A Comparative Analysis of Protected Area Planning and Management Frameworks

Per Nilsen
Grant Tayler

Abstract—A comparative analysis of the Recreation Opportunity Spectrum (ROS), Limits of Acceptable Change (LAC), a Process for Visitor Impact Management (VIM), Visitor Experience and Resource Protection (VERP), and the Management Process for Visitor Activities (known as VAMP) decision frameworks examines their origins; methodology; use of factors, indicators, and standards; appropriate application; and relationships. While many areas in the frameworks can be improved, the most pressing needs are integration of principles among the frameworks and with other planning processes that emphasize ecosystem-based management and an evaluation of their effectiveness, particularly with the profound organizational changes taking place in all protected area agencies.

Since the mid 1970's, a variety of planning and management frameworks have been developed for protected areas to address issues such as recreation carrying capacity; human use that causes stress for ecosystems; methods to determine appropriate types, levels, and conditions of use; and methods to inventory and manage an appropriate mix of visitor opportunities. These frameworks include the Recreation Opportunity Spectrum (ROS), the Limits of Acceptable Change (LAC) framework, the Process for Visitor Impact Management (VIM), the Visitor Experience and Resource Protection (VERP) framework, and the Management Process for Visitor Activities (known as VAMP). While each framework or "pre-formed decisionmaking structure" (Meis 1990) has a unique origin, these frameworks also share many similarities. Considerable effort has been devoted to describing what the individual frameworks seek to accomplish, the steps involved, and how they have been applied to individual sites.

Until recently, few comparative analyses have been undertaken for these contemporary frameworks. Recent examples include: a comparative analysis of the formula-based carrying capacity approaches, as well as of ROS and LAC (Graefe and others 1990); a comparative analysis of ROS, LAC, VIM, and VAMP (Payne and Graham 1993); two workshops on visitor management (Graham and Lawrence 1990; Rickson and others 1995); and studies on the use of these frameworks (Giongo and others 1993; Schneider and others 1993).

As part of a project to define a spectrum of appropriate National Park opportunities and in response to numerous staff inquiries about the various planning and management tools, a summary description of 11 approaches was prepared for Parks Canada (Tayler 1996). Five of these frameworks are described and compared here. After an extensive literature review, each of the five frameworks was described and analyzed in terms of origins; methodology; use of factors, indicators, and standards; appropriate applications; and relationships (see table 1). These variables were chosen to create a practical snapshot of the selected frameworks for Parks Canada field staff. Field staff could then decide which approach would be appropriate to address the issues they were dealing with. The comparative analysis then led to the identification of a number of common themes, issues, and recommendations for future research.

Results of the Comparative Analysis

Origins

The circumstances and the parties involved in developing each approach are unique and have been described in detail in the literature (Graham and Lawrence 1990; Rickson and others 1995). A comparison of their origins (Tayler 1996) revealed that each approach:

- Originated from a collaboration between researchers and Federal agency staff or between researchers and national nongovernmental organizations (VIM, for example, was developed in conjunction with the U.S. National Parks and Conservation Association).
- Benefited from advances in recreation research, particularly in the late 1970's with the work of Driver and Brown (1978), and Clark and Stankey (1979) on ROS, and in the mid-1980's with the development of LAC (Stankey and others 1985) and VAMP (Parks Canada 1985).
- Was a response to both legislative and policy requirements, as well as to increasing recreation demands, impacts, and conflicts.
- Recognizes the origins and deficiencies of the traditional carrying capacity model for recreation management and strives to move beyond it.

In: McCool, Stephen F.; Cole, David N., comps. 1997. Proceedings—Limits of Acceptable Change and related planning processes: progress and future directions; 1997 May 20–22; Missoula, MT. Gen. Tech. Rep. INT-GTR-371. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Per Nilsen is Head of Appropriate Activities and Risk Management, Parks Canada, Department of Canadian Heritage, 4th Floor, 25 Eddy St., Hull, QC, Canada, K1A 0M5. Grant Tayler is a Visitor Management Consultant and a recently retired coordinator of the Visitor Activity Planning Program, National Parks, Parks Canada, 7 Centrepark Drive, Gloucester, ON, Canada, K1B 3C2.

Table 1—Comparative Analysis of Planning and Management Framework.

Recreation Opportunity Spectrum (ROS)

Developed by researchers working for the U.S. Forest Service and Bureau of Land Management in response to concerns about growing recreational demands and increasing conflict over use of scarce resources, and a series of legislative directives that called for an integrated and comprehensive approach to natural resource planning. The process comprised six land classes to aid in understanding physical, biological, social and managerial relationships, and to set parameters and guidelines for management of recreation opportunities.

Steps of the Process

1. Inventory and map the three setting perspectives that affect the experience of the recreationalist, namely the physical, social and managerial components.
2. Complete analysis:
   a) identify setting inconsistencies;
   b) define recreation opportunity classes;
   c) integrate with forest management activities; and
   d) identify conflicts and recommend mitigation.
3. Schedule.
4. Design.
5. Execute projects.
6. Monitor.

The end product is a definition of the opportunity for experience expected in each setting (six classes—primitive to urban), the indicators of the experience, and the parameters and guidelines for management.

Factors, Indicators and Standards:

Seven **setting indicators** have been identified. They represent aspects of recreation settings that facilitate a range of experiences that can be influenced by managers.

1. Access
2. Remoteness
3. Visual Characteristics
4. Site Management
5. Visitor Management
6. Social Encounters
7. Visitor Impacts

Criteria have been developed by the U.S. Forest Service for each of the indicators and for each of the six land classes, e.g., distance guidelines, remoteness, user density in terms of capacity and frequency of contact, and degree of managerial regimentation required.

Applications Best Suited for

This process can be employed in almost all landscape planning exercises. However, the nature of the spectrum, the indicators and their criteria depend on the purpose of the area, the mandate of the organization and the responsibilities of management.

Relationships

This management matrix approach has been incorporated into the LAC system and can be used with VIM. It has been recognized within VAMP, but is hindered by the current use of zoning in Parks Canada.

Strengths: It is a practical process with principles that force managers to rationalize management from three perspectives:
- protection of the resource;
- opportunities for public use; and
- the organization's ability to meet preset conditions.

It links supply with demand and can be readily integrated with other processes. It ensures that a range of recreation opportunities are provided to the public.

Weaknesses: The recreation opportunity spectrum, its setting indicators and their criteria must be accepted in total by managers before any options or decisions can be made. Disagreement will affect the rest of the planning program. ROS maps need to be related to the physical and biophysical characteristics of each area.

Process for Visitor Impact Management (VIM)

Developed by researchers working for the U.S. National Parks and Conservation Association for use by the U.S. National Park Service. The process addresses three basic issues relating to impact: problem conditions; potential causal factors; and potential management strategies.

Steps of the Process

1. Conduct pre-assessment database review.
2. Review management objectives.
3. Select key indicators.
4. Select standards for key impact indicators.
5. Compare standards and existing conditions.
6. Identify probable causes of impacts.
7. Identify management strategies.
8. Implement.

Factors, Indicators and Standards

The list of possible **indicators of impact** includes:

Physical impacts:
- soil density, pH, compaction, drainage, chemistry, productivity
- amount and depth of litter and dust
- area of barren core and of bare ground
- area of complete campsites
- number and size of fire rings
- number of social trails
- visible erosion

Biological impacts:
- soil fauna and microfauna
- ground-cover density and loss of ground cover
- diversity and composition of plant species
- proportion of exotic plant species
- plant species height, vigour and diseases
- trees—mutilation, seeding regeneration, exposed roots
- wildlife species—diversity, abundance, sightings
- presence or absence of indicator species
- reproduction success

Social Impacts:
- number of encounters
  - by activity type with other individuals/day
  - by size of group
  - with other groups/day
  - by mode of transport
  - by location of encounter
- visitor perception of crowding
- visitor perception of impact on the environment
- visitor satisfaction
- visitor complaints
- visitor reports of undesirable behaviours

Standards are established for each indicator based on the management objectives that specify acceptable limits or appropriate levels for the impact.

Applications Best Suited for

This is a flexible process parallel to LAC that can be applied in a wide variety of settings. It employs a similar methodology to assess and identify existing impacts and particularly the causes.

Relationships

Like LAC, this process has been incorporated into the VERP system.

Strengths: Process provides for a balanced use of scientific and judgemental considerations. It places heavy emphasis on understanding causal factors to identify management strategies. The process also provides a classification of management strategies and a matrix for evaluating them.

Weaknesses: The process does not make use of ROS, although it could. It is written to address current conditions of impact, rather than to assess potential impacts.

(con.)

Table 1 (Con.)

Limits of Acceptable Change (LAC)

Developed by researchers working for the U.S. Forest Service in response to concerns about the management of recreation impacts. The process identifies appropriate and acceptable resource and social conditions and the actions needed to protect or achieve those conditions.

Steps of the Process

A nine-step process, normally illustrated as a circle of steps:

1. Identify area concerns and issues.
2. Define and describe opportunity classes (based on the concept of ROS).
3. Select indicators of resource and social conditions.
4. Inventory existing resource and social conditions.
5. Specify standards for resource and social indicators for each opportunity class.
6. Identify alternative opportunity class allocations.
7. Identify management actions for each alternative.
8. Evaluate and select preferred alternatives.
9. Implement actions and monitor conditions.

Factors, Indicators and Standards

Factors will depend on issues identified in Step 1 above. Examples:

Resource:

- trail conditions
- campsite conditions
- water quality
- air quality
- wildlife populations
- range condition
- threatened/endangered species

Social:

- solitude while travelling
- campsite solitude
- conflicts between visitors
- conflicting travel methods
- conflicts with party size
- noise

Examples of indicators and standards are in the literature. Standards are the measurable aspects of the indicators and are the basis for judging whether a condition is acceptable or not. Standards describe acceptable and appropriate conditions for each indicator in each opportunity class.

Applications Best Suited for

The process is a good vehicle for deciding the most appropriate and acceptable resource and social conditions in wilderness areas. It has been applied to wild and scenic rivers, historic sites and tourism development areas.

Relationships

The process incorporates opportunity classes based on concepts of ROS and a means of analysis and synthesis. It is built into the U.S. National Park Service VERP framework.

