RECREATION MANAGEMENT

by

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Introduction

Traditionally in North America, the management of forested lands has been primarily concerned with the effective and efficient harvest of timber. However, there has been a shift in forest management to a more holistic paradigm that recognizes the value of non-timber forest amenities including aesthetics and outdoor recreation (Prins *et al*. 1990). While the continued extraction of one of the world's most significant renewable resources is an important aspect of modern forest management, it is no longer sufficient for this to be the sole concern of the forester. Outdoor recreation participation has grown in North America, especially after World War II, due to increases in leisure time, incomes, access, and population (Stankey *et al.* 1990). British Columbia (BC) has not been immune to these increases: between 1984 and 1994, the BC Ministry of Forests (1995a) reported a 35% increase at managed recreation sites and trails. Indeed it is largely because of the relevance of these factors that outdoor recreation in BC requires careful consideration in natural resource management and planning – the recreating public is competing for many of the same resources and landscapes that are desirable for forestry.

For many people (especially those who are not associated with the forestry profession), the pursuit of an outdoor recreation activity provides the impetus to interact with forested landscapes and is therefore the basis for much of the general public's impressions of forestry as a whole. For these people, outdoor recreation experiences are shaped in part by the setting within which these activities take place (i.e. forest outdoor recreation becomes the interface through which people experience forested landscapes and it is through this interface that people develop affinities or attachments for certain places, be they in parks or on Crown land). This is one of the reasons that it is important for forest managers to consider outdoor recreation when engaging in forest planning. People expect the areas that they visit and play in (and have become attached to) to be *cared* for. Not only do people *want* their forests cared for, but foresters have a professional responsibility to act as in the best interests of the society whose resources they are charged with managing. It is for these reasons that recreation deserves our attention in this handbook.

The word *recreation* literally means to recreate or restore. This renewal and refreshment occurs through participation in an activity that is pleasurable and is free of typical demands or restraints – it reflects a conscious choice to disengage from work. Outdoor recreation then, is the pursuit of a pleasurable activity during leisure time that takes place outside, or more specifically, in the natural environment. These sentiments are reflected in the British Columbia Ministry of Forests' (BCMoF) definition of recreation:

> …any mental or physical revitalization as the voluntary pursuit of leisure time. Outdoor recreation is recreation that takes place out-of-doors, and forest recreation takes place in a forest or wildland setting (1991, p. G9).

Outdoor recreation is best conceived of as a field of study rather than as a discipline in itself, for it brings many disciplines to bear on particular issues or problems, and can be both interdisciplinary and multidisciplinary. As a field, outdoor recreation focuses attention on activities that are pursued in leisure time; in the context of forestry, these are activities that take place in forested landscapes.

The BCMoF (1995a) has recognized the role that social science can play in recreation resource management: "Social research can improve knowledge about the use, value and demand for outdoor recreation and public perception studies support many aspects of recreation management" (p. 189). Among some of the more traditional disciplines that study recreation and contribute to a fuller understanding of the subject are sociology, psychology, landscape architecture/ landscape planning, geography, economics, and political science. Studies and research in forestry, business, and medicine have also helped to further the understanding of outdoor recreation issues and concerns. In addition, there are a number of recreation, park, leisure studies and tourism programs that are making major contributions to the subject of recreation. Indeed one of the challenges facing people who study outdoor recreation is the integration of the research findings from these disciplines into concise outdoor recreation theory. We have chosen to highlight some of the research topics from a few of the more traditional disciplines that study recreation (see Table 1); however, this list is not exhaustive.

Table 1:
Some examples of recreation research areas of traditional academic disciplines.

Discipline	Research Topic Examples
Economics	Utility theory, choice, and value.
Geography	Spatial behavior and location theories.
Landscape Architecture	Recreation site design and landscape level planning.
Psychology	Focus on the individual, perception and cognition, learning, attitude & behavior.
Sociology	Social structure and change, group behavior, institutions, status, norms, conflict.

Economics is an important discipline in the study of outdoor recreation; in this context, economics deals with the allocation of scarce resources and may concentrate on maximization, optimization, and cost effectiveness of a variety of recreation benefits. Applications of economic analysis to recreation and tourism include: estimation and prediction of demand and supply, valuation, determination of regional economic impacts, and use of economic analysis in management, marketing and policy decisions. Many of our societal decisions have economic assumptions at their root, and the desire to be able to quantify both market and non-market values for inclusion in decision-making tools such as cost/benefit

analysis has led economists to develop a number of methodologies that are used to estimate dollar measures of economic values associated with recreation. Some of the methods most commonly used to accomplish this task are: market price, hedonic pricing, travel cost, benefit transfer, substitute cost and contingent valuation/choice methods. For further discussions of these methodologies see, Bateman and Willis (1999), Boardman *et al*. (2001), Loomis and Walsh (1997), Adamowicz *et al*. (1998), Boxall *et al*. (1996) and Tietenbuerg (2000).

Over the last 60 years, geographers have developed robust spatial theories and methods of spatial analysis that address them (Golledge and Stimson, 1997).These theories have been applied to issues related to recreation planning and management and have contributed to our understanding of these fields. Examining the locations, movements and interactions of people engaged in recreational activities within the environment has become an area of interest to today's geographers. This has been done at many scales and has led to a better understanding of regional human-environment relations, a significant factor in learning how to effectively balance human needs and environmental protection. Additionally, a number of spatially explicit models of recreation behavior have been developed using the capabilities and theories of modern day geographic information systems (e.g. Deadman *et al.* 1994 and Gimblett *et al.* 1999; 2001a; 2001b). For further discussion on geography's contribution to recreation we suggest readers consult Carlson (1980), Hall and Page (1999), Mitchell (1994), and Smith and Mitchell (1990).

Landscape architecture and landscape planning have made valuable contributions to the management of outdoor recreation through the development of management and planning tools and through the application of design to the planning process. Naussauer (1995; 1988) has suggested that the adoption of a principle of care or neatness can have an effect on people's perceptions and attitudes toward landscapes. Management tools like the *Limits of Acceptable Change*, *Visitor Activity Management Process*, and the *Visitor Impact Management* process have assisted park planners and landscape managers in providing recreation opportunities that are enjoyable and meet the desires of people using areas for recreation, while at the same time taking other landscape values in to account such as ecology (Payne and Graham, 1993; Stankey *et al.* 1990). Other planning tools that have been developed include inventory tools like the *Recreation Opportunity Spectrum* and the *Recreation Features Inventory*; these tools are being used in BC to keep track of recreation opportunities and to allow for recreation to be considered in forest landscape planning. These planning and inventory tools are described later in this chapter.

Sociological methods and theory have been used to examine the behaviour of groups of people that participate in outdoor recreation. These groups may be centered on a particular recreation activity like rock climbing, backcountry skiing, or hunting, or reflect larger segments of society like demographic groups. Not only do groups of recreation participants seek out particular activities, these groups may also desire similar experiences and settings in which to engage in their activity (e.g. Twynam and Robinson, 1997). A better and fuller understanding of how groups of people organize themselves, and how these groups interact with the environment in which they pursue recreation can help to determine which activities are popular or exist in an area, and may also assist

in the management of the areas that support the activities that are desired (e.g. Robson *et al*. 2000).

Psychology differs from sociology in its focus, as it deals with individual people instead of groups of people. Psychological research into outdoor recreation has included investigations of the motivations of people for pursuing certain activities (e.g. Csikszentmihalyi, 1990; Jones *et al.* 2000), and how people assess and perceive the landscapes that they interact with (e.g. Meitner and Daniel, 1997; Weidemann *et al.* 1997). Virden and Knopf (1989) have examined the psychological relationships between recreation activity, desired experiences and preferred environmental setting. In addition, an interesting body of research investigating the effects of people's experiences with environments on psychological well-being, physiological systems, and health outcomes was pioneered by Roger Ulrich, a noted environmental psychologist (see Ulrich *et al.* 1991; Ulrich, 1984; and Parsons *et al.* 1998).

Most social science research that has focused on outdoor recreation has been a combination of sociology and psychology, and has been termed *social-psychology*. Social-psychology has also had an influence on recreation research as demonstrated by Mannell and Kleiber (1997). Other categories of social-psychological research includes: leisure studies (e.g. Jackson & Burton, 1999) recreation participation and its constraints (e.g. Crawford *et al.* 1991); recreation choice and behaviour (e.g. Haider and Hunt, 1997); and social interaction and its processes among recreationists and social groups and the nature and quality of recreation experience and its beneficial consequences. Manning (1999) provides an excellent synopsis of the role of the social sciences in outdoor recreation research and is a must read if you have an interest in this area.

Outdoor Recreation Use and Trends in BC

Outdoor recreation in BC is growing, both in popularity, and in significance. In response to this trend, the BC Ministry of Environment, Lands and Parks (BCMELP) launched a comprehensive eco-tourism and adventure travel strategy to address what has been termed the *green economy* (or financial return on services and products that focus on the natural environment, or that consider environmental impacts); BCMELP also recognized that participation in outdoor recreation activities provide significant benefits in terms of quality of life and human health (BCMELP, 2001). It should be noted that in the summer of 2001 BCMELP was split into the Ministry of Sustainable Resource Management (BCMSRM) and the Ministry of Water, Land and Air Protection (BCMWLAP) both of which now share the responsibility for the management of recreation concerns. For example parks and protected areas management falls under the jurisdiction of BCMWLAP, while general landscape planning falls under the jurisdiction of BCMSRM.

The popularity of outdoor recreation is reflected in the number of British Columbians that have visited a park or protected area: 90% have visited a protected area at least once in their lifetime and 60% of residents visit protected areas on an annual basis. There is strong sentiment among British Columbians that provincial parks should be protected from privatization and commercialization (The Legacy Panel, 1999).

In June of 1999, amendments to the *Park Act* protected 1.4 million hectares of land as Class A Parks[1] – this represents a 22.5% increase in the area of parkland and ecological reserves from 1989-1999; in 1993-1994 there were 1.8 hectares of parkland for each BC resident, by 2000-2001 this had increased to 2.8 hectares despite an increase in provincial population (BCMELP, 2001). This increase in the amount of parkland may have been a response to the increases in park visits: between 1993 and 1999 park visitation increased 16.86% to 26.5 million visitors annually; however, park visits decreased in 2000 to 23.5 million visits (an increase of only 3.82% from 1993). Alternatively, this may simply represent a desire to set aside more public land for future generations. Whatever the reason, it is clear that land set aside for recreational purposes has increased; this underscores the need for resource managers with an understanding of the relevant dimensions of outdoor recreation.

The public's pursuit of outdoor recreation in British Columbia does have some positive economic benefits to the province. For the period 1993-2000, the annual revenue that was retained by park facility operators increased 35.85% to $10,625,000 (BCMELP, 2001). A study by the BC Ministry of Water, Land and Air Protection (BCMWLAP) found that the total expenditures related to provincial parks in 1999 was $533 million, 90% of this figure was estimated to be visitor expenditures (33% of these expenditures came from out-of-province visitors); for every dollar invested in parks by the Government, ten dollars was spent by park visitors (BCMWLAP, 2001).

However, the provision of, and public participation in, outdoor recreation is not limited to parks and protected areas. Public forestlands (i.e. Crown land) also provide outdoor recreation opportunities; indeed some activities, such as hunting and the use of ATVs and other motorized recreational vehicles, are not permitted in parks – provincial forestlands are the only places that these opportunities can be pursued.

The BC landbase is 94.8 million hectares; the BCMoF administers 81.9 million hectares (86%) of this landbase (BCMoF, 2001). Of the land that is under BCMoF jurisdiction, roughly 60% is productive forestland – these landscapes also provide settings that are attractive for outdoor recreation. The BCMoF (1995a) reported that during the ten-year period spanning 1984-1994, outdoor recreation use increased 35% at managed recreation sites and trails. A total 88 million user-days was reported for outdoor recreation use on provincial public lands for 1992-1993.

In 1995, the BCMoF reported that 18 million hectares (roughly 22%) of provincial forest land had special recreation values (BCMoF, 1995a); typically this *specialness*, or significance, is based on three criteria: recreation feature uniqueness, scarcity and attraction capability (BCMoF, 1995c). It is significant features, like the Mackenzie Heritage Trail in the Chilkooten, the Meager Creek hot springs near Pemberton, or the large redcedar grove near Cougar Mountain up Sixteen Mile Creek north of Whistler, that attract people to provincial forests; 51

[1]Parks are categorized into three levels of protection: Class A Parks have the highest level of protection; Class B Parks only allow for resource extraction activities that do not interfere with recreation (this category is being phased out, only two parks remain in this category); and Class C parks, which have the same degree of protection as Class A Parks, but are managed by local parks boards (Haddock and Brewster, 1999).

million visitor days were recorded for provincial forests in 1993 (BCMoF, 1995a). Table 2 illustrates some of the recreation activities that people engage in.

Table 2: 1994 Outdoor recreation participation by activity in BC.

Recreation Activity	% Annual Participation
Hiking	59
Camping	49
Fishing	45
Downhill skiing	27
Canoeing/kayaking	20-25
Overnight camping	16
Cross country skiing	15
Hunting	10
Snowmobiling	7

Adapted from BCMoF, 1995a, p. 179.

A 1990 survey of BC Forest Service recreation site visitors found that 62% of respondents preferred natural settings to recreate in, and that 72% of respondents indicated that they would not use recreation sites that were located in recently logged areas (BCMoF, 1995a). Not only do people prefer settings that appear cared for (Naussauer, 1995; 1988), but some also prefer wilderness or backcountry settings. Outside of parks, 51 million hectares of provincial forests do not have roads in them, 37% of these (19 million hectares) are in commercial forests.

A ten-year review and analysis of forest, range and recreation resources in BC attempted to address the implications of possible resource scarcity or surplus (BCMoF, 1995a). This analysis found that the economic benefits of outdoor recreation in BC provincial forests was valued at $3 billion for 1993, expenditures for that year contributed $2.4 billion to BC's economy (88% from BC residents), and the net economic value was calculated as $867 million (84% from BC residents). The economic value of doubling designated wilderness areas in 1993 was also examined, and estimated to be $160 million (76% of this value was attributed to existence and bequest values, while the remaining 24% was attributed to option or use values). Total actual expenditures for outdoor recreation on Crown lands (which includes use in national, provincial and regional parks) was calculated at $4 billion/year (80% from BC residents), and the annual net value was estimated as $1.5 billion (BC residents accounted for 74%). Non-resident outdoor recreation expenditures in the province were valued at $780 million (BCMoF, 1995a).

The demand for outdoor recreation opportunities in BC is significant. When this demand is considered in light of the economic returns that recreation enthusiasts contribute to the provincial coffers, as well as intangible advantages that include improved quality of life, increased productivity, and assorted health benefits (Ulrich, 1984; Ulrich *et al*. 1991), it becomes apparent that outdoor recreation is a forest amenity that has become entrenched in BC resource management.

Outdoor Recreation and Provincial Legislation

Provincial legislation and policy pertaining to outdoor recreation in BC applies to all provincial Crown land outside of parks (i.e. all forested and non-forested land under provincial jurisdiction and non-municipal and rural settlements), but does not apply to private land, national and provincial parks, and other protected areas (i.e. regional parks and municipal lands) (BCMoF, 1995b). The management of provincial forestland for outdoor recreation can be expected to change due to changes in legislation and forest tenures (for example, community forestry tenures in BC require that non-timber values, such as recreation, must be managed for explicitly).

Until recently, the BCMoF's Recreation Management Policy recognized that recreation was a resource that included the full spectrum of recreation values and opportunities from scenic landscapes and wilderness areas to cultural and historic landmarks and developed facilities. The BCMoF's management of recreation would maintain and enhance these resources and balance all forest uses; this responsibility was informed through the identification of the recreation needs and interests of society through an ongoing consultation and discussion with the public (BCMoF, 1997a; 1991).

The recent review of governmental core services concluded that the management of recreation sites and trails would no longer be priority of the BCMoF. As a result, the management of all BCMoF recreation sites and trails will be transferred to other agencies and organizations (including forestry companies) or cancelled – this reorganization is scheduled to be completed by March 31, 2004. The new Results-Based Code will be sensitive to local stakeholder concerns and certification systems. While no longer an explicit management concern, recreation opportunities will be addressed through mechanisms like locally specified quality of life/benefits to society criteria and indicators. Community and social values and needs will continue to be a concern of provincial forest managers. The BCMoF is considering options for continuing to provide outdoor recreation opportunities in the province that include encouraging local communities and community groups to accept responsibility for the management of outdoor recreation opportunities and facilities. Although this transition away from integrated forest value management is in its early stages, there is some concern that the divestment of recreation resources may dilute provincial operating and environmental standards.

Outdoor Recreation Management Tools Used in BC

A number of tools are available for the management of outdoor recreation on provincial Crown land in BC. These tools have been divided into inventory tools (i.e. the *Recreation Resources Inventory*) and outdoor recreation management tools.

The Recreation Resources Inventory

There are a variety of tools that can be employed for the management of outdoor recreation, and for the integration of outdoor recreation into forest planning and management; the use of these tools can help provide the evidence of care for public lands that people demand. One challenge in managing recreation resources is the difficulty of putting the somewhat abstract amenities provided by the physical

environment that contribute to the overall recreational resource into practice.

In 1992, an analysis of BC's cultural, recreation, and tourism inventories identified 38 separate inventories that were maintained by different government agencies and levels of government that varied widely in geographic scope, level of detail, and resource focus. These inventories largely reflected the interests and mandates of the body that coordinated them and, due to the number of inventories and the number of bodies that was responsible for them, the information was not coordinated in a comprehensible fashion (Economic Planning Group *et al*. 1992).

The 1992 report, made recommendations for improving the state of cultural, recreation, and tourism inventories in order to facilitate better data sharing and maintain a high standard of data quality. Among the recommendations that were made were to: coordinate the inventories across government agencies and levels; to manage the data using a Geographic Information System (GIS); and set standards for common data requirements such as (i) assessment of resources (e.g. significance, capability, suitability, sensitivity, and vulnerability), (ii) robust and transparent data (e.g. quality of attribute and spatial data, sources, status and ownership of data, and the coordination of cartographic standards), and (iii) ensure that the data could be coordinated and integrated with other information (e.g. market, financial, economic and community information) (Economic Planning Group *et al*. 1992). To this end, the Recreation Resources Inventory (RRI) was developed to aid in identifying critical landscape features to be included in the landscape planning process.

The BCMoF has used the Recreation Resources Inventory to monitor and catalog recreation amenities. The BCMoF uses four separate recreation inventories to catalog these recreation resources: the Recreation Opportunity Spectrum, the Recreation Features Inventory (RFI), the Visual Landscape Inventory (VLI), and the Recreation Facilities Inventory (see Figure 1).

All four inventories noted above are used in land use planning and in forest operations planning to provide information about the recreation resources and amenities that are present in the planning area. The VLI and the RFI are used by the BCMoF in the Timber Supply Review (TSR) process and are also used by the Chief Forester to aid in the determination of Annual Allowable Cut (AAC). The Recreation Facilities Inventory identifies, both spatially and in an attribute database, the location, status, characteristics and structures that are associated with the forest recreation campgrounds, trails and interpretive sites that are managed by, or have been recognized by, the BCMoF.

The BCMoF is directed through legislation to develop and maintain ROS, RFI and VLI inventories. The Ministry of Sustainable Resources Management is primarily responsible for maintaining the Recreation Resources Inventory, although some responsibilities are shared with the BCMoF. The inventories have been coordinated by the Senior Recreation Inventory Forester of the Archaeological and Recreation Inventory Section of the Terrestrial Information Branch of the Ministry of Sustainable Resources Management.

It is important to note that all of the inventories that constitute the Recreation Resources Inventory are descriptive tools. They are provide information about what should be managed and are not intended to provide management direction, nor act as management prescriptions. Management goals and objectives are determined by government policy and though the consideration of public input.

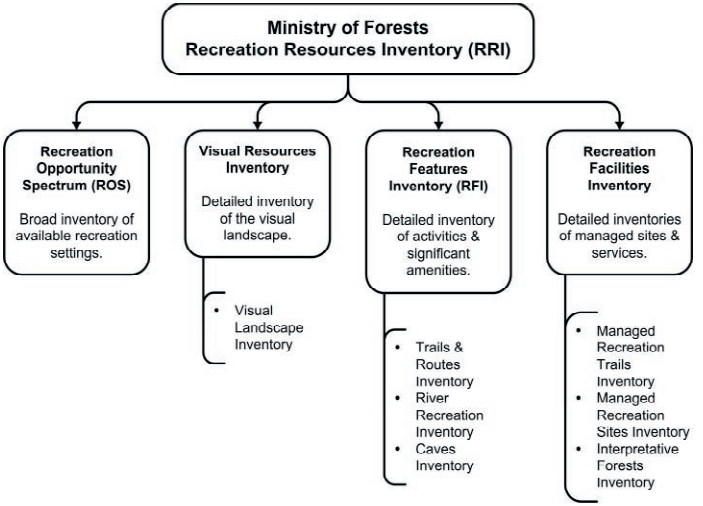

Figure 1:
Components of the BCMoF Recreation Resources Inventory (adapted from BCMoF, 1998a).

The Recreation Opportunity Spectrum

The ROS was developed in the United States in the late 1970s as a tool to help policy makers and land managers respond to an increase in outdoor recreation use as well as other impacts on natural resources (including wilderness areas). It allows for macro (or regional) planning in a variety of settings. The management of outdoor recreation had become complex and required inter-agency cooperation for its management, as well as its integration with natural resource management. The ROS was created so that the diverse range of outdoor recreation opportunity settings could be identified and assessed according to a standard set of principles and definitions. An outdoor recreation opportunity setting is defined as "the combination of physical, biological, social, and managerial conditions that give value to a place" (Clark and Stankey, 1979, p. 1). The ROS considers opportunity in terms of three dimensions: the demand for activity opportunity (e.g. skiing or canoeing), demand for setting opportunity (e.g. backcountry or front country), and demand for experience opportunity (e.g. seeing one other recreation party or seeing seven other recreation parties) (Driver, 1989).

The basic assumption of the ROS is that outdoor recreation quality can be secured through the identification and provision of a diverse set of recreation opportunities. By identifying and providing a range of settings, "from the paved to the primeval" (Nash, 1973), managers can offer recreation opportunities that will appeal to broad segments of the public as well as for future generations (Clark and Stankey, 1989; Driver, 1989). This principle has been recognized in the management of outdoor recreation in BC:

> A recreation opportunity is the availability of choice for someone to participate in a preferred recreation activity within a preferred setting and enjoy the desired experience.
>
> (BCMoF, 1998b, p. 1)

The BCMoF uses the ROS to catalog areas of BC according to their current states of remoteness, naturalness, and expected social experience, and to provide land use planners and resource managers with information about existing outdoor recreation opportunities and settings. The information can be used to incorporate recreation opportunities into TSR, and can also assist in the development of recreation guidelines in Higher Level Plans and forest district level recreation planning (BCMoF, 1998b). The ROS can be used to estimate the effects of management decisions, and may be applied to integrate outdoor recreation supply and demand information into other outdoor recreation management frameworks (see below); information that is derived from ROS analysis is applicable for most landscape planning exercises (Nilsen and Tayler, 1997).

In BC, the ROS identifies seven opportunity settings (or *classes*) along a continuum; these classes are identified and described in Table 3. The factors that distinguish one ROS class from another are remoteness, naturalness, and social experience. Remoteness is measured in terms of access and the size of the areas being considered (*e.g.* larger tracts of undisturbed forestland that are further away from roads are needed for more primitive areas); in BC, the size and distance from road criteria have been increased from the USA standard for Semi-primitive and Primitive classes. The level of naturalness that is necessary for a particular ROS class is determined by the presence and degree of motorized use and evidence of human use (i.e. infrastructure). Social experience accounts for the degree of opportunity to experience things such as solitude and closeness to nature, as well as the degree of challenge that is available and the level of self-reliance necessary to have an enjoyable recreation encounter.

Clark and Stankey (1989) suggest that when all of the ROS classes are available, changes in recreation demand can be accommodated more readily than if they were not, by virtue of a diverse set of recreation opportunity settings. It should be noted that it is a relatively easy task to change an area's recreation setting from a primitive state to a more developed one (e.g. from *Semi-Primitive Non-Motorized* to *Roaded Modified*) – one need only improve motorized access and increase the amount of infrastructure; however, the same does not hold true for movement in the other direction. In order to change a recreation setting from some state of development to a more primitive state (e.g. *Semi-Primitive Motorized* to *Primitive*), access must be discontinued and the area must be left to reclaim any evidence of human development; while possible; it must be recognized that this process may take a long time – the full benefit of this shift may not be appreciated for generations.

Recreation Features Inventory

The Recreation Features Inventory (RFI) is a descriptive tool that catalogs biophysical, cultural and historic landscape features and assesses their recreational value within a local context. The RFI assesses recreation features that are present in a landscape and divides that landscape into discrete sub-components based on biophysical features that have recreational value. These subcomponents are called *Recreation Feature Polygons* (RFPs), and form the basis for the RFI. The public may be also asked to provide input to this process to aid in an assessment of the recreational value, or *significance*, of an area. Each RFP has four classifications associated with it: recreation features; recreation activities that are associated

Table 3: ROS polygon delineation standards (BCMoF, 1998b, p.13).

ROS Class	Factors					
	Remoteness		Naturalness		Social Experience	
	Distance from road (km)	Size (ha)	Motorized Use	Evidence of Humans	Solitude/Self-reliance	Social Encounters
Primitive (P)	> 8	> 5000	• Occasional air access, otherwise no motorized access or use in the area.	• Very high degree of naturalness. • Structures are extremely rare. • Generally no site modification. • Little on-the-ground evidence of other people. • Evidence of primitive trails.	• Very high opportunity to experience solitude, closeness to nature; self-reliance and challenge.	• Very low interaction with other people. • Very small party sizes expected.
Semi-Primitive Non-Motorized (SPNM)	≥ 1 from a 4-wheel-drive road.	≥ 1000	• Generally very low or no motorized access or use. • May include primitive roads and trails if usually closed to motorized use.	• Very high degree of naturalness. • Structures are rare and isolated except where required for safety or sanitation. • Minimal or no site modification. • Little on-the-ground evidence of other people.	• High opportunity to experience solitude, closeness to nature, self-reliance and challenge.	• Low interaction with other people. • Very small party sizes expected.
Semi-Primitive Motorized (SPM)	≥ 1 from a 2-wheel drive road	≥ 1000	• A low degree of motorized access or use.	• High degree of naturalness in the surrounding area as viewed from access route. • Structures are rare and isolated. • Minimal site modification. • Some on-the-ground evidence of other people. • Evidence of motorized use.	• High opportunity to experience solitude, closeness to nature, self-reliance and challenge.	• Low interaction with other people. • Small party sizes expected.
Roaded Natural (RN)	≤ 1	N/A	• Moderate amount of motorized use within the area. • May have high volume of traffic	• Moderate degree of naturalness in surrounding area. • Structures may be present and more highly developed. • Moderate site modification.	• Moderate to high opportunity to experience solitude, closeness to nature, self-reliance and	• Moderate interaction with other people. • Small to large party sizes expected.

			through the main travel corridor.	• Some on-the-ground in evidence of other people. • Some on-site controls. • Typically represent main travel corridors and recreation areas that have natural-appearing surroundings.	challenge.	
Roaded Modified (RM)	≤ 1	N/A	• Moderate to high degree of motorized use for both access and recreation.	• Low degree of naturalness. • Moderate number of more highly developed structures. • Highly modified in areas, generally dominated by resource extraction activities. • On-the-ground evidence of other people and site controls.	• Low to moderate opportunity to experience solitude, closeness to nature, self-reliance and challenge.	• Moderate to high interaction with other people. • Moderate to large party sizes expected.
Rural (R)	≤ 1	N/A	• High degree of motorized use for both access and recreation.	• Very low degree of naturalness. • Complex and numerous structures, high concentrations of human development and settlements associated with agricultural land. • Obvious on-the-ground evidence of other people and on-site controls.	• Low opportunity to experience solitude, closeness to nature, self-reliance and challenge.	• High interaction with other people. • Large party sizes expected.
Urban (U)	≤ 1	N/A	• Very high degree of motorized use for both access and recreation.	• Very low degree of naturalness. • Highly developed and numerous structures associated with urban development. • Very high site modification. • Obvious on-the-ground evidence of other people and on-site controls.	• Very low opportunity to experience solitude, closeness to nature, self-reliance and challenge.	• Very high interactions with other people. • Very large party sizes expected.

with those features; the significance of the features and the associated activities, and the sensitivity of those features to development or recreation use (BCMoF, 1998a). The RFI records each RFP as a spatially geo-referenced map linked to an alpha-numerically coded attribute database. The *Recreation Features Inventory: Standards and Procedures Manual* (BCMoF, 1998a) should be consulted for a complete listing and definition of these classifications and codes.

The recreation features that are described in the RFI are based on biophysical, cultural and historic elements that are present in a landscape. The biophysical features include shoreline and hydrological elements, water bodies, vegetation, glacial and landform characteristics and wildlife elements. Human-developed features that are described in the RFI include trails, campsites, and cultural, historic and other human-made developments. Up to eight recreation features can be identified for any RFP, but only the three most significant features are included in the map label (BCMoF, 1998a).

The recreation activities that are identified in the RFI are based on their existing or *potential* occurrence in the RFP. Activities that do not currently take place in a RFP but lend themselves to the biophysical or human-developed features are included in the inventory – this permits resource managers to consider future recreation uses of an area. As with the recreation features, up to eight activities may be described in the database but only the three most significant are included in the map label.

The significance of an RFP is rated on a four-point scale (very high, high, medium and low) based on the relative importance of the recreation features and their associated activities to other RFPs within the forest district. RFP significance is based on either a single or combination of factors, including: activity attraction capability, uniqueness, scarcity, scenic view, current recreation use and accessibility. Significance factors are noted for each RFP. An RFP that has been rated *very high, high* or *medium* for significance must include a statement outlining the rationale for the rating.

The RFP sensitivity classification indicates the resiliency or vulnerability of the RFP to potential alterations caused by resource development. This classification identifies the recreation feature that, regardless of its significance, relative to the other features present, is the most sensitive to use or development. Sensitivity is ranked on a three-point scale from *high* (i.e. development would have a major impact) to *low* (i.e. development would have a low impact). The type of alteration that dominates the RFP is also noted – examples of alteration may include timber harvest openings, power lines, transportation routes, human-made structures, or recreation use. Any RFP that has been rated *high* or *medium* for sensitivity must include a statement outlining the rationale for the rating. Finally, if the RFP or feature being described has provincial recognition (e.g. by Land Resource Management Plans, Regional Landscape Plans or Tree Farm License Plans), then this is noted.

Other inventories are included under the umbrella of the RFI: the *River Recreation Inventory*, the *Caves Inventory*, and the *Recreation Trails And Routes Inventory*. These inventories are not currently as fully developed or as complete as the RFI but were initiated to recognize more specific values that these features provide to outdoor recreation participants.

The *River Recreation Inventory* is an expansion of the river feature that is

included in the RFI and is divided into three river recreation elements: river features, river experience class, and white water class. Each element is inventoried separately, though it may be carried out at the same time. The information cataloged as *river recreation features* is similar to the information that is collected for the broader features classification of the RFI. However, this inventory is limited to those features that fall within approximately ten meters of the high water level of either river shore. It also includes other attributes such as: dominant river pattern, river recreation activities, mode of travel to the river, access distance from nearest road and boat launch types. A river is delineated into separate zones based on the combination of features identified with it. These zones are then assessed for feature significance and feature sensitivity as per the RFI. The *river experience class* is similar in scope and theory to the ROS. However, a river is delineated into separate zones and rated, based on what is seen and heard while floating the river and on the duration of the experience rather than on the distance a river is from a road. The *whitewater classification* provides information about the difficulty of running the river, and is based on the *International Whitewater Classification* system (a six-class classification from *easy* to *extreme*) (BCMoF, 1995c). Currently, these *River Recreation Inventories* have been piloted on three rivers: the Cowichan, Nanaimo, and the Chilliwack rivers; data is available for two other rivers, but are not complete inventories.

The *Cave Inventory* provides more specific information on caves and karst features that should have been identified in the RFI, and includes data on the location, type of cave, dominant rock type, geological formation, and length of all known passages. Caves contain fragile ecosystems and formations that require careful management to maintain their integrity, for this reason, management recommendations are made (BCMoF, 1995c). Presently, the *Cave Inventory* contains data for Vancouver Island Forest Districts but could be applied across the province. This inventory is classified information, to protect the caves from vandalism and inexperienced spelunkers.

The third inventory that falls under the umbrella of the RFI is the *Recreation Trails and Routes Inventory*. This database is similar to the River Recreation Inventory, as it is based on the delineation of zones along linear recreation features that are approximately ten meters on either side of the trail or route. Other information collected includes: the trail name, the feature significance of the trail or route, and the trailhead's distance from the nearest road. This inventory is still in development.

The *Backcountry Monitoring Inventory* tracks the condition of backcountry areas using permanent and temporary sampling locations to assess the status and change in environmental conditions over time. This inventory tracks attributes such as percent vegetation cover, percent exposed mineral soil and tree reproduction and uses statistical analyses to project the level of environmental deterioration or reclamation (BCMoF, 1995c). This inventory has been used in a few selected back-country areas in the province.

The detail and amount of information that is identified and cataloged in the RFI makes it a powerful tool for resource management, as it allows for the inclusion of recreation features and activities (as well as management considerations) in operational planning. The information provided by the RFI, as well as the other inventories under its umbrella is spatial; this allows resource managers to both

recognize the recreation values that may be present in an area, and to assess the impacts of development or other changes to forestland.

Visual Landscape Inventory

The importance of visual considerations in forest management has been generally accepted; indeed, the public tends to judge forest management by how it looks (Sheppard and Harshaw, 2001). People are drawn to attractive landscapes, or areas that have aesthetic qualities; coincidently, these areas frequently contain merchantable timber or other resource values (BCMoF, 1994). For a more thorough discussion of visual resource management see the following chapter by Picard and Sheppard in this volume.

The *Visual Landscape Inventory* (VLI) delineates, classifies and catalogs visually sensitive areas of BC so that conflicts between forest practices and resource development and public expectations can be mitigated. The VLI is typically conducted in areas that are visually sensitive (e.g. travel corridors, view points, and recreation features). The VLI is a tool that is used to record information about a landscape's visual condition, characteristics and sensitivity to alteration by identifying and delineating visually sensitive areas and units and describing these *Visually Sensitive Units* (VSUs) using a standard set of measures. These measures include *existing visual condition*, *visual absorption capacity*, *biophysical and viewing characteristics*; these measures are used to determine the unit's Visual Sensitivity Class. This information assists resource managers in determining suitable land uses and developments, as well as management objectives and prescriptions (unless otherwise noted, the *Visual Landscape Inventory: Procedures & standards manual* (BCMoF, 1997b) was used as the source for this section). The VLI classifies and records provincial viewpoint location, information, and photography taken from these sites; these data are recorded as a separate layer that link primarily to the VLI but can also be associated with any of the other recreation inventories.

The *existing visual condition* is a baseline assessment of the current (at the time of the inventory) level of human alteration that is apparent in a landscape; any future development proposals will be measured against this baseline condition. The existing visual condition is expressed as a *visual quality class*, and is initially based on the percentage of non-visually effective green-up (or scale of existing alteration); this determination does not include natural openings. These classes and the associated non-visually effective green-up percentages are described in Table 4.

The other factors that are considered in establishing the final existing viewing condition are the *influence of visual landscape design*, the *influence of site disturbance*, the *influence of vegetative colour and texture*, and other considerations that present themselves on a unit by unit basis. The influence of visual landscape design is an assessment of development on the landscape, and the degree that these developments have considered visual landscape design principles (see BCMoF, 1994 for further discussion of these principles). The influence of landscape design is rated as: *high* – square or sharp angles are evident, does not follow natural features, and hard edges; *moderate* – the design demonstrates some effort to lessen the visual impacts of the development, a degree of natural character is maintain; and *low* – the natural character of the landscape is preserved through the recognition of natural features and there is evidence of care, feathered edges have been used to reduce the contrastof the development with the adjacent undisturbed area. If no human-made

Table 4: Existing visual condition classes and characteristics.

Visual condition class	Characteristics	Percent non-visally effective green-up
Preservation (P)	No visible human-caused alterations	0%
Retention (R)	Human-caused alterations are visible but not evident	0-1.5%
Partial Retention (PR)	Human-caused alterations are evident but subordinate and therefore not dominant	1.5%-7%
Modification (M)	Human-caused alterations are dominant but have natural appearing characteristics	7%-20%
Maximal Modification (MM)	Human-caused alterations are dominant and out of scale	20%-30%
Excessive Modification (EM)	Human-caused alterations are excessively and greatly out of scale	>30%

Adapted from BCMoF, 1997b.

alterations are apparent, then the influence of visual landscape design assessment is not applicable. The types of alteration that are present in a visually sensitive unit are also cataloged (i.e. harvest openings, power lines, quarries, etc.).

The *influence of site disturbance* is an evaluation of the degree to which site disturbances (e.g. roads, trails, landings) are visible. In this context, site disturbance refers to exposed, or disturbed, soil that may cause long-term reductions in visual quality – this evaluation incorporates the position and shape of the disturbance, potential soil erosion problems, as well as the amount and placement of debris and roads. The rating of the influence of site disturbance ranges from high (where site modification is dominant) to not applicable (where there is no visual evidence of disturbance). Descriptions of the ratings for influence of site disturbance are: *high* – there is a high contrast between the site and the surrounding area and disturbances are obvious (e.g. road patterns, evidence of erosion and debris); *moderate* – the level of disturbance begins to dominate the view, but there may be some indication of erosion or sidecasting; and *low* – there is no evidence of erosion or sidecasting, and the level of site disturbance is minimal.

The *influence of vegetative colour and texture* measures the amount of *visually effective green-up* (VEG) that is present in the disturbed area and the effect that VEG has on mitigating past disturbance. The influence of vegetative colour and texture is rated on a three-point scale from *high* (where VEG is effective in screening past disturbance) to *low* (where new clearcuts may be visible, or past disturbances have only begun to be rehabilitated); this rating may not be applicable if there are not any previous disturbances.

The final existing visual condition rating is based on a consideration of the initial existing visual condition rating (i.e. percent and the scale of existing alteration) and the factors discussed above. A certain degree of professional judgment is also used to determine the final rating.

The biophysical characteristics of landscapes can determine the amount of

alteration that a landscape can withstand without affecting its visual character or integrity. The v*isual absorption capacity* (VAC) is an assessment of a landscape's ability to absorb this sort of change, and is rated *high*, *moderate* or *low*. This rating is based on four elements of the landscape: *slope*, *aspect*, *surface variation*, and *landscape cover*. Slope, or the steepness of the surface of the VSU, affects the landscape in three principle ways: as the slope of a landscape increases, so too does the visible area of that landscape; slope also determines the degree of screening that vegetation will provide and affects the viewing perspective of that landscape.

Aspect, or the direction that a slope faces, affects the amount, quantity and direction of light that reaches a slope. North facing slopes are generally shaded (due to the sun's position) and appear duller and less detailed, while south facing slopes receive direct sunlight which makes colour, textures and details more vivid; north facing slopes can mask, or absorb, alteration better than south facing slopes. The ratings for aspect are *high* (northerly facing, or flat slopes), *moderate* (east or west facing slopes), and *low* (southerly facing slopes).

Surface variation is the range of different land surfaces, or topography, that are present in a VSU. A landscape surface that is uneven contains benches or gullies, or rolls, can absorb alterations more easily than a landscape that is even (e.g. steep, uniform slopes). Surface variation is measured on a three-point scale, from *high* to *low*.

The contrast of landscape cover elements, or *rock/soil/vegetative variety*, can affect the VAC of a VSU. Less variety of ground cover tends to highlight differences more than varied amounts and kinds of rock, soil and vegetation types. The variation of the amount of rock, soil and vegetation type is rated on a three-point scale from *high* to *low*.

The biophysical characteristics of a VSU are measured by a *biophysical rating*, which is an assessment of the degree of viewer interest and attention that a landscape has. The biophysical rating, based on biological features or landforms, is determined through the consideration of six factors: *slope*, which has the opposite affect on bio-physical rating than it does on VAC – a steep slope presents prominent landscape feature to the viewer and is likely to draw and keep their attention than a gentle slope; *aspect*, which is based on a similar rationale as that applied to VAC; *edge*, or the characteristics of the boundary between the VSU and the biophysical features within it (*e.g.* a shoreline or a skyline); *topographic variety*, which rates diverse topographic elements as more interesting to a viewer than uniform topographic elements; *vertical relief*, or the height of a VSU; and the *vegetative variety* present in a VSU. The biophysical rating assessment is rated on a three-point scale from *high* to *low*. The presence of water features and adjacent scenery also has an effect on the assessment of a VSU's biophysical rating; studies have demonstrated that people are attracted to water, and it can be expected that the presence of a water feature will draw and keep a viewer's attention and interest.

The general circumstances under which a VSU is viewed, or the *viewing condition*, can have an influence the sensitivity rating of the VSU. The viewing condition is based on an assessment of four factors: the *viewing distance*, *viewing frequency*, *viewing duration*, and *viewing angle*. The distance from the viewing location and the VSU can influence the amount of detail, texture and contrast,

as well as the colours that are perceived by viewers; viewing distance is often described as being foreground (< 1km from the VSU), midground (1-8 km from the VSU), and background (>8km from the VSU); as the distance between the viewer and the VSU increases, the level of detail that can be discerned decreases. The number of viewpoints that a VSU can be seen from contributes to the viewing frequency; the more opportunities that there are to see a VSU, the higher the viewing frequency. The amount of time that people have to observe a VSU is called the viewing duration – as the duration increases, so does the likelihood that the landscape will be scrutinized and the sensitive elements of the VSU made more apparent. Viewing angle is a measure of the position and perspective between the viewer and the landscape feature that is being seen. The viewing angle can be direct or oblique. When direct, the viewer is parallel to, and looking right at the viewing feature – this viewing angle may be more sensitive to alterations, as they are likely to be seen; alternatively, when the viewing angle is oblique, or on the periphery of the viewer's vision – this viewing angle is not as sensitive to alteration. Viewing angle is rated on a three-point scale from *high* (direct view) to *low* (an oblique view).

The final viewing characteristic that is taken into consideration in the VLI is the *viewer rating*. The determination of the viewer rating is based on the number of people likely to see the VSU, and on an assessment of viewer expectations and preferences. To gauge what viewer expectations and preferences may be, public input is solicited. Viewer rating is measured on a three-point scale from *high* (the number of viewers and expectations have a high influence on the visual sensitivity) to *low* (the number of viewers and expectations have a low influence on the visual sensitivity).

All of the ratings for the visual factors discussed here (*existing visual condition*, *visual absorption capacity*, *biophysical and viewing characteristics*) are combined to determine the VSU's *visual sensitivity class*, a measure of the VSU's overall sensitivity to alteration. The five visual sensitivity classes (VSC) are illustrated in Table 5.

The VSC is an estimate of the amount of public concern or criticism that may ensue if the visual resources of a particular landscape are negatively altered. These concerns may include economic ramifications, like a negative impact on tourism, or social impacts, like detrimental effects on recreation experiences. The BCMoF's recognition of visual resources is an important step to considering the full range of values that forested landscapes hold. The BCMoF (1995c) suggests that the primary focus of Visual Resource Management is to mitigate the visual impacts of human-made alterations; the VLI is a tool that assists resource managers in this task.

Outdoor recreation management tools

All of the frameworks discussed in this section address the notion of *carrying capacity* and human uses of the natural environment that can cause stress in ecosystems. Although most of these frameworks were developed within the context of parks and protected areas management, the application of these methods can help to determine appropriate types, levels, and conditions of recreational use. The

Table 5: Visual sensitivity class (VSC) description.

Visual sensitivity class	Description
1	• Very high sensitivity to human-made visual alteration. • The area is extremely important to viewers. • Very high probability that the public would be concerned if the VSU was visually altered in any way or to any scale.
2	• High sensitivity to human-made visual alteration. • The area is very important to viewers. • High probability that the public would be concerned if the VSU was visually altered.
3	• Moderate sensitivity to human-made visual alteration. • The area is important to viewers. • The probability exists that the public would be concerned if the VSU was visually altered.
4	• Low sensitivity to human-made visual alteration. • The area is moderately important to viewers. • There is a risk that the public would be concerned if the VSU was visually altered.
5	• Very low sensitivity to human-made visual alteration. • The area may be somewhat important to viewers. • There is a small risk that the public would be concerned if the VSU was visually altered.

Adapted from BCMoF, 1997b.

methods to inventory and manage an appropriate mix of visitor opportunities that are presented here are the *Limits of Acceptable Change*, the *Visitor Impact Management* process, the *Visitor Experience and Resource Protection* framework, and the *Visitor Activity Management Process*. The *Recreation Opportunity Spectrum* that was discussed earlier is also considered to be an outdoor recreation management tool.

The outdoor recreation management tools that are described below are typically based on the application of a set of criteria and indicators. *Criteria* can be understood as broad categories of concern, such as trail condition. *Indicators* are derived from criteria and are specific variables that describe the status of the conditions of the criteria. Indicators can be applied and measured at different scales (i.e. from site to district), and might include campsite condition, trail conditions, social conditions (e.g. crowding, number of visitors), soil conditions (e.g. compaction, erosion), vegetation conditions, and management setting (Jackson and Leavers, 2000). A third level, *measures*, are applied to assess aspects of the indicators against a base, or desired, condition; measures judge the acceptability of the condition that is being examined (Nilsen and Tayler, 1997).

Carrying capacity and recreation

The question of how much human use can be accommodated in natural areas is often framed in terms of carrying capacity. The application of carrying capacity was first suggested for park management in the 1930s, although systematic application did not occur until the 1960s. The initial focus was on biological and ecological issues and was based on the hypothesis that increasing numbers of visitors caused greater environmental impact (measured through soil compaction, vegetation disturbance, etc.). Later, social aspects of carrying capacity emerged as a critical dimension, as environmental resources were not the only resource attributes that were affected by recreational use; the quality of the recreation experience was important too. These social aspects were based on the hypothesis that increasing numbers of people caused greater social impacts (measured by indicators like crowding or number of user conflicts). Thus, carrying capacity has two components: biological (environmental) capacity and social capacity (Manning, *et al*. 1996; Nash, 1990; Hendee, 1990; Stankey *et al*. 1990).

The concept of carrying capacity acknowledges that the natural environment has an ability to absorb some impacts of recreation use, as well as impacts that occur naturally in these environments; however, it also recognizes that there is a limit of impact or change that natural areas can sustain (Stankey *et al.* 1990). This limit is interpreted by recreation resource managers and used to develop range of carrying capacity, beyond which desired conditions are threatened; thus the carrying capacity of an area is best conceived of as a threshold that is set by resource managers based on fieldwork, research and experience. There has been increasing recognition among recreation researchers that carrying capacity is a "normative idea, derived from social judgments about appropriate conditions" (Stankey *et al.* 1990, p. 218). Carrying capacity *is not* an inherent quality of a landscape or ecosystem (Pigram, 1983). It cannot be emphasized enough that the determination of the carrying capacity of an area is not based on science alone: the establishment of an area's carrying capacity is also a product of value judgments. These value judgments are the result of legislative mandate, public input, management setting and philosophy, and the expectations of the people charged with managing the resources of an area; it becomes the resource managers job then, to facilitate consensus among competing value judgments (Stankey *et al.* 1990). A number of recreation management frame-works have been developed to guide resource managers through these decisions; some of these are presented later in this section.

The application of the carrying capacity concept to manage natural areas that receive recreation use should not attempt to preserve an ecosystem in any one state, as a certain amount of change occurs as a result of natural processes (e.g. succession). Natural change must be permitted to take place, but human impacts as a result of recreation must be checked and mitigated. Carrying capacity can be a useful tool to assist resource managers in achieving long term goals in backcountry recreation planning if accompanied by an effective monitoring program (Hendee, 1990).

It is the unknowns (e.g. use, quality, and sensitivity) that threaten recreation resources. Inventory and monitoring of recreation use and impacts are important first steps for managing recreation resources, but setting management thresholds cannot be overlooked. These thresholds are based on the criteria and indicators

that have been adopted by the managers of an area; the definition and framing of these criteria and indicators can determine what the carrying capacity for an area is and allow it to be managed, this concept is central to contemporary recreation planning frameworks like the *Limits of Acceptable Change* or the *Visitor Activity Management* process (Manning *et al.* 1996). The determination of thresholds for the capacity of a recreation feature or setting, beyond which that feature or setting ceases to sustain use and the resource begins to become degraded, allows resource managers to measure recreational use and the impacts that this use has. There are also intangible impacts that occur when these thresholds are exceeded that include social and economic benefits (Jackson and Leavers, 2000).

One of the problems of establishing carrying capacity is determining how much impact is too much; for example, how much crowding ought to be permitted in a particular backcountry area? Frameworks like the *Limits of Acceptable Change* can help to provide direction by emphasizing the definition of the visitor experience that is to be provided and maintained through monitoring. The *Visitor Experience and Resource Protection* process, discussed later in this section, is a framework that is used in park management. This process incorporates carrying capacity into its framework and recognizes the type and level of visitor use that can be accommodated while sustaining the desired resource and social conditions that compliment the purposes of the park units or zones and their management objectives. In this context, carry capacity is not a prescription for the number of visitors but a direction for desired ecological and social conditions: what level of visitor use is appropriate and where should visitor activity occur? (Manning *et al.* 1996).

Carrying capacity presents a paradox to resource managers: standards must be developed that are site specific, but they must be able to be adapted to various environmental settings at a variety of scales (Stankey *et al.* 1990). The indicators of change or capacity that are selected must be reliable, should be measurable using quantitative methods, and be able to demonstrate the impacts of recreation use. Jackson and Leavers (2000) have identified the following principles for the selection of indicators of recreation use and impacts: indicators should be: measurable (quantifiable), reliable (precise, accurate, and repeatable), cost effective, significant (relate to significant features of an area), relevant (relate to human impacts), sensitive (provide an 'early warning'), efficient, and be responsive to changes in human use patterns. Additionally, the indicators should be transparent so that the public and other interested parties can understand how the indicators were developed and applied.

A survey of recreation managers in the Squamish Forest District about carrying capacity models and elements found that there was support for carrying capacity methods in the management of recreation on Crown lands in BC. The managers that responded to the survey indicated that they required more baseline information, and that social and environmental elements were regularly included in carrying capacity measurements (other elements such as economics and access were also used, though not as consistently). There was also consensus among respondents that the monitoring of indicators should be the responsibility of all of the agencies that are involved in land use planning (e.g. BCMoF, BC Assets and Lands, BCMSRM, and BCMWLAP) as well as the users of the resource (i.e. the public and commercial recreation licensees). Coupled with monitoring is the responsibility to ensure

that the thresholds that have been established are not exceeded; examples of enforcement and regulation of recreation capacity thresholds include the adoption of reservation systems (e.g. the West Coast Trail, Bowron Lakes), licenses and permits (e.g. fishing and hunting), limits on group sizes or length of stay, and size limits on fish and game (Jackson and Leavers, 2000).

Some criticisms of carrying capacity are that the term itself implies that there is a single, fixed, amount of recreational use that can be determined through research and that there is an implication of an undue emphasis on limitations (alternative management strategies to limitations exist). A historical sense of carrying capacity tends to divert attention from social and experiential concerns that form an integral part of recreation management (Manning *et al.* 1996). It has also been suggested that the application of carrying capacity is inconsistent, although the *Limits of Acceptable Change* framework is the most common method that is used for assessing carrying capacity (Jackson and Leavers, 2000). The type of experience that people seek in their pursuit of a recreation activity differs widely – different people seek different experiences and have different expectations; thus the social component of carrying capacity is difficult to determine, what may be acceptable to one person may be restrictive to others. Another criticism of carrying capacity has been that there is an implicit cause-and-effect relationship between the level of use an area receives and the amount of impact it receives; there is evidence to suggest that other factors, such as season of use, are more important considerations in accounting for the impacts of recreation use (Stankey *et al.* 1990).

The tools

The frameworks discussed here have originated form collaborative efforts of government and non-government recreation researchers in response to various legislative and policy requirements as well as increases in recreation demands, impacts and conflicts. These frameworks recognize the origins and deficiencies of carrying capacity and attempt to move beyond it.

These outdoor recreation management tools represent two schools of thought: *rational planning* and *transactive planning*. Rational planning uses methodologies that are based on scientific methods, and aims to be value-free by imposing a separation between the investigator and society; rational planning is characterized as being fact-based, and uses approaches that evaluate correct, or best, choices (e.g. cost/benefit analysis).

Transactive planning views society as a complex network of intentional actions that cannot be understood through observation. Transactive planning typically has increased levels of public participation and stakeholder input, as it recognizes the merit of non-professionals; this is characterized by integrative bargaining, or principled negotiation, and is premised on the belief that optimal planning outcomes are a result of dialog between interested parties combined with technical information and government policy direction (Commission on Resources and Environment, 1996).

Most of these outdoor recreation management frameworks follow the standard rational planning approach, and follow a hierarchy of decisions that involve strategic and tactical decisions (Nilsen and Tayler, 1997). The general steps that these frameworks follow have been outlined by Nilsen and Tayler (1997) and Jackson and Leavers (2000):

1. Define terms of reference or goals (legal and policy mandates that govern or guide management).
2. Database development (identify the pertinent issues and concerns, as well as resource features and recreation activities).
3. Situation analysis (what is the context that recreation opportunities and settings are framed in?).
4. Synthesis.
5. Definition of management objectives.
6. Development of management alternatives (what other options exist?).
7. Development of a final plan.
8. Implementation of the management plan.

Limits of Acceptable Change

The *Limits of Acceptable Change* (LAC) approach was designed to manage designated and non-designated wilderness areas in the United States (Payne and Graham, 1993), and is an example of transactive planning. LAC, when applied to wilderness or natural areas settings can be viewed as an extension of the ROS (which is based on rational planning). The LAC framework is an attempt to apply the carrying capacity concept:

> The challenge is not one of how to prevent any human-induced change, but rather one of deciding how much change will be allowed to occur, where, and the actions needed to control it. (Stankey *et al.* 1985, p. 1).

LAC has four components: the specification of acceptable and achievable resource and social conditions; a comparison of acceptable and existing conditions; the identification of ways in which to balance acceptable and existing conditions; and the on-going monitoring and evaluation of the management plan (Stankey *et al*. 1990; Stankey *et al.* 1985). A recent modification of the LAC framework has incorporated defining management goals and desired conditions as the first step in the process. These steps help to develop a framework that identifies management strategies and the extent of change that may be appropriate for an area; LAC also can alert outdoor recreation and landscape managers of the need for action when changes to an area exceed standards that have been developed (Nilsen and Tayler, 1997).

LAC seeks to balance the needs and desires of outdoor recreation participants and other stakeholders with environmental considerations and the desire state of the area. The role that the public plays in LAC is large, and it is important to note that this process seeks consensus in order to advance. The involvement of the public in the planning process makes it more likely that the results of the exercise will be accepted and understood as the public had a role in their development; public input may also generate a broader range of ideas and solutions.

One of the key inputs to LAC is a landscape classification framework, usually the ROS; this makes the planning process two tiered, and may introduce complexity. A potential weakness of this approach is that a wilderness or backcountry area's classification may be threatened if user groups and/or other stakeholders suggest developments or management scenarios that are contrary to the sustainability of these wilderness or backcountry settings.

One of the first applications of LAC in BC was at Swan Lake (now Swan Lake

Provincial Park), a BC Forest Service wilderness area; LAC was selected as the framework to assist forest managers in meeting the goals and objectives for this area. Parks Canada has used the LAC framework in Gwaii Haanas where the season of recreation use was an issue, and for the Chilkoot Trail where the impact of recreation use had become an issue due to an increase in the number of people using the trail (Jackson and Leavers, 2000).

Visitor Experience and Resource Protection

The *Visitor Experience and Resource Protection* framework (VERP) is a useful management tool for the management of outdoor recreation in national parks, as it can assist park planners and managers in addressing visitor carrying capacity, environmental and experiential (social) conditions, and allows managers to make sound decisions about visitor use (Nilsen and Tayler, 1997). As the name implies, VERP addresses the quality and impacts of visitor experience. Factors that may contribute to the quality of the visitor experience include: information or interpretation of the setting or area, facilities, crowding and visitor behaviour or activities (i.e. inappropriate actions of others), resource impacts, management actions, and natural features (Manning *et al*. 1996). VERP was developed by the US National Park Service to respond to its legislated responsibility to address carrying capacity in all of its national park units, and as an alternative to LAC. VERP was developed in the context of the US Parks Service's General Management Plans and represents a rational planning approach (Hof and Lime, 1997). VERP addresses carrying capacity through the adoption and meeting of goals instead of as a reactive tool.

VERP is an iterative planning framework that identifies current conditions and desired future conditions for management zones within parks and protected areas; VERP also considers the alternative allocation of these zones. VERP is a proactive approach to outdoor recreation planning, as it is goal-driven (Hof and Lime, 1997).

Visitor Impact Management

The *Visitor Impact Management* process (VIM) is a reactive management framework that is best suited for specific recreation site problems and is based on a rational planning approach. VIM addresses three basic issues of outdoor recreation impacts on the natural environment and on the quality of recreation visitor's experience: the identification of problem conditions; the identification of potential causal factors; and the identification of potential management strategies (Nilsen and Tayler, 1997; Payne and Graham, 1993).

VIM focuses on requirements for an enjoyable visitor experience by balancing an area's carrying capacity and visitor impacts, and was developed in the context of parks and protected areas. VIM was designed to deal with problems such as human waste and garbage disposal, and the destruction of habitat due to visitors straying from trails; it is the effects of the visitors themselves that is being managed – VIM places the park visitor within the context of a park's limitations, not *vice versa* (Payne and Graham, 1993).

VIM seeks to shape visitor use around the capabilities of the area (park); it is an expert-driven process and does not incorporate public involvement. The results of the process are management policies that are fairly transparent.

Visitor Activity Management Process

The *Visitor Activity Management Process* (VAMP) is a Canadian-based framework that was developed in response to demands for increased nature interpretation in Canadian National Parks; it was hoped that VAMP would also increase the profile of National Parks in Canada, and help to increase the number of park visitors. VAMP works within the context of a park's management plan, and focuses on service planning by attempts to match appropriate recreation activities within the limitations (e.g. ecological, managerial); VAMP is a rational planning approach (Payne and Graham, 1993).

VAMP can be applied in a number of management contexts from large protected areas to site-specific facilities, and is useful for strategic and operational decisions such as deciding which education and recreation opportunities will be targeted, or the kind and quality of supporting services and facilities an area requires. VAMP combines a marketing approach to the management of public recreation opportunities with the constraints of managing heritage resources. This outdoor recreation management tool focuses on the requirements for creating an enjoyable visitor experience by identifying outdoor recreation user requirements and attempts to meet and plan for them (Nilsen and Tayler, 1997; Payne and Graham, 1993). However, Payne and Graham (1993) suggest that VAMP may be too service-oriented to be applicable to wilderness or backcountry areas.

Similarities and differences among the tools

VAMP and VERP are similar as they both emphasize criteria at a strategic level, and make suggestions about which indicators should be used. VERP describes resource and social indicators (e.g. crowding), while VAMP emphasizes social indicators and measures from the perspective of the visitor and is complemented by management practices that address resource criteria, indicators and measures (Nilsen and Tayler, 1997).

VIM and LAC identify criteria at the beginning of the planning process, and allow management objectives to follow. Both of these tools are reactive, or issues-driven, and attempt to narrow the range of criteria and place greater emphasis on the choice of indicators and measures and monitoring. VIM explicitly attempts to identify the cause of impacts, while LAC emphasizes the definition of opportunity classes and in the development of alternative class allocations (Nilsen and Tayler, 1997).

The application of these outdoor recreation planning tools depends greatly on setting. The ROS, VERP and VAMP are comprehensive and holistic approaches and address interpretation; these tools seek to establish a broad direction for managing human use in a variety of landscape settings. VIM and LAC are issues driven and due to their narrow focus, can help to interpret a management decision.

Lessons learned from the application of outdoor recreation management tools: Common themes

There are two important considerations in the successful adoption of any management framework or process. Public involvement is critical during the implementation of planning to ensure that there is public acceptance of the conceptual plan. The second consideration is the necessity to foster an institutional

setting that ensures that all levels of management are committed to, and held accountable for, the implementation of the planning process. This commitment includes the provision of adequate financial and human resources for the project, ensuring that the best quality data is made available, and that employees have the necessary training to successfully complete the task. (Hof and Lime, 1997). It cannot be emphasized strongly enough that the key to successful outdoor recreation management is monitoring; the tracking of visitor use trends and the state of recreation resources over time is critical for understanding the dynamic nature of this social use of forested landscapes.

Conclusions

The management of outdoor recreation in BC will become increasingly important and complex as resources (e.g. recreation opportunities and settings) become scarce and demand for recreation resources increases. If not carefully managed within the context of other forest resources, the number of conflicts between the public, resource companies, and the government ministries and agencies charged with the management of these resources can be expected to increase.

There are a number of tools that aid in the management of outdoor recreation in BC. But the full benefit of these tools will not be appreciated unless they are used and applied correctly and consistently. It is also important that resource managers adopt a set of principles for the management of outdoor recreation in BC. Some of these principles include:

1. **Manage forests to meet present needs without compromising the needs of future generations**
   This principle is the cornerstone of sustainability. As it is difficult to know what the needs of future generations might be, it is necessary to be cautious when considering management actions in forested landscapes.

2. **Manage for a diverse set of values, settings and opportunities**
   It is important to recognize the value of non-timber resources. Timber is not the only resource provided by forested landscapes, other forest values include recreation, visual resources, botanical products, and watersheds. With regard to outdoor recreation, it is important to recognize that people have different desires and needs for the pursuit of recreation activities; therefore it is important to provide a diversity of recreation settings from primitive backcountry areas to accessible recreation sites and trails. Managing for a diversity of outdoor recreation opportunities can also help to achieve principle #1 above.

3. **Manage for human-induced change**
   It is not the natural environment that needs to be managed; it is the public's use of, and behaviour in, forested landscapes that requires management attention. Recognize that recreation use of forested landscapes will have impacts on other resources and seek to mitigate those impacts.

4. **Outdoor recreation management should be efficient, economical, effective and transparent**
   The management of outdoor recreation is no different than the management of other resources. The adoption of efficient, economical, and effective

management strategies can help to ensure that management efforts are directed at the issues and concerns that matter. Efficient, economical, and effective management strategies can help to maintain the integrity of outdoor recreation resources. The implementation of transparent management strategies allows other forest resource users, government agencies, and the public to understand the management decisions that are made, and can facilitate broader acceptance of outdoor recreation goals and objectives.

5. **Identify and develop appropriate outdoor recreation management objectives**
   Recognize that outdoor recreation management objectives vary depending on location, availability of settings and opportunities, and the people who use the resources. These management objectives should also be realistic.

6. **Monitor the state of the outdoor recreation resources**
   Forested landscapes are dynamic – they change over time due to natural cycles and human activities. Outdoor recreation opportunities and settings also change as a result of recreation use and other resource uses. Many of the outdoor recreation management tools discussed in this chapter (e.g. LAC, VERP, VIM and VAMP) include monitoring as a key step in maintaining and understanding recreation resources. Changes in resource settings can affect outdoor recreation opportunities and experiences; these changes can also influence who uses the recreation resources. Understanding these changes is key to the management of outdoor recreation participants.

7. **Monitoring outdoor recreation participant behaviour and attitudes**
   People and populations are also dynamic. In order to keep abreast of changing public attitudes and recreation behaviour, it is important to consult the public on a regular basis through the use of solicitation tools like surveys, interviews, and round table discussions. The consultation of the public and other outdoor recreation stakeholders allows the opinions and preferences of the public to be incorporated into management decisions. Surveys and interviews of recreation participants can be employed to answer specific management questions: What do recreation participants think of current management? What recreation activities are important to them? What areas people using? Are there any conflicts that are arising that require management intervention? Surveys and interviews of recreation participants can also be used to determine public preferences: What do people want?

8. **Attempt to incorporate design into timber harvest layout and operations as well as outdoor recreation facilities**
   As the number of people engaging in outdoor recreation activities in forested landscapes increases, it becomes important to think about reducing the visual, environmental, and social impacts that these activities have, as well as the impacts on outdoor recreation that other forest resource use has. The incorporation of design can help to mitigate some of these conflicts by incorporating the concept of *care* discussed in this chapter. Not only do people prefer landscapes that appear cared for, but this evidence of care can also have a positive influence on the behaviour and experiences of people participating in outdoor recreation activities.

9. **Limiting use is only one option for outdoor recreation management**
   Imposing limits on people's behaviour (e.g. where they can go, what they can do) is one strategy for the management of outdoor recreation, but it is not the only one. Resource managers should attempt to employ alternative strategies, such as the provision of other recreation opportunities that can help to distribute outdoor recreation use across a landscape, or the use of site hardening to reduce the direct impacts of concentrated recreation use at popular sites or facilities.

10. **Incorporate interpretation and education objectives into the management of outdoor recreation facilities**
    Encouraging awareness of the setting and landscape that outdoor recreation participants are in can assist the management of these areas. Providing people with information about the settings that they are in can enhance their experiences; as people gain an appreciation and understanding of the landscapes that they choose to be in, they start to develop affinities for these places – these affinities can be powerful influences for adopting behaviours that are consistent with reducing impacts on the natural environment. Outdoor recreation management is essentially the management of people – by giving people the tools to understand their surroundings, and the impacts that their actions and behaviours can have, the public can begin to manage themselves.

It is important to remember that people engage in outdoor recreation for enjoyment. This interaction with forested environments, and the experiences that these interactions bring, influence how people think about forested landscapes. By striving to provide positive outdoor recreation experiences on Crown land in BC, the public is served not only as consumers of recreation, but as the ultimate stewards of these landscapes.

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