U.S. found that lower-income visitors had a more elastic demand curve than did high-income
users as illustrated in Figure 4 (Reiling et al., 1992, 1994). This suggests that pricing may
discriminate against lower-income visitors.

A final issue concerns the use of differential pricing to influence recreation use patterns.
Differential pricing consists of charging higher or lower fees at selected times and locations.
Research demonstrates that outdoor recreation tends to be characterized by relatively extreme
"peaking." That is, certain areas or times are used very heavily while other times or areas are
relatively lightly used. Can pricing be used to even out such recreation use patterns? Research is
suggestive of this potential use of pricing (LaPage et al., 1975; Willis et al., 1975; Manning et
al., 1982). For example, studies of experimental differential campsite pricing at state parks in
Vermont, USA documented significant shifts in campsite occupancy patterns (Manning et al.,
1984; Bamford et al., 1988).
Conclusion

Environmental impacts of ecotourism demand management action to protect significant natural and cultural resources, as well as the quality of the visitor experience. Managers have at their disposal an array of management actions that range from indirect, light-handed approaches such as information/education to direct, more heavy-handed approaches such as rationing and allocation. While the former may be preferred, the latter may ultimately be required, at least in some places at some times. A growing body of research offers guidance concerning the range of management actions that might be used to ration and allocate use of parks and related ecotourism sites, their potential advantages and disadvantages, and differential effects they may have on selected groups in society.
Table 1. Direct and indirect management practices. (Adapted from Lime, 1977, 1979.)

<table>
<thead>
<tr>
<th>Type</th>
<th>Example</th>
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<tbody>
<tr>
<td><strong>Direct</strong></td>
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<tr>
<td>(Emphasis on regulation of behavior; individual choice restricted; high degree of control.)</td>
<td>Impose fines</td>
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<td></td>
<td>Increase surveillance of area</td>
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<td></td>
<td>Zone incompatible uses spatially (hiker only zones, prohibit motor use, etc.)</td>
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<td></td>
<td>Zone uses over time</td>
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<td></td>
<td>Rotate use (open or close roads, access points, trails, campsites, etc.)</td>
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<td></td>
<td>Require reservations</td>
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<td></td>
<td>Assign campsites and/or travel routes to each camper group in backcountry</td>
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<td></td>
<td>Limit usage via access point</td>
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<td></td>
<td>Limit size of groups, number of horses, vehicles, etc.</td>
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<td></td>
<td>Limit camping to designated campsites only</td>
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<td></td>
<td>Limit length of stay in area (maximum/minimum)</td>
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<td></td>
<td>Restrict building of campfires</td>
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<td></td>
<td>Restrict fishing or hunting</td>
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<td><strong>Indirect</strong></td>
<td></td>
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<tr>
<td>(Emphasis on influencing or modifying behavior; individual retains freedom to choose; control less complete, more variation in use possible.)</td>
<td>Improve (or not) access roads, trails</td>
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<td></td>
<td>Improve (or not) campsites and other concentrated use areas</td>
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<tr>
<td></td>
<td>Improve (or not) fish and wildlife populations (stock, allow to die out, etc.)</td>
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<td></td>
<td>Identify the range of recreation opportunities in surrounding area</td>
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<td></td>
<td>Educate users to basic concepts of ecology</td>
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<td></td>
<td>Advertise underused areas and general patterns of use</td>
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<td></td>
<td>Charge consistent entrance fee</td>
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<td></td>
<td>Charge differential fees by trail, zone, season, etc.</td>
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<td></td>
<td>Require proof of ecological knowledge and recreational activity skills</td>
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</tbody>
</table>
Table 2. Evaluation of five recreation use rationing practices. (Adapted from Stankey and Baden, 1977)

<table>
<thead>
<tr>
<th></th>
<th>Reservation</th>
<th>Lottery</th>
<th>First come, first serve</th>
<th>Pricing</th>
<th>Merit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clientele group benefited by system</td>
<td>Those able and/or willing to plan ahead; i.e., persons with structured lifestyles.</td>
<td>No one identifiable group benefited. Those who examine probabilities of success at different areas have better chance.</td>
<td>Those with low opportunity cost for their time (e.g., retired, unemployed). Also favors users who live nearby.</td>
<td>Those able or willing to pay entry costs.</td>
<td>Those able or willing to invest time and effort to meet requirements.</td>
</tr>
<tr>
<td>Clientele group adversely affected by system</td>
<td>Those unable or unwilling to plan ahead; e.g., persons with occupations that do not permit long-range planning, such as many professionals.</td>
<td>No one identifiable group discriminated against. Can discriminate against the unsuccessful applicant to whom the outcome is important.</td>
<td>Those persons with high opportunity cost of time. Also those persons who live some distance from areas. The cost of time is not recovered by anyone.</td>
<td>Those unwilling or unable to pay entry costs.</td>
<td>Those unable or unwilling to invest time and effort to meet requirements.</td>
</tr>
<tr>
<td>Experience to date with use of system</td>
<td>Main type of rationing system used in both U.S. National Forests and National Parks.</td>
<td>Limited. However, it is a common method for allocating big-game hunting permits.</td>
<td>Used in U.S. National Parks for many services. Often used with reservation systems.</td>
<td>Little. Entrance fees sometimes charged, but not to limit use.</td>
<td>Little. Merit is used to allocate use for some specialized activities such as mountain climbing and river running. Not clearly known. Could vary considerably depending on level of training required.</td>
</tr>
<tr>
<td>Acceptability of system to users</td>
<td>Generally high. Good acceptance in areas where used. Seen as best way to ration by users in</td>
<td>Low.</td>
<td>Low to moderate.</td>
<td>Low to moderate.</td>
<td></td>
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<tr>
<td>Difficulty for administrators</td>
<td>Moderately difficult. Requires extra staffing, expanded hours. Record keeping can be substantial.</td>
<td>Difficult to moderately difficult. Allocating permits over an entire use season could be very cumbersome.</td>
<td>Low difficulty to moderately difficult. Could require development of facilities to support visitors waiting in line.</td>
<td>Moderate difficulty. Possibly some legal questions about imposing a fee for wilderness entry.</td>
<td>to attain necessary proficiency and knowledge level. Difficult to moderately difficult. Initial investments to establish licensing program could be substantial.</td>
</tr>
<tr>
<td>Efficiency – extent to which system can minimize problems of suboptimization</td>
<td>Low to moderate. Underutilization can occur because of “no shows,” denying entry to others. Allocation of permits has little relationship to value of the experience as judged by the applicant. Reducing visitor numbers. Controlling distribution of use in space and time by varying number of permits available at different trailheads or at different times.</td>
<td>Low. Because permits are assigned randomly, persons who place little value on an opportunity stand as good a chance of gaining entry as those who place high value on it. Reducing visitor numbers. Controlling distribution of use in space and time by number of permits available at different places or times, thus varying probability of</td>
<td>Moderate. Because system rations primarily through a cost of time, it requires some measure of worth by participants. Reducing visitor numbers. Controlling distribution of use in space and time by number of persons permitted to enter at different places or times.</td>
<td>Moderate to high. Imposing a fee requires user to judge worth of experience against costs. Uncertain as to how well use could be “fine-tuned” with price.</td>
<td>Moderate to high. Requires user to make expenditures of time and effort (and maybe dollars) to gain entry.</td>
</tr>
<tr>
<td>Principal way in which use impact is controlled</td>
<td>Reducing visitor numbers. Controlling distribution of use in space and time by varying number of permits available at different trailheads or at different times.</td>
<td>Reducing visitor numbers. Controlling distribution of use in space and time by number of permits available at different places or times, thus varying probability of</td>
<td></td>
<td></td>
<td>Some reduction in numbers as well as shifts in time and space. Major reduction in per capita impact.</td>
</tr>
<tr>
<td>How system affects user behavior</td>
<td>Affects both spatial and temporal behavior</td>
<td>Affects both spatial and temporal behavior</td>
<td>Affects both spatial and temporal behavior. User must consider cost of time of waiting in line.</td>
<td>Affects both spatial and temporal behavior. User must consider cost in dollars.</td>
<td>Affects style of user's behavior.</td>
</tr>
</tbody>
</table>

1. Based upon actual field experience as well as upon evidence reported in visitor studies (Stankey, 1973).
2. This criterion is designed to measure how the different rationing systems would directly impact the behavior of users (e.g., where they go, when they go, how they behave, etc.).
Figure 1. Strategies for Managing Impacts of Ecotourism (From Manning, 1979; 1999)
Figure 2. Direct and Indirect Management Practices (Adapted from Peterson and Lime, 1979)
Figure 3. Dimensions of Equity (Adapted from Crompton and Lue, 1992)
Figure 4. Elasticity of Demand (From Reiling et al., 1996)
References


*Proceedings of the 1985 National Outdoor Recreation Trends Symposium, Volume II.*  