Strengths: The final product is a strategic and tactical plan for the area based on defined limits of acceptable change for each opportunity class, with indicators of change that can be used to monitor ecological and social conditions.

Weaknesses: The process focuses on issues and concerns that guide subsequent data collection and analysis. Strategic and tactical direction may not be provided on management topics where there are no current issues or concerns.

Visitor Experience Resource Protection (VERP)

Created by the U.S. National Park Service. It is a new framework dealing with carrying capacity in terms of the quality of the resources and the quality of the visitor experience. It contains a prescription for desired future resource and social conditions, defining what levels of use are appropriate, where, when and why.

Steps of the Process

1. Assemble an interdisciplinary project team.
2. Develop a public involvement strategy.
3. Develop statements of park purpose, significance and primary interpretive themes; identify planning mandates and constraints.
4. Analyse park resources and existing visitor use.
5. Describe a potential range of visitor experiences and resource conditions (potential prescriptive zones).
6. Allocate the potential zones to specific locations within the park (prescriptive management zoning).
7. Select indicators and specify standards for each zone; develop a monitoring plan.
8. Monitor resource and social indicators.
9. Take management actions.

Factors, Indicators and Standards

The following **factors** are considered in the planning process:

- park purpose statements
- statements of park significance
- primary interpretation themes
- resource values, constraints and sensitivities
- visitor experience opportunities
- resource attributes for visitor use
- management zones

Resource and social indicators, as well as associated standards, were developed for each zone at Arches National Park, where the process was first tested.

Applications Best Suited for

The VERP framework was conceived and designed to be part of the U.S. National Park Service's general management planning process. This analytical, iterative process attempts to bring both management planning and operational planning together as one exercise. The emphasis is on strategic decisions pertaining to carrying capacity based on quality resource values and quality visitor experiences. The product is a series of prescriptive management zones defining desired future conditions with indicators and standards.

Relationships

This framework refers specifically to both LAC and VIM. No mention is made of ROS or VAMP. VERP parallels the basic processes of VAMP and ROS, and is seen as a component of LAC.

Strengths: Like VAMP, VERP is a thought process that draws on the talents of a team and is guided by policy and the park purpose statement. It guides resource analysis through the use of statements of significance and sensitivity, and visitor opportunity analysis is guided by statements defining important elements of the visitor experience. Zoning is the focus for management.

Weaknesses: Additional work is required to pilot the approach in different environments. "Experience" is not defined and the indicators for it are absent beyond the examples for Arches National Park. The will and ability to monitor sufficiently to provide information to guide management actions must also be tested.

(con.)

Table 1 (Con.)

Management Process for Visitor Activities (VAMP)

Created by Parks Canada as a companion process to the Natural Resources Management Process within the Parks Canada Management Planning System. The process provides guidance for planning and management of new parks, developing parks and established parks.

Steps of the Process

The process uses a model based on a hierarchy of decisions within the management program. Management plan decisions relate to the selection and creation of opportunities for visitors to experience the park's heritage settings through appropriate educational and recreational activities. Decisions about managing and delivering support services for each activity are reflected in the service plan. The basic principles of VAMP are within three Parks Canada documents:

- *Guiding Principles and Operational Policies*;
- *Management Planning Manual*; and
- *Visitor Activity Concept Manual*.

General steps of the management plan process are:

1. Produce a project terms of reference.
2. Confirm existing park purpose and objectives statements.
3. Organize a database describing park ecosystems and settings, potential visitor educational and recreational opportunities, existing visitor activities and services, and the regional context.
4. Analyse the existing situation to identify heritage themes, resource capability and suitability, appropriate visitor activities, the park's role in the region and the role of the private sector.
5. Produce alternative visitor activity concepts for these settings, experiences to be supported, visitor market segments, levels of service guidelines, and roles of the region and the private sector.
6. Create a park management plan, including the park's purpose and role, management objectives and guidelines, regional relationships, and the role of the private sector.
7. Implementation—set priorities for park conservation and park service planning.

Factors, Indicators and Standards

Factors that are considered in developing indicators and standards include:

- visitor activity profiles
  - kind
  - quantity, diversity, location
  - experiences/benefits sought
  - support services and facilities required at all stages of trip cycle
- stakeholder profiles
- interpretation theme presentation
- resource values, constraints and sensitivities
- existing legislation, policy, management direction, plans
- current offer of services and facilities at all stages of trip cycle
- regional activity/service offer
- satisfaction with service offer

Applications Best Suited for

The detailed process is specific to the planning program of Parks Canada and is parallelled by the Natural Resources Management Process. The basic VAMP concept incorporates the principles of ROS. The framework will benefit from and can easily incorporate the principles of VIM, LAC and VERP. The focus is assessment of opportunity, while the more precise impact question is left to the Natural Resources Management Process.

Relationships

The overall process provides a comprehensive framework for the creation and management of opportunities for visitors within the Parks Canada Management Planning Program.

Strengths: Comprehensive decision-making process based on a hierarchy. It benefits from the structured thinking required to analyse both opportunity and impact. It combines social science principles with those of marketing to focus on visitor opportunities.

Weaknesses: Although well-developed at the service planning level, VAMP does not yet have the clout it should have at the management planning level, mainly because the "opportunities for experience" definition has not been built into management plans or into the zoning.

Steps of the Process

All of the frameworks follow the steps of standard rational planning: terms of reference, database development, situation analysis, synthesis, objectives, alternatives, final plan, and implementation. Each approach, therefore, recognizes, in varying degrees, a hierarchy of decisions that need to be made, ranging from inventory and analysis to development of a management concept (strategic decisions), and, subsequently, implementation and operations (tactical decisions).

ROS, VIM, and VAMP are rational-comprehensive planning approaches (Payne and Graham 1993). The recently developed VERP (Hof 1993) can be added to this list. LAC was originally developed as a rational-comprehensive or synoptic planning process, but has been applied using the theory of transactive planning to produce plans for areas such as the Bob Marshall Wilderness Complex (McCool 1990).

Factors, Indicators, and Standards

Stankey and McCool (1990) make a distinction between factors, indicators, and standards. Factors are "broad categories of issues or concerns" (such as trail conditions), from which one or more indicators can be identified that reflect the overall condition of the factor. "Indicators are specific variables" (such as soil compaction) "that singly, or in combination, are taken as indicative of the conditions of the overall opportunity class" or "factor." "Standards are measurable aspects of indicators" that "provide a base against which a particular condition can be judged as acceptable or not" (Stankey and McCool 1990: 225-26).

The five approaches vary considerably in the language they use and the degree of emphasis they place on factors, indicators, and standards. These differences reflect variations in the questions being asked, the type of research and analysis that follows, and the decisions that are being made. VAMP and VERP share the greatest similarities, with their emphasis on a broad range of factors at the strategic level of planning and management. With these strategic decisions in place, there is a basis for developing indicators and standards. Each approach addresses the issue of indicators and standards differently. In VERP, both resource and social indicators are described; however, all the social indicators relate to levels of crowding (USDI 1995). VAMP emphasizes social indicators and standards (levels of service) from a visitor's perspective and is complemented by a natural resource management and an environmental impact assessment process that address resource factors, indicators, and standards. The results of applying these processes are integrated during management planning.

LAC and VIM identify issues and concerns (factors) at the outset of the process, then define management objectives. The issues and management objectives guide the selection of indicators and standards. This issue-driven approach leads to a narrow range of factors being considered and more emphasis on choosing appropriate indicators and standards, followed by monitoring. Graefe and others (1990: 232) note that "VIM includes an explicit step aimed at identifying probable causes of impact conditions, while LAC places greater emphasis on defining opportunity classes and developing alternative class allocations."

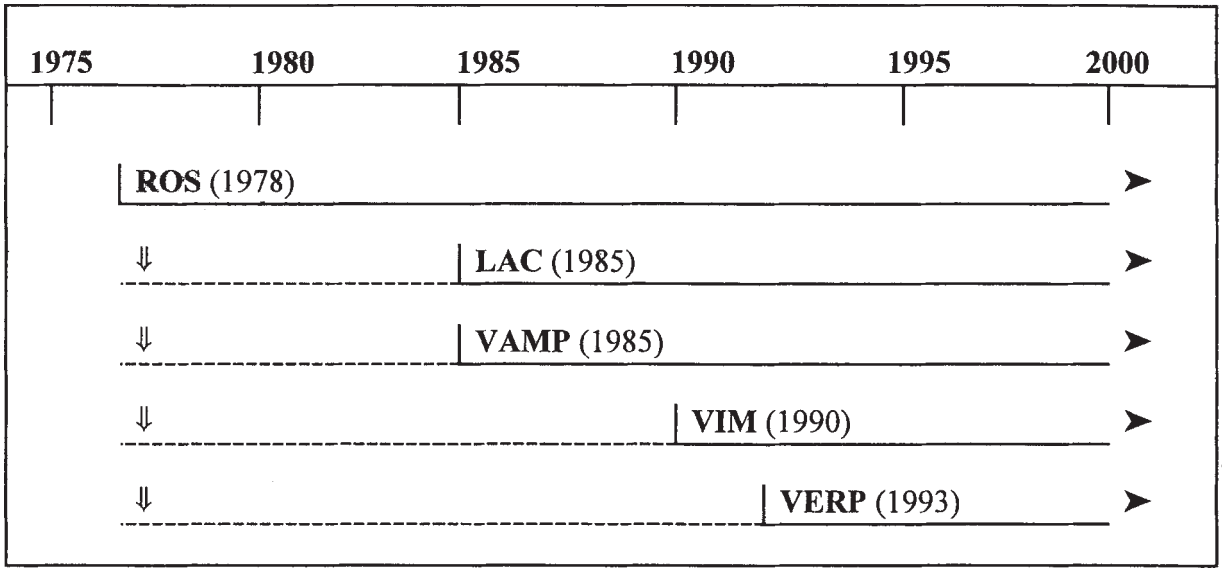

Figure 1—Evolution of the frameworks.

ROS seems to fall between the two subgroups. ROS does consider physical (resource), social, and managerial factors that contribute to strategic decisions about the supply of recreation opportunities; however, indicators are used differently than in the other frameworks. ROS has seven groups of setting indicators and standards that inventory the supply and demand of recreation opportunities, assist in monitoring over time, identify impacts, and determine the effectiveness of management actions (USDA 1981, 1990). Once the ROS class designations are agreed on during the planning process, they can be used to guide tactical decisions related to day-to-day operations.

Appropriate Applications

The appropriate application of each framework depends on which questions are being asked, and in which contexts or settings. ROS, VERP, and VAMP are more comprehensive and holistic. They are particularly useful for establishing a broad direction for the management of human use in protected areas. VIM and LAC are primarily issue-driven and narrower in focus. ROS, VERP, and VAMP also address the issue of interpreting natural and cultural resources directly, whereas LAC and VIM require a conscious managerial decision to consider interpretation (Pugh 1990).

ROS is for macro or regional planning in a variety of different settings (Driver 1990). It is designed to integrate information about the supply and demand for outdoor recreation opportunities into other forms of planning (such as land and resource planning in the U.S. Forest Service). ROS can also be used to estimate the effects of management decisions on the provision of recreation opportunities. Its underlying concepts and principles can be applied to almost all landscape planning exercises.

VIM is reactive and best suited to more site-specific problems. It was derived from an extensive review of the recreation carrying capacity literature (Kuss and others 1990). For the impact of recreation on the environment and the quality of the visitor experience, VIM addresses three basic issues: problem conditions, potential causal factors, and potential management strategies. VIM emphasizes identifying probable causes of impact conditions given the scientific evidence that exists to date about the nature of recreation impacts.

LAC is "an extension of the ROS concept applied specifically to wilderness area management," but "could be applied to any natural areas used for recreation purposes" (Graefe and others 1990: 93). The "LAC concept provides a framework within which the appropriate amount and extent of change can be identified. It also can alert managers to the need for action when changes exceed standards" (Stankey and McCool 1990: 220). LAC is a good vehicle for addressing specific factors in a transactive planning approach, to define the limits of acceptable change. It relies on the use of indicators, standards, and monitoring to identify unacceptable impacts.

VERP builds on the experience of VAMP and the other previously mentioned frameworks, and to date has been applied to some U.S. National Parks. It was first applied at Arches National Park in response to the General Management Plan (USDI 1989), "to help National Park planners and managers address visitor carrying capacity and make sound decisions about visitor use" (USDI 1995: 3).

Although VAMP is designed to complement Parks Canada's existing planning frameworks, its associated principles can be readily applied in a variety of management contexts, from large protected areas to specific facilities. It combines a marketing approach to management of public opportunities with the constraints of managing heritage resources, focusing on the visitor requirements for enjoyable experiences through appropriate activities. VAMP is particularly useful for making strategic and operational decisions about target markets, market position, appropriate educational and recreation activities in selected heritage settings, and the kind, quantity, and quality of supporting services and facilities (Parks Canada 1985, 1988, 1991).

Relationships

Each framework builds successively on the experiences of the development and application of previous approaches. For example, elements of ROS have been built into each of the succeeding approaches (fig. 1). LAC calls for the identification of opportunity classes, whereas VAMP and VERP use management zones that are unique to each National Park. Since VIM was developed as a result of a comprehensive literature review in the late 1980's, it incorporates elements of ROS, LAC, and VAMP as they existed at that time (Kuss and others 1990).

VERP refers specifically to LAC and VIM, incorporating many of the same elements and techniques. Its comprehensive, strategic nature and recognition that the "Park Service should manage visitor use continuously, the same way it manages resources" (USDI 1995: 54) mirrors the basic concepts of VAMP. VAMP, however, places more emphasis on the factors that lead to a successful National Park experience through the selection of appropriate visitor activities, the conditions under which they are offered, profiles of visitor markets, and the kind, quality, and quantity of services and facilities.

VAMP draws heavily on the principles of ROS and the associated recreation production process model. The basic VAMP concept is based on the four levels of demand in the ROS model, namely demand for activities, setting attributes, experience opportunities, and benefits (Driver and Brown 1978). VAMP also draws from and easily incorporates many of the principles of VIM, LAC, and VERP.

Common Themes

All the approaches include:

- Interdisciplinary planning teams
- A focus on management of human-induced change
- A need for sound natural science and social science information
- Formal and informal data gathered over time
- The establishment of clear, measurable management objectives
- The definition of recreation opportunity settings as a "combination of biological, social and managerial conditions that give value to a place" (Clark and Stankey 1990: 127)
- The hierarchy of demand and the link between activities, settings, experiences, and benefits (Driver and Brown 1978)
- Recognition that "there is no single, predictable environmental or behavioural response to recreation use" (Graefe 1990: 214)
- Recognition that "most impacts *do not* exhibit a direct linear relationship with user density," and a variety of situational factors must be considered (Graefe 1990: 214)
- Recognition that it is important to provide a diversity of recreation and educational opportunities
- A focus on elements of the recreation setting, because these are the components of the recreation opportunity that managers can readily influence
- A range of direct and indirect management strategies (Graefe and others 1990), in particular, zoning or landscape classification along a spectrum
- Ongoing monitoring and evaluation

Reference to the indicators (particularly resource indicators) and standards in LAC, VERP, and VIM have made these approaches appealing to recreation planners and managers using a scientific natural resource management perspective. The use of indicators and standards also makes these approaches attractive to those interested in ecosystem-based management and monitoring. The emphasis on monitoring helps managers understand the consequences of recreation use and impact. However, in the future, more emphasis on understanding the probable causes of impacts (such as Step 6 of VIM) is needed, rather than just the impacts themselves, if the source of the impacts is to be influenced.

VIM is the only approach analyzed that specifically emphasizes understanding the probable causes of visitor impact. It also suggests a range of management strategies, and includes a framework for evaluating alternatives.

Finally, all of the approaches recognize that "effective management involves both scientific and judgemental considerations…and [effective management] is more than carrying capacity and use limits" (Graefe 1990: 216).

Issues and Recommendations

Lack of Integration

While some integration among the frameworks has occurred, there is considerable room for improvement. Each framework could benefit from a thorough review and integration of the key principles of the other frameworks and the lessons learned through application, where appropriate. The LAC Workshop (this proceedings) in Missoula, MT (May 1997), represents an important first step in this direction. Similarly, additional research is necessary on the degree of success that has been experienced in the integration of these frameworks with other planning and management frameworks and concepts. A particular gap to be addressed is the integration of these frameworks with planning exercises that emphasize ecosystem-based management.

Matching Frameworks to Problems

Managers and planners continue to struggle to identify which planning frameworks and associated research tools and techniques should be used to address specific problems. The first step is to decide which questions they are trying to answer, since each framework tries to answer different types of questions.

To balance the complex issues of outdoor recreation management with the reality of dwindling financial and human resources, managers and planners must look to fields such as risk management for techniques to help prioritize which problems should be addressed and on what scale. For example, Cole and Landres suggest considering criteria such as "the intensity, longevity and areal extent of impacts

as determined by threat characteristics (intensity, areal extent, frequency, timing, predictability and others) and the vulnerability (resistance, resilience) of the affected attribute" (1996: 170), when evaluating the significance of an impact.

Emphasis on Indicators and Standards

LAC, VERP, and VIM place considerable emphasis on identifying factors, indicators, and standards, and on subsequent monitoring. Such a threat-specific approach provides a mechanism for detecting early signals of problems, but does not necessarily pinpoint the root causes of the problems. Like a doctor working on a patient with multiple wounds, the current approaches emphasize understanding the size, shape, and significance of each wound, without understanding the cause, alternative ways of healing the injury, or ways to prevent it from recurring. Likewise, the key indicators of the health of the whole patient (in this case, the ecosystem) may be not be monitored along with the site-specific problems.

Additional research is required to understand the relationship between factors, indicators, and standards. Graefe and others (1990) suggest that additional work is also required to understand the probable causes of impacts and how these causes can be influenced. Similarly, the "integrated monitoring" of a wide range of key ecosystem indicators at the appropriate level is required in conjunction with threat-specific monitoring to ensure that the health of the overall ecosystem is considered as part of the planning exercise (Woodley 1996).

Data and Information Requirements

The frameworks' varying degrees of emphasis on factors, indicators, and standards, combined with a lack of questions about the appropriate scope and scale of analysis, create a confusing picture of which approaches should be used for what purpose. This diversity of emphasis directly influences decisions about what type of data collection, analysis, and information is required. Inappropriate data may be collected if strategic questions and a hierarchy of decisions were not considered at the outset. There is a continued need for better-defined baseline data and information needs at the appropriate levels of management; more timely information, provided at the right point in the decisionmaking process; and an understanding of the authority and limitations of available data (Machlis 1993, 1996).

Definitions and Descriptions

Each of the frameworks calls for the definition and description of opportunity objectives, classes, or zones. These are determined through an analysis of resources, social and managerial conditions, and the availability, capability, feasibility and suitability of settings for outdoor recreation. While each framework uses similar principles and concepts, the language used to describe them is often imprecise and vague. Additional work is required to articulate the attributes that define opportunity objectives, classes, or zones. This effort would establish a common vocabulary, as well as agreed-on standards, that can be more readily monitored, managed, and maintained.

Changing Environments, Organizations, and Staff Capabilities

The reinvention of government in the early 1990's, combined with fiscal restraint, brought considerable changes to organizational structures, priorities, and the availability of financial and human resources in all protected area agencies. Staff capabilities and training are eroding or disappearing, yet the mandates for protection or multiple use, and the provision of education and recreation opportunities remain. Lack of training, knowledge, and the time needed to understand different approaches have led to misapplications of some of the frameworks. Elsewhere, staff are reinventing approaches to visitor management based on their limited understanding of previous research, thereby wasting scarce human and financial resources. In parks, protected areas, and educational institutions, there is a need to understand the basics of each planning and management framework as summarized in table 1.

Alternative Management Strategies

Each of the planning and management frameworks requires an array of direct and indirect management strategies. VIM goes a step further and suggests a matrix to evaluate these strategies. Little research, however, has been completed to determine the effectiveness of any of these strategies. This problem is further described by McCool and Christensen (1996), who confirm that there is plenty of experience in applying these strategies but that knowledge about their effectiveness is largely anecdotal. "This experience is invaluable and should be documented, synthesized and archived" (McCool and Christensen 1996: 81). Furthermore, there is little documentation of the costs of alternative strategies or public preferences for direct versus indirect approaches in front-country and urban environments. The U.S. Forest Service report entitled "Managing Wilderness Recreation Use: Common Problems and Potential Solutions" (Cole and others 1987) is a notable exception.

In addition to evaluating the effectiveness of the management strategies recommended by the various planning frameworks, Schneider and others (1993: 1) note that "although researchers have devoted great effort to developing recreation management innovations, there have been few evaluations of these innovations or studies of their diffusion and implementation." Some progress has been made through workshops at Waterloo in 1989 (Graham and Lawrence 1990) and Wisconsin in 1992 (Rickson and others 1995), and through other studies (Giongo and others 1993; Schneider and others 1993). Managers and practitioners, however, would benefit from further evaluations of implementation of the frameworks, and, more important, their effectiveness in maintaining the integrity of ecosystems while providing opportunities for education and outdoor recreation in protected areas.

References

Clark, R. N.; Stankey, G. 1979. The recreation opportunity spectrum: a framework for planning, management and research. Gen. Tech. Rep. GTR-PNW-98. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest Experiment Station. 32 p.

Clark, R. N.; Stankey, S. 1990. The recreation opportunity spectrum: a framework for planning, management and research. In: Graham, R.; Lawrence, R., eds. Towards serving visitors and managing our resources—proceedings of a North American workshop on visitor management in parks and protected areas. Waterloo, ON: University of Waterloo: 127-156.

Cole, David N.; Landres, Peter B. 1996. Threats to wilderness ecosystems: impacts and research needs. Ecological Applications. 6(1): 168-184.

Cole, David N.; Petersen, M. E.; Lucas, Robert C. 1987. Managing Wilderness Recreation Use: Common Problems and Potential Solutions. Gen. Tech. Rep. INT-230. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 60 p.

Driver, B. 1990. Recreation opportunity spectrum: basic concepts and use in land management planning. In: Graham, R.; Lawrence, R., eds. Towards serving visitors and managing our resources—proceedings of a North American workshop on visitor management in parks and protected areas. Waterloo, ON: University of Waterloo: 159-183.

Driver, B.; Brown, P. 1978. The opportunity spectrum and behavioural information in outdoor recreation resource supply inventories: a rationale. In: Gyde, H. Lund and others, tech. coords. Integrated inventories and renewable natural resources: proceedings of the workshop. Gen. Tech. Rep. RM-55. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station: 24-31.

Giongo, Francesca; Bosco-Nizeye, J.; Wallace, G. N. 1993. A study of visitor management in the world's national parks and protected areas. Fort Collins, CO: Colorado State University, College of Natural Resources. 138 p.

Graefe, A. 1990. Visitor impact management. In: Graham, R.; Lawrence, R., eds. Towards serving visitors and managing our resources—proceedings of a North American workshop on visitor management in parks and protected areas. Waterloo, ON: University of Waterloo: 213-234.

Graefe, A.; Kuss, F. R.; Vaske, J. J. 1990. Visitor impact management: the planning framework. Washington, DC: National Parks and Conservation Association. 105 p.

Graham, R.; Lawrence, R., eds. 1990. Towards serving visitors and managing our resources—proceedings of a North American workshop on visitor management in parks and protected areas. Waterloo, ON: University of Waterloo. 520 p.

Hof, M. 1993. VERP: A process for addressing visitor carrying capacity in the national park system (working draft). Denver, CO: National Park Service, Denver Service Center.

Kuss, F. R.; Graefe, A. R.; Vaske, J. J. 1990. Visitor impact management: a review of research. Washington, DC: National Parks and Conservation Association. 256 p.

Machlis, G. 1993. Social science and protected area management: the principles of partnership. The George Wright FORUM. 10(1): 9-20.

Machlis, G. 1996. Usable knowledge: a plan for furthering social science and the national parks. Washington, DC: National Park Service. 72 p.

McCool, Stephen F. 1990. Limits of acceptable change: evolution and future. In: Graham, R.; Lawrence, R., eds. Towards serving visitors and managing our resources—proceedings of a North American workshop on visitor management in parks and protected areas. Waterloo, ON: University of Waterloo: 186-193.

McCool, Stephen F.; Christensen, N. A. 1996. Alleviating congestion in parks and recreation areas through direct management of visitor behavior. In: Lime, David W., ed. Congestion and crowding in the National Park System. St. Paul, MN: Minnesota Agricultural Experiment Station: 67-83.

Meis, S. 1990. Visitor management issues: monitoring and evaluation. In: Graham, R.; Lawrence, R., eds. Towards serving visitors and managing our resources—proceedings of a North American workshop on visitor management in parks and protected areas. Waterloo, ON: University of Waterloo: 337-347.

Parks Canada. 1985. Management process for visitor activities. Ottawa, ON: National Parks Directorate, Visitor Activities Branch. 76 p.

Parks Canada. 1988. Getting started: a guide to park service planning. Ottawa, ON: Parks Canada, National Parks Directorate, Visitor Activities Branch. 128 p.

Parks Canada. 1991. Visitor activity concept. Ottawa, ON: Parks Canada, Program Headquarters, VAMP Technical Group. 16 p.

Payne, R. J.; Graham, R. 1993. Visitor planning and management in parks and protected areas. In: Deardon, P.; Rollins, R., eds. Parks and protected areas in Canada: planning and management. Toronto, ON: Oxford University Press: 185-210.

Pugh, D. 1990. Decision frameworks and interpretation. In: Graham, R.; Lawrence, R., eds. Towards serving visitors and managing our resources—proceedings of a North American workshop on visitor management in parks and protected areas. Waterloo, ON: University of Waterloo: 355-356.

Rickson, R. E.; Field, D. R.; Nilsen, P., eds. 1995. For the record: presentations at the second Canada/U.S. workshop on visitor management in parks forests and protected areas. Madison, WI: University of Wisconsin - Madison. 259 p.

Schneider, Ingrid; Anderson, Dorothy; Jakes, Pamela. 1993. Innovations in recreation management: importance, diffusion, and implementation. St. Paul, MN: U.S. Department of Agriculture. 12 p.

Stankey, G.; Cole, David N.; Lucas, Robert C.; Peterson, Margaret E.; Frissell, Sidney S. 1985. The Limits of Acceptable Change (LAC) system of wilderness planning. Gen. Tech. Rep. INT-176. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 37 p.

Stankey, G.; McCool, S. 1990. Managing for appropriate wilderness conditions: the carrying capacity issue. In: Hendee, J. C.; Stankey, G. H.; Lucas, R. C. Wilderness Management (2d ed.) Golden, CO: Fulcrum Press: 215-239.

Tayler, G. 1996. Spectrum of national park opportunities. Unpublished report prepared for the Parks Canada, National Parks, Natural Resources Branch. 20 p.

U.S. Department of Agriculture, Forest Service. 1981. ROS user's guide. Washington, DC: U.S. Department of Agriculture, Forest Service. 37 p.

U.S. Department of Agriculture, Forest Service. 1990. ROS primer and field guide. U.S. Government Printing Office. 794-499. 10 p.

U.S. Department of the Interior, National Park Service. 1989. General management plan, development concept plan, environmental assessment: Arches National Park. Moab, UT: National Park Service.

U.S. Department of the Interior, National Park Service. Denver Service Centre. 1995. Visitor experience and resource protection implementation plan: Arches Utah National Park. Denver, CO: National Park Service, Denver Service Centre. 72 p.

Woodley, S. 1996. A scheme for ecological monitoring in national parks and protected areas. Environments. 23(3): 50-74.

Other Works Consulted

Cole, David N; McCool, Stephen F. 1997. Limits of acceptable change and related planning frameworks: critical issues. Background paper for the limits of acceptable change workshop. Missoula, MT: May 20-22. 23 p.

Driver, B. 1970. Elements of outdoor recreation planning. Ann Arbor, MI: University of Michigan Press. 316 p.

Graefe, A.; Vaske, J. J.; Kuss, F. R. 1984. Social carrying capacity: an integration and synthesis of twenty years of research. Leisure Sciences. 6(4): 395-431.

Graham, R. 1990. Visitor activity management and Canada's national parks. In: Graham, R.; Lawrence, R., eds. Towards serving visitors and managing our resources—proceedings of a North American workshop on visitor management in parks and protected areas. Waterloo, ON: University of Waterloo: 271-296.

Lime, David W., ed. 1996. Congestion and crowding in the national park system. St. Paul, MN: Minnesota Agricultural Experiment Station. 144 p.

Manfredo, Michael J., ed. 1992. Influencing human behaviour: theory and applications in recreation, tourism and natural resources management. Champaign, IL: Sagamore Publishing Co., Inc. 371 p.

Manning, R. E. 1986. Studies in outdoor recreation. Corvallis, OR: Oregon State University Press. 166 p.

Manning, R. E.; Lime, D.; McMongale, R. 1994. Indicators of the quality of the visitor experience at a heavily used National Park. Fifth international symposium on society and resource management; 1996 June 7-10. Fort Collins, CO: Colorado State University, College of Natural Resources: 214-215.

Manning, R. E.; Lime, D.; Hof, M.; Friemund, W. 1995. The carrying capacity of national parks: theory and application. In: Payne, R.; Nilsen, Per. 1995. Innovations and challenges in the management of visitor opportunities in parks and protected areas. Occasional paper #26. Waterloo, ON: University of Waterloo, Heritage Resources Centre: 9-21.

McCool, Stephen F. 1990. Limits of acceptable change: some principles. In: Graham, R.; Lawrence, R., eds. Towards serving visitors and managing our resources—proceedings of a North American workshop on visitor management in parks and protected areas. Waterloo, ON: University of Waterloo: 194-200.

McCoy, K. Lynn; Krumpe, Edwin E.; Stewart Allen. 1995. Limits of acceptable change planning. International Journal of Wilderness. 1(2): 18-22.

Parks Canada. 1994. Guiding principles and operating policies. Ottawa, ON: Parks Canada, Department of Canadian Heritage. 125 p.

Parks Canada. 1993. Status report on the contribution of the implementation of VAMP to the achievement of Parks Canada's mandate. Ottawa, ON: National Parks, Visitor Activities Branch. 52 p.

Payne, R. J.; Nilsen, Per. 1995. Innovations and challenges in the management of visitor opportunities in parks and protected areas. Occasional paper #26. Waterloo, ON: University of Waterloo, Heritage Resources Centre. 84 p.