



GREAT BARRIER REEF
MARINE PARK AUTHORITY

RESEARCH PUBLICATION NO. 79

A Review of Research into Tourist and Recreational Uses of Protected Natural Areas

Jayne Ormsby,
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MARINE PARK AUTHORITY

PO Box 1379

Townsville Qld 4810

Telephone: (07) 4750 0700

Fax: (07) 4772 6093

Email: info@gbmpa.gov.au

www.gbmpa.gov.au

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GREAT BARRIER REEF
MARINE PARK AUTHORITY

PO Box 1379
Townsville Qld 4810
Telephone (07) 4750 0700
Fax (07) 4772 6093
Web site: www.gbrmpa.gov.au

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PREFACE

This report is one of the outcomes of a consultancy project conducted by the authors for the Great Barrier Reef Marine Park Authority (GBRMPA). The goals of the project brief were to:

- Identify relevant social indicators to monitor aspects of human use and impacts on human use of the Great Barrier Reef Marine Park and World Heritage Area; and
- Develop a Reef-wide social monitoring program that the GBRMPA can implement at either local or broad scale level to monitor the identified social indicators.

In particular the GBRMPA was seeking to monitor indicators of the following:

- Perceptions of impacts on use and amenity;
- Values held for specific and more general locations;
- Motivations for engaging in Reef-related activities;
- Experiences of Reef-related activities;
- Perceptions of environmental conditions;
- Social profiles; and users' understanding of Marine Park regulations governing use and management strategies and initiatives.

The proposal that was accepted focussed the project on tourist and recreational use of the Great Barrier Reef (GBR) and suggested the project goals required three components.

- The determination of what factors should be monitored. This requires an understanding of the full range of factors that influence patterns of use and user evaluations of their experience, and the relative importance of these factors.
- Methods for measuring these factors or performance indicators.
- Procedures for incorporating these measures into a Reef wide ongoing, cost effective monitoring program.

This report is a review of the literature to assist in the first component listed above.

EXECUTIVE SUMMARY

- This report focuses on tourist and recreational use of protected natural areas in order to provide insights into social indicators and monitoring for the Great Barrier Reef World Heritage Area.
- It reviews the factors that influence patterns of use of protected areas in general and the evaluations by users of their experience together with the relative importance of factors determining use and experience.
- Further, the report provides some preliminary recommendations identifying topic areas for future studies of GBR recreation and tourist use.
- The report commences with a review of how readers can efficiently access the details of the literature contained in this report. In particular the extensive use of key points in tables as well as summary sections in the detailed report is designed to facilitate the reading of individual sections.
- A starting point for managing the human use of protected areas is to embrace the need to manage people and to influence human behaviour. Factors to consider in assessing human use of natural environments include the type and amount of the use or interaction between people and places, what drives or influences these interactions, how individuals and communities value the environment and the beliefs people have about the environment.
- Management models, often developed in the United States, to understand and shape human use of natural environments include carrying capacity, the recreational opportunity spectrum, the limits of acceptable change and the tourism optimisation management model. While the carrying capacity model is largely inadequate, the remaining models share some common recommended procedures for managing users.
- The common management steps suggested by the contemporary models are:
 - Understand existing use and demand
 - Establish settings for different use and experiences
 - Determine indicators to measure both environmental quality and experience
 - Establish acceptable or optimal levels for the indicators
 - Monitor the indicators
 - Implement changes if the optimal levels are not met
- The available published literature on tourist and recreational use of protected areas highlights that visitor behaviour and satisfaction are shaped by a number of key influences. These influences can also be seen as general topics or themes which need to be monitored in a comprehensive social monitoring system.
- The key influences on visitor behaviour and satisfaction are:
 - Visitor motives and levels of experience
 - Perceived quality (especially scenic beauty) of the physical environment
 - Interactions with other people
 - Effectiveness of interpretation programs
 - Perceived quality of service provided by tour operators
 - Perceived quality of the facilities and infrastructure on site
- These key influences and potential topics for monitoring have varying degrees of coverage in the literature. Two further issues for inclusion in a comprehensive assessment system would be:
 - The cultural background of the users

- The measurement of outcomes beyond satisfaction (such as environmental learning, or knowledge gain)
- A significant issue for future research to aid monitoring studies includes comparing the relative importance of these different influences on visitor satisfaction and experience.
- The core literature reviewed provides a basis for not just recommending areas of study in research and monitoring but indicates some commonly used measures of key influences which can be encouraged in future work.

1.0 INTRODUCTION

1.1 An Overview of Human Uses of Protected Areas

Key Points

Research into human uses of protected areas is limited.

The research available is dominated by studies conducted in North American terrestrial settings on tourist and recreational uses.

When thinking about human uses of natural environments there are four sets of factors to consider.

1. The nature and extent of the uses or interactions between people and places.
2. The nature of the forces that influence demand for these interactions.
3. The values that individuals and communities have with regard to the environment.
4. The perceptions or beliefs that people have about the environment and their interactions with it.

The human tendency is to set our species apart from and sometimes above the rest of nature. It is this tendency, with its many deep-rooted social and cultural norms, that has most assuredly been one of the dominating reasons why natural resource managers and scientists in most modern cultures have defined ecosystems to exclude the human species.

(Cordell, Hoover, Super & Manning 1999, p.2)

This quote from the beginning of a historical analysis of the gradual development of human dimensions to forest management in the United States is based on the argument that natural environment or protected area managers manage people not the environment (Brake & Williams 1990; Graham, Nilsen & Payne 1988; Hall & McArthur 1993; Machlis 1989). Central to all management tools is the need to influence human behaviour and thought in some way. Yet despite this importance, research into human uses and perceptions of natural areas is only recently, and often reluctantly, being used in natural resource management decisions and planning.

The following is a list of uses that can be identified as relevant to environmental or natural resource management (based on Cicin-Sain & Knecht 1998; Kay & Adler 1999; Vallega 1999).

- Resource exploitation
 - Agriculture
 - Fishing, hunting, collecting
 - Mining
 - Water supply
- Places for infrastructure
 - Settlement
 - Transportation
 - Waste disposal
- Tourism
- Recreation
- Individual and community identity
 - Historical
 - Cultural
 - Spiritual
- Scenic/aesthetic appreciation
- Research and education
- Conservation

An alternative approach to understanding the range of human uses that managers need to consider is provided by Cordell et al (1999) who suggests that there are four sets of factors associated with human use of natural environments.

- *Interactions* - the activities that humans engage in that have direct and/or indirect impacts on the natural systems. These activities can vary along a number of dimensions including non-consumptive to consumptive, on-site to off-site, the past to the future, and from an individual to a whole community.
- *Demands* - the forces which generate the activities described above. These demands are in turn influenced by the values held by people and their perceptions.
- *Values* - defined as “significance, meaning, utility or priority attached by individuals or cultures to material or non material matters that form the basis of human thoughts, behaviours and cultures” (Cordell et al. 1999, p.6).
- *Perceptions* - what people believe or know. Perceptions are based in part on experience but also on culture, education and communication. Perceptions in turn may influence attitudes and behaviour.

Put more simply there are a number of different ways that humans can interact with natural environments. In order to manage those interactions it is important to understand the nature and extent of the interactions and the forces that drive and shape them, including the values and perceptions of users both as individuals and in their social networks, groups and communities.

The following figure outlines a model of the key factors involved in human use of protected areas. At the centre of the model is the contact or interaction between direct users and the environment. This interaction is influenced directly by the features of the environment, the characteristics of the users and the way in which the management agency regulates the interaction. In the case of the environment, the key features are the opportunities that it affords for use and its resilience. For users, key characteristics are their motivations and expectations, their competence and ability and their perceptions of the environment and its management. Both direct users and managers are in turn influenced by the broader communities of which they are a part. In this instance, the economic, social and political structure and culture of communities, are critical in understanding both the demand for use and perceptions of appropriate management. Finally there is a set of outcomes of the interactions between humans and the environment. These include:

- the satisfaction of the individual user;
- perceptions and;
- actual negative and positive, environmental and economic impacts of use; and
- evaluations of the success or otherwise, of the management of the environment.

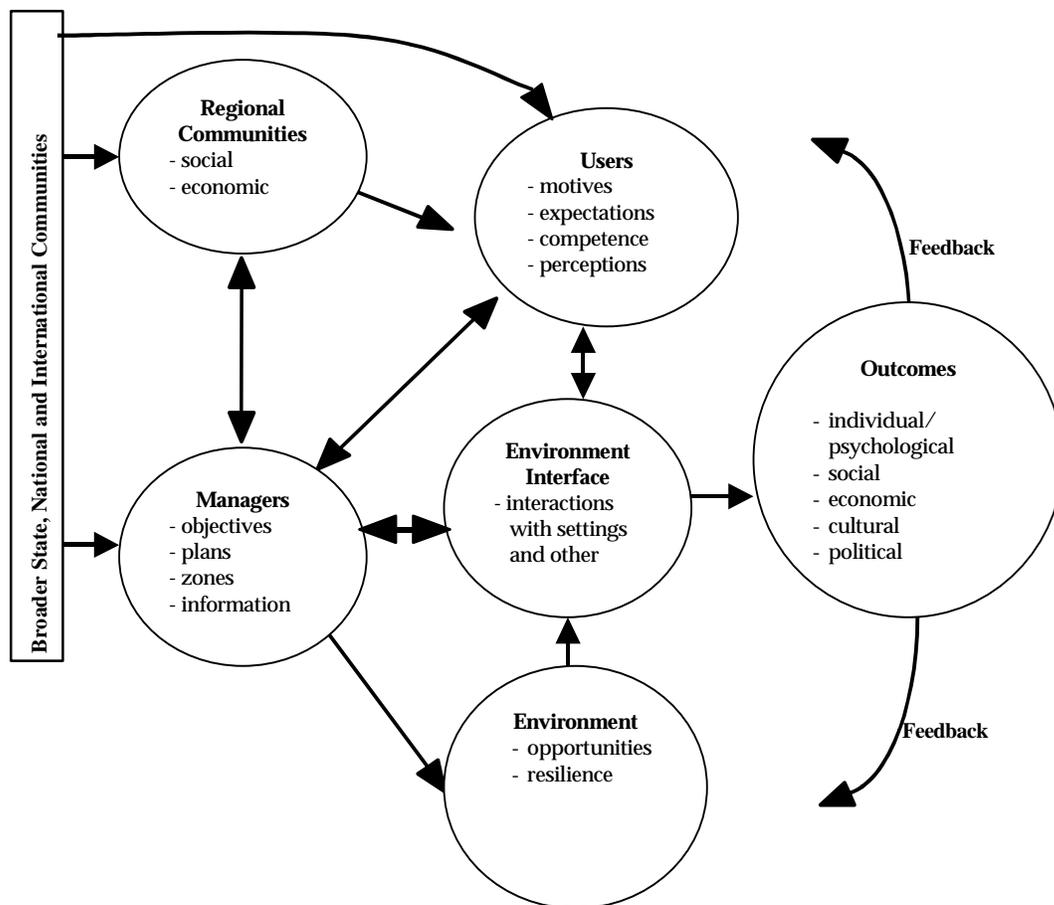


Figure 1. A general model of human use of protected areas.

The literature on human uses of protected areas has paid most attention to tourism and recreation. In many protected areas, these are the dominant uses because human settlements and other commercial activities are usually excluded from the protected area. There has been an increase in the attention paid to the needs of communities who have been displaced by the declaration of National Parks and other types of protected area, but much of this has focussed on land rights and the development of cooperative management regimes. There has also been an increasing recognition that human communities, adjacent to protected areas, can have impacts on the environment in those protected areas, through such things as the development of infrastructure and waste management. Further, there has been a move away from the western model of National Park towards multiple use models, which can include commercial and exploitative uses. This reflects both the recognition of the rights of previous residents to continue their traditional uses and the economic pressures faced by many communities. (See Brechin, West, Harmon & Kutay 1991, and Fortin & Gagnon 1999, for further discussion of these issues). Despite these changes the existing literature and research evidence is mostly concerned with recreational and tourist uses.

Definitions – Tourists and Visitors

This report will use the World Tourism Organization's (McIntyre 1993) standard definitions as follows:

Tourism – the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business, and other purposes.

Traveller – any person on a trip between two or more locations.

Visitor – any person travelling to a place other than of his/her usual environment for less than 12 consecutive months and whose main purpose of travel is not to work for pay in the place visited.

Tourist – (overnight visitor) visitor staying at least one night in a collective or private accommodation in the place visited.

Excursionist – (same day visitor) a visitor who does not spend the night in a collective or private accommodation in the place visited.

In popular usage the label tourist is usually reserved for visitors who are some distance from their home and they are distinguished from people who live in the area. Thus people who are visiting natural environments close to their normal residence are usually seen as **recreationists** rather than tourists, even if they are staying overnight.

This report will use the term visitor as much as possible or the phrase tourist and recreational use.

1.2 Aims of This Report

The primary aim of this literature review was to identify the factors that have a significant influence on visitors' experiences and uses of natural protected areas. It was hoped that it would be possible to identify a number of factors that have been found to be related to visitor use and experience and that these could be used as the basis for a monitoring program for tourist and recreational use of the GBRWHA. In addition, the review provides a critical description of the major management models discussed in the protected area literature.

In order to provide for a range of different audiences, with different needs and available time, this report provides a number of different options for finding the information a reader requires.

- Each section has been written so that it can be read on its own without the need to have read any other part of the report.
- At the beginning of each section there is a table listing the major points to be made in that section.
- At the end of most sections is a more detailed summary.
- A detailed subject index is also available.

2.0 MANAGEMENT MODELS AND CONCEPTS

Key Points

Early management models borrowed the concept of carrying capacity from agricultural science. This concept has proