

Limiting Recreational Use in Wilderness: Research Issues and Management Challenges in Appraising Their Effectiveness

Stephen F. McCool

Abstract—Limits on the overall number of recreationists permitted to enter or visit wilderness, national park backcountry or whitewater rivers have been formally established for about 30 years. Such limits have usually been established to protect biophysical or social conditions from unacceptable impacts in the face of rapidly rising amounts of visitation. Use limits are one of a number of tools available to managers, but represent a particularly intrusive and controversial one. Use limit policies may have significant negative displacement effects, are implemented within a regional context—even if not recognized in the decision—and must meet the criteria of effectiveness, efficacy, and efficiency in order to be useful in managing impacts. Unfortunately, evaluations of use limit policies using these criteria do not exist within the literature. The paper suggests that evaluations encompass four major domains, consider effects within a regional context, and research move from one-shot case study experimental designs to those that are more conducive to better understanding of the consequences of use limit policies.

Introduction

The development of policies that limit access to recreational resources is one of the most controversial actions implemented for managing recreation on the public lands but one of the least understood. Some managers, confronted with a seemingly insatiable demand for high quality recreational opportunities occurring in magnificent natural environments with little evidence of human use and influence, have responded by restricting access to these settings through a variety of means, but frequently through a use limit policy based on a conception of an area's carrying capacity. Implementation of a use limit policy leads to development of use rationing and allocation regimes once demand exceeds the limit.

A use limit policy is a formalized regulation that restricts the number of visitors that may enter an area over a given time period—day, week, month, or season. Such policies became popular with accelerating growth of whitewater river recreation in the 1960s and 1970s. These limits were aimed at controlling or preventing impacts either to the

biophysical setting or to the recreational experience. While whitewater river managers dominated the initial implementation of use limit policies, terrestrial wilderness managers have also adopted limits on recreational use. Use limits administered in terrestrial areas often come in forms different from those used on rivers (which usually involve limits on the number of groups launching per day), often featuring limited campsite availability. Regardless of the form, use limit policies remain controversial as they carry significant distributional consequences that are often viewed as unfair by visitors. Following their initial implementation in the 1970s, they were repeatedly accompanied by litigation and civil disobedience, recurrently triggered by important issues of equity.

Despite their widespread application and a rapidly growing interest in many venues, questions about the efficacy of use limit policies remain. Do such policies really control, confine, or reduce impacts? Does their implementation provide for higher quality experiences? Are they the “best” way of reducing or controlling impacts? How do their positive and negative consequences compare? Since people are directly affected, how do visitors respond to them? What issues are confronted by managers when they are implemented?

A large number of studies have examined visitor *preference* for use limit policies (see McCool and Christensen 1996 for a brief review of some of this research). In general, this research shows that when given a reason for limiting use, visitors sampled at individual areas agree to such limits—hardly a startling conclusion (see Hall, this proceedings for additional comments about such preference studies). However, such research has avoided evaluations of how visitors view the *acceptability* of use limit policies within the context of the potential tradeoffs between the quality of the experience (or biophysical character) and access restrictions involved. For example, mitigating biophysical impacts through a use limit policy may achieve a gain in resource quality, but comes at the expense of restricted access to the area. The extent to which visitors would perceive biophysical or social conditions so objectionable that they would find a use limit policy acceptable has not been reported in the literature.

Reports evaluating the effectiveness of use limit policies in confining, controlling and reducing visitor-induced impacts do not appear in the literature. While implementation of a use limit policy raises an abundant number of managerial (Warren 1977), economic (McCool 1978), experiential (Schreyer and Roggenbuck 1978), political (Dew 1984), and philosophical issues (McAvoy and Dustin 1983), the lack of evaluative mechanisms, frameworks and reports evoke still others.

In: Freimund, Wayne A.; Cole, David N., comps. 2001. Visitor use density and wilderness experience: proceedings; 2000 June 1–3; Missoula, MT. Proc. RMRS-P-20. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Stephen F. McCool is a Professor, School of Forestry, University of Montana, Missoula, MT 59812.

The growing, apparently inevitable, implementation of recreation use limit policies occurs within the context of accelerating demand for recreation opportunities that are rapidly declining in availability, a poorly developed scientific arena, and a reduced institutional capacity to manage recreation. A widening interest in privatization of public recreation opportunities fueled primarily by conservative political agendas also serves to magnify the complexity of use limit policies. These conditions all suggest that a significant, critical examination of recreation use limit policies is not only appropriate, but essential to addressing many of the fundamental issues currently confronting wildland recreation managers. Such an assessment could assist in developing a policy-relevant research agenda for scientists. Implementation of use limit policies raises several additional questions: Under what conditions are such policies appropriate? What benefits may accrue and what costs ensue? What pragmatic barriers and issues are elicited when use limits are proposed? How can the success of these policies be appraised?

These are important questions; they can be addressed only within the context of appropriate scaffolding that outlines general issues and evaluative frameworks. The overall goal of this paper is to advance our understanding of these issues and frameworks. The paper is organized around three major themes. First, I advance several questions that stem from the application of use limits. In general, use limit policies are both controversial and costly; we should be clear about the benefits to both recreational experiences and resources prior to their implementation. I will briefly outline three principal questions arising out of their implementation. Second, I suggest a framework that would be productive for evaluating use limit policies as tools for controlling biophysical and social impacts resulting from recreation. The current lack of evaluative frameworks severely limits the social and managerial learning needed to advance the state of the art. This framework can serve as a starting point for evaluation of existing use limit policies through development of policy relevant research and may serve as a foundation for considering limiting use in areas where such policies don't currently exist. In both cases, a rich field of research is indicated. Finally, I review potentially useful elements of a framework to guide research on use limit policies and to refocus their implementation at the regional level.

Important Questions in Use Limit Policy Implementation

There are three significant questions raised when use limit policies are under consideration, in addition to their overall effectiveness in controlling, confining or reducing impacts from recreational use. How these questions are addressed in the design of a specific use limit policy suggests what social costs are potentially involved when implemented. Again, these questions are addressed in reference to the potential benefits that such policies are designed to achieve and represent differing potential tradeoffs.

Distributional Consequences of Use Limit Policies Are Unclear—Restricting access to public recreation opportunities leads to significant distributional consequences that raise fundamental questions about the equity of use

limit policies and how those restrictions are implemented. Restriction of access, particularly in how such restrictions are implemented through design of rationing systems, affects different groups differently. A major issue here is the potential mismatch between the recreational opportunities an area offers and the opportunities visitors seek. Stankey and Baden (1977), in their early evaluation of issues associated with implementation of use limit policies, identified this question as one of suboptimization. Suboptimization occurs when there is a mismatch between the preferences of recreationists for particular settings and the settings they are actually allowed to visit as a result of a use limit policy. Thus, some visitors are seeking an experience in a specific place while others may be seeking an experience anywhere. Suboptimization results when the latter replaces the former, which can occur in some rationing systems. When suboptimization occurs, visitors receive some, but not all, the benefits a particular recreation setting can offer. Suboptimization is not only an efficiency question, it is an equity one as well. Allocations that are suboptimal result in a smaller flow of benefits to the public because access is denied to opportunities sought by segments of the recreating public.

Use limits are accompanied by rationing and allocation mechanisms when demand exceeds the supply defined in the limit. Each mechanism (for example, lottery, queue, reservation) discriminates against a certain type of user, thus raising the question of what specific goals should be established for these policies (Stankey and Baden 1977). For example, a queue discriminates against those who don't have time to wait in the line while a reservation system favors those who can plan ahead.

In addition, implementation of a use limit policy in the face of growing demand cannot be considered separate from the decision of how to ration and allocate use, if only because such decisions are inevitable. These decisions are inextricably linked and are inherently political in character (McCool and Utter 1981). Shelby (1981) has suggested four goals of rationing systems: (1) equality—every one has the same chance for entry; (2) social efficiency—people willing to pay the highest price have a better chance to enter; (3) equity—rationing favors those individuals favored by society; and (4) need—visitors with expectations closely aligned with area goals or who are members of a special class have a higher chance of entry. The distributive effects on expected wilderness experiences of the mechanisms to attain each goal are different.

Use Limit Policies Occur Within Regional and Managerial Systems That May Not Be Well Defined or Accounted for When Decisions Are Made—Two types of systems are involved in use limit policies: a spatial system, in which different Wildernesses are spatially related within a specific region and a management system centered on the decision and implementation procedures for use limit policies. Both types of systems interact and will be discussed below.

Regional System

Recreational use of Wilderness and other similar back-country areas occurs within the context of a system of areas.

The operative system is neither obvious because recreation user preferences are not known nor easy to manage because adjacent protected areas may be administered by agencies with differing objectives. For example, the Glacier National Park backcountry is administered by the National Park Service while the adjacent Great Bear Wilderness is managed by the Forest Service. Both agencies have distinctly different approaches to managing backcountry use.

While each wilderness is managed under the mandates of the Wilderness Act to provide "outstanding opportunities for solitude and a primitive and unconfined experience," because of existing use patterns, administrative traditions and resource characteristics, this does not necessarily translate into exactly the same value of setting attributes among and within wildernesses. Each wilderness is different enough to justify varying standards of solitude and human-induced impacts; thus, each wilderness provides opportunities for somewhat different experiences that include, but are not limited to solitude or primitive and unconfined experiences.

Wildernesses therefore are not necessarily substitutable, yet management actions in one area have effects on another. These effects may not be visible for some time, and may affect different types of recreationists, displacing some while others replace them. For example, a use limit policy (implemented through rationing) that is excessively bureaucratic and potentially restrictive may negatively affect visitors seeking escape from the pressures of society, and thus they may choose not to enter that particular Wilderness but another one instead. Others who are not as sensitive to bureaucratic procedures may replace these visitors. Thus, use limits may inadvertently lead to visitor successional processes, leading to not only development of dissatisfaction, but to differing expectations of what each of the areas should provide in terms of setting attributes.

While all Wildernesses are governed by the same legislative mandate, each is managed under plans that frequently recognize idiosyncratic characteristics, are influenced by individual manager philosophies toward recreation, and reflect the specific institutional capacity to manage. Since the notion of a system is not explicitly recognized, wilderness plans—and the use limit policies contained within them—developed independent of each other carry the potential of duplicating goals, objectives and standards or of leaving gaps in the range of wilderness related experiences that recreationists seek, leading to unanticipated surprises, and encouraging unplanned visitor succession.

This system is complex, involving areas, as well as users, managers, agencies, outfitters and so on. Effective management can occur only with an understanding of each element of the system, the behaviors of each element, and how management actions and the response of visitors affect these elements. Lime (1977) recognized the relevance of regional studies nearly 25 years ago. In a river management context, the importance of regional analysis has been well-stated by these managers:

We now do our planning on a river-by-river basis. Alternatives are usually selected without consideration of opportunities afforded by other rivers; the planning process is often locally oriented...It is doubtful that our present river-by-river approach can effectively cope with an increasing demand for a decreasing resource. Should we evaluate viable management alternatives for a specific river without considering management on other rivers? (Yearout and others 1977: 191).

A variety of other authors have recognized that management of recreational use must occur within the context of a regional system of opportunities, and that limiting recreational use in one of these areas without considering the management regime in others carries a variety of significant negative consequences (for example, Stankey 1977; Schreyer 1977).

The notion of a system of areas suggests that fundamental decisions about what areas should provide what kinds of experience opportunities need to be made. While this is an intrinsically political question, science plays an important role in providing information to decisionmakers. Some of that information would revolve around better understanding the population of wilderness users, their motivations, expectations and willingness to make the tradeoffs between protection of biophysical/social conditions and access that use limit policies imply. Since a system exists, data collection to be helpful to management of the system must be conducted at the system level, rather than at the individual area level, which is highly susceptible to visitor succession and replacement biases.

Management System

Anticipation of the distributional and regional consequences of use limits requires that we have a better understanding of the management system within which use limit policies are implemented. Implementation of a use limit policy triggers effects that occur, as argued earlier, elsewhere in a geographical sense, and often are identified only after a significant time delay. Such decisions are systemic in character, and dealing with them requires a systemic process.

Senge (1990) has classified different decisionmaking systems that confront organizations. A use limit policy, implemented without reference to the regional context within which the area is situated, is representative of a "shifting the burden" type of system. In a shifting the burden type of system, an underlying problem generates issues that need attention, but for a variety of reasons, confronting symptoms of the problem is easier than dealing with the root causes. So, shifting the burden of implementing an underlying solution to something that is easier and more visible to implement takes place. The underlying problem remains unsolved. In some respects, there may not be awareness that there is a fundamental underlying problem—managers may view use impact problems as simply an operational issue associated with wilderness management. If so, then they are more likely to adopt an operational remedy (Caldwell 1990). If a problem is defined at an operational level but is in reality a systemic one, then managers will continue to be confronted with new versions of the problem, and the burden of solving the problem may be shifted to others.

Use limit policies represent a shifting the burden type of system in that the questions of underlying causes of impacts, the acceptability of impacts and how they can be managed are never really addressed. Limiting use focuses on only one of the causes of human-induced impacts—and probably a minor one at that. When use limit policies are implemented, visitors denied access shoulder the burden of management that has not addressed fundamental problems. Visitors granted access are not necessarily selected on the basis of

merit (in this case ability to engage in minimum impact behaviors) and thus benefit from the burden shouldered by others.

By shifting the burden, the problem appears solved in the short-run, but in the long-term, it resurfaces. Visitors desiring experiences dependent on the wild character of wilderness may be displaced (and thus endure the burden) as more and more rules on entry are implemented. Other areas—as noted above—may see increases in use as visitors seek other places without the restrictive environment. As Senge argues, following implementation of a symptom solution when the problem reoccurs, “there is increased pressure for symptomatic response. Meanwhile, the capability for fundamental solutions can atrophy” (p. 104).

A major issue here is that the problem—human-induced impacts—may never be framed in a way that leads to fundamental solutions being considered. Bardwell (1991) insists that much of land management activity is directed toward solving solutions, solving the wrong problem, defining problems in such a way that they cannot be solved, and solving non-problems, simply because not enough attention has been paid to framing the problem. As Clark and Stankey (1991) suggest, asking the right question is critical to developing responses to real problems and issues. Use limit policies generally emanate from a problem framed as “how many are too many for this area?” when the more fundamental problem can be succinctly stated as “what are the appropriate or acceptable conditions for this area, given its regional context and legislative mandate?” Once that question is addressed, managers can turn to the more pragmatic, yet still controversial decisions of what management tools are appropriate. Reframing the question in this manner is consistent with legislative and policy direction to protect important biophysical characteristics and experiential values, and may eventually lead to implementation of a use limit policy, but only following extensive analysis.

Use Limit Policies May Displace the Problem

The net effect of implementing use limit policies without understanding the regional context is to initiate suboptimization effects or to displace the problem spatially. The problem (of unacceptable impacts) has been displaced to other places (most likely to other wildernesses or protected areas) or to other users. The other places may not have the institutional capacity to respond to increased use-induced impacts, and the other users may be unfairly restricted in access to their favorite sites, resulting in suboptimization as they seek opportunities in settings that are not necessarily preferred ones. Use limit policies as now implemented provide no incentive for visitors to reduce impacts (since merit is generally not a basis for rationing use), thus exacerbating the problem. This now occurs in some wildernesses where some areas are closed to camping because of impacts, so people camp elsewhere. Generally, the places that are closed show some level of impact, so visitors are forced to camp in other places where impacts are relatively low. This leads to increased overall degradation, because new places are impacted and the old places are not adequately restored.

Wilderness managers are faced with a difficult job. Cole and Hammit (2000) argue that the Wilderness Act mandates three competing objectives: wildness (untrammelled character), naturalness (unmodified environments), and solitude (being alone with others). Use limit policies represent attempts to achieve naturalness and/or solitude (depending on the rationale for their implementation), but hamper achievement of the wildness objective. Since not all three objectives can be fully achieved under the demand and supply conditions facing most wildernesses, choices have to be made. What is important is explicitly identifying what goals managers are seeking, recognizing that tradeoffs are occurring and identifying the rationale for those tradeoffs.

Frameworks and Considerations for Evaluation and Implementation of Use Limit Policies

The above discussion raises significant questions about the efficacy of use limit policies, but was not intended to suggest they should never be employed. Use limit policies may lead to distinctive and improved changes in biophysical and experiential quality. Properly implemented, they protect, maintain or create unique, highly valued and increasingly rare experiences. Their implementation reflects a growing scarcity of recreation opportunities, and thus point to the need for fundamental change in how society may wish to change its behavior or allocates resources.

A Proposed Framework for Evaluation

Largely, implementation of a use limit policy, as with other land management practices, is an experiment. As a management experiment, the outcomes, in terms of biophysical impacts, visitor satisfaction, and problem displacement need to be monitored and evaluated to determine the success of the policy. Such evaluation would help managers understand the effectiveness of use limit policies (for example, do they work?), as well as provide a needed perspective on their efficiency in accomplishing management objectives. Without evaluation to go along with their implementation, managers have no idea if the tool worked, the consequences of it on other dimensions of management, and effects at larger temporal and spatial scales.

A proper framework for evaluation requires not only specification of objectives, but also a monitoring system that focuses on outputs, rather than inputs. This is particularly important with respect to policies that restrict access since this is one of the most intrusive and potentially harsh actions that an agency can take.

What might such a framework look like? One suggestion proposed by Brewer (1973) is to address four major questions:

1. Conceptual soundness—is there a defensible theoretical foundation?
2. Technical—is it translated into practice well?
3. Ethical—who wins and who loses?
4. Pragmatic—does it work?

What is outlined below represents the types of issues, questions and potential approaches such an evaluation

may involve. It is designed to be suggestive rather than definitive.

1. *Conceptual soundness—is there a defensible theoretical foundation?* Here a defensible theoretical foundation would involve scientifically sound assumptions underlying use limit policies. Listed below are several such assumptions:

a. *There is a definitive relationship between use level and impact.* There must be a definitive, predictable relationship that demonstrates the amount of impact caused by a given level of recreational use. This is particularly important for use limit policies that are directed toward reducing, limiting, or controlling recreation induced biophysical or social impacts.

b. *Social and biophysical conditions are stable.* An implicit assumption is that the social and biophysical conditions are, or should be stable. Since use limits lead to a single capacity, such a capacity assumes that both conditions are stable (Seidl and Tisdell 1999). If such conditions are not stable, multiple capacities and, therefore, multiple use limits exist, suggesting that such limits are informed by science but are social judgments.

c. *A specific normative definition of carrying capacity has been established.* As use limits have been proposed and implemented, they carry the implication that a specific definition of carrying capacity for recreation has been established.

2. *Technical—is it translated into practice well?* Implementation of use limit policies leads to a large number of practical problems that managers have traditionally been ill-equipped to address. These problems include the type of rationing system to use to administer use limits when demand is in excess of the limit, how to implement the rationing system (for example, mail, telephone), staffing and enforcement resources, legal resources needed to respond to challenges to the system, and so on.

3. *Ethical—who wins and who loses?* As indicated earlier, there are significant issues about equity and fairness. Some argue that highly regulatory actions are fairer than voluntary adoption of appropriate behavior (Dustin and McAvoy 1984). What is important though is developing a better understanding of how use limit policies affect different types of visitors and how might those effects be mitigated. While some research on this question has been conducted, it is primarily conceptual in focus and needs to be examined within the context of real people responding to real use limit policies. Because of the lack of research on these questions, the current state-of-knowledge about these effects is highly speculative.

4. *Pragmatic—does it work?* Here, we are interested in the practical utility of use limit policies. Such pragmatism can be assessed by using three criteria developed by Checkland and Scholes (1990): efficacy, efficiency, and effectiveness. Efficacy, in this sense, means does a use limit policy confine, control, or mitigate human-induced impacts? This criterion suggests that monitoring of key impact variables is an essential—not optional—component of a use limit policy. Without such monitoring and evaluative action, managers have no idea if the use limit policy worked and visitors and others interested in wilderness will have paid certain costs without the advantage of understanding the benefits. Efficiency deals with relationship between inputs

(usually defined as staff and funding) for a given output (reduction in impacts). Generally speaking, managers and citizens want tools to be efficient so that waste is minimized. Effectiveness concerns whether a given management activity meets a longer term aim—in this case a wilderness that shows little evidence of human-induced impacts.

This type of appraisal process would seem to be incredibly informative to managers and would lead to a better understanding of not only what conditions lead to successful use limit policies but also would speak to their design as well.

Research and Managerial Considerations

Understanding the overall value of use limit policies requires a regional approach that would be integrative in character and involve assessments at several scales. Research would occur on both biophysical and social aspects at both regional and local scales to better understand how use limit policies control, mitigate, or influence impacts of recreational use, how people make decisions about what sites they visit, and the objectives for which areas within the region are established. Such a research project would need to address several questions:

1. *What is the region of interest?* Scientists would need to define the region—the set of interacting areas and the population upon which they draw for recreational use. This is made difficult because many areas draw upon a national population for visitation. The region would be defined, not so much by administrative characteristics, but by the areas that provide the roughly similar types of recreational opportunities.

2. *What choice mechanisms are involved in selecting areas to visit?* Visitors go through some type of process to make decisions about what areas to visit (Stankey and McCool 1985). In this process, solitude and other expectations dependent on use density play varying roles in site selection. Scientists would determine how significant such motivations or expectations were in anticipated experiences, how these are related to other expectations, the perception of how well a specific area provides opportunities to meet these expectations, and the willingness of visitors to make tradeoffs.

3. *What recreational opportunities exist?* Research would inventory existing management policies and objectives to determine the supply of density dependent opportunities and access to them. This would help identify how such opportunities are related to the demands established earlier, the appropriateness of use limit policies in achieving these objectives, and the potential impacts of implementing a policy in one area on others.

4. *How much change in biophysical conditions has occurred?* In this component, scientists would inventory conditions—impacts—across all the areas involved in the regional system. This component provides scientists and managers with the data necessary to determine the biophysical effects of use limit policies and to make the necessary tradeoffs that will occur explicit in management.

5. *What criteria will be used in determining what opportunities will be provided and management actions will be implemented where?* Once we know how the system works, then the next question concerns how decisions will be made. This component requires that explicit criteria be developed so that they can be debated.

Given the above, what alternative frameworks might there be to examine use limit policies at a regional scale? The Limits of Acceptable Change framework (Stankey and others 1986) and its derivatives (such as VERP), implemented at a larger, system wide scale, could help managers identify the potential issues and consequences of implementing a use limit policy. Specifically, the notion of wilderness recreation opportunity classes, applied to several wildernesses connected in a systems context can help identify specific goals and priorities for protecting wilderness threatened by recreational impacts. An example might help describe how this would work. A region might contain several wildernesses, some heavily used and impacted, others showing little relative evidence of human-induced impacts. The current management approach is to limit to protect the heavily impacted wildernesses first, and then develop plans for those that show less impact. This approach has the consequence of doing nothing to limit and control impacts in the heavily used wilderness (because those impacts have already occurred), but potentially endangering less impacted wildernesses as visitors—engaging in suboptimizing behavior—seek alternatives. Using an approach based on the notion of a system in a regional context, the wildernesses with the least impact may receive management attention first, then those with the most impact, assuming of course, development and acceptance of appropriate goals (Cole 1997).

Conclusion

Recreation use limit policies are but one alternative in the manager's box of tools to limit, control, and mitigate human-induced biophysical and social impacts in wilderness and similar protected areas. They have been adopted in a variety of situations, beginning initially with whitewater rivers in the West, but often with little attention to the validity of their theoretical foundations, distributional effects on users, and displacement of problems to other similar regional resources. Their implementation without formal evaluation leads open a number of questions, particularly those dealing with their efficacy in confining, controlling, and limiting impacts and their effects at larger temporal and spatial scales.

Protected areas exist and should be managed within a regional context, a proposition well established in the outdoor recreation management and research literature. Continuing to ignore this proposition will have potentially severe impacts on relatively pristine resources as visitors attempt to find acceptable substitutes for the places they originally sought to access. Most problematic is the lack of knowledge that prevents definitive conclusions about the efficacy of use limit policies.

The academic community has been slow to study the efficacy of recreation use limit policies. Substantial research has been conducted on visitor perceptions of use density and encounters and how these relate to feelings of satisfaction. Other scientists have examined relationships between visitor use and biophysical impacts. The literature in these two areas has increased our knowledge about the character of recreational use, experiences and impacts with accompanying generic implications for management.

Scientists have important roles in management decisions, ranging from helping to identify the acceptability of the various tradeoffs involved in use limit decisions through identifying appropriate frameworks for their use, implementation and evaluation to advising managers on the regional system affected by a use limit policy. We also need science to help managers (and their affected publics) pursue venues that will determine what wilderness experience opportunities will be provided where.

Overcoming these issues requires that not only management understand and account for the regional context, but that research be conducted at a regional level too. Doing things at a regional level requires that a number of barriers be overcome—conflicting mandates, differing agency cultures, academic territories, functionalism and disciplinarianism, and inadequate funding. But in the long run, it is the only way in which the functionality of use limit policies can be adequately assessed.

References

- Bardwell, L. 1991. Problem framing: A perspective on environmental problem-solving. *Environmental Management* 15(5): 603–612.
- Borrie, W.T., S.F. McCool, and G.H. Stankey. 1998. Protected area planning principles and strategies. In *Ecotourism: A guide for planners and managers*, edited by K. Lindberg, M. E. Wood and D. Engeldrum. North Bennington, VT: The Ecotourism Society.
- Brewer, G.D. 1973. Politicians, bureaucrats, and the consultant. A critique of urban problem solving. New York, NY: Basic Books.
- Caldwell, Lynton Keith. 1990. Between two worlds: Science, the environmental movement and policy choice. New York, NY: Cambridge University Press.
- Checkland, P., and J. Scholes. 1990. Soft systems methodology in action. West Sussex, UK: John Wiley and Sons.
- Clark, R.N., and G.H. Stankey. 1991. New forestry or new perspectives? The importance of asking the right questions. *Forest Perspectives* 1(1): 9–13.
- Cole, D.N. 1997. Recreation management priorities are misplaced—allocate more resources to low-use wilderness. *International Journal of Wilderness* 3(4): 4–8.
- Dew, T. 1984. Politics of a river controversy: The case study of the Rogue. In 1984 National river recreation symposium proceedings, edited by J. S. Popadic, D. I. Butterfield, D. H. Anderson and M. R. Popadic. Baton Rouge, LA: Louisiana State University.
- Dustin, D.L., and L.H. McAvoy. 1984. The limitation of the traffic light. *Journal of Park and Recreation Administration* 2(3):28–32.
- Lime, D.W. 1977. Research for river recreation planning and management. In *Proceedings: River recreation management and research symposium*. Minneapolis, MN: North Central Forest Experiment Station.
- Lindberg, K., S. McCool, and G. Stankey. 1997. Rethinking carrying capacity. *Annals of Tourism Research* 24: 461–465.
- McAvoy, L.H., and D.L. Dustin. 1983. Indirect versus direct regulation of recreation behavior. *Journal of Park and Recreation Administration* 1(2):12–17.
- McCool, S.F. 1978. Recreation use limits: Issues for the tourism industry. *Journal of Travel Research* 27(2): 2–7.
- McCool, S.F., and N.A. Christensen. 1996. Alleviating congestion in parks and recreation areas through direct management of visitor behavior. In *Congestion and crowding in the National Park system*, edited by D. W. Lime. St. Paul, MN: Minnesota Agricultural Experiment Station, University of Minnesota.
- McCool, S.F., and J. Utter. 1981. A process for allocating public recreation resources. In *Recreation use allocation: Proceedings of a national conference*, edited by L. J. Buist. Reno, NV: Nevada Agricultural Experiment Station, University of Nevada Reno.
- Saveriades, A. 2000. Establishing the social carrying capacity for tourist resorts of the east coast of the Republic of Cyprus. *Tourism Management* 21(2): 147.

- Schreyer, R. 1977. Restricting recreational use of wildlands: Lessons from whitewater rivers. *Western Wildlands* 4: 45–52.
- Schreyer, R., and J.W. Roggenbuck. 1978. The influence of experience expectations on crowding perceptions and social-psychological carrying capacities. *Leisure Sciences* 1(4): 373–394.
- Seidl, I., and C. A. Tisdell. 1999. Carrying capacity reconsidered: From Malthus' population theory to cultural carrying capacity. *Ecological Economics* 31: 395–408.
- Senge, P. M. 1990. *The fifth discipline: The art and practice of the learning organization*. New York, NY: Doubleday/Currency.
- Shelby, B. 1981. Allocation issues identified in recreation research. In *Recreation use allocation: Proceedings of a national symposium*, edited by L. J. Buist. Reno, NV: Nevada Agricultural Experiment Station, University of Nevada Reno.
- Shelby, B., and T. Heberlein. 1986. *Carrying capacity in recreation settings*. Corvallis, OR: Oregon State University Press.
- Stankey, G.H. 1977. Rationing river recreation use. In *Proceedings, river recreation management and research symposium*, edited by D. W. Lime and C. Fasick. St. Paul, MN: North Central Forest Experiment Station, USDA Forest Service.
- Stankey, G.H., and J. Baden. 1977. *Rationing wilderness use: methods, problems, and guidelines*. Ogden, UT: USDA Forest Service, Intermountain Research Station.
- Stankey, G.H., D.N. Cole, R.C. Lucas, M.E. Petersen, and S.S. Frissell. 1986. *The limits of acceptable change (LAC) system for wilderness planning*. Ogden, UT: USDA Forest Service Intermountain Research Station.
- Stankey, G.H., and S.F. McCool. 1985. *Proceedings—symposium on recreation choice behavior*. USDA Forest Service, Intermountain Research Station Gen. Tech. Rep. INT-184. Ogden, UT.
- Warren, S.E. 1977. How to ration river floating use: The Middle Fork of the Salmon experience. In *Proceedings: River recreation and management symposium*, edited by D. W. Lime and C. A. Fasick. St. Paul, MN: USDA Forest Service, North Central Forest Experiment Station.
- Yearout, R., A. Seamons, and L. Lee. 1977. *Regional river recreation management*. In *Proceedings: River recreation management and research symposium*. St. Paul, MN: USDA Forest Service.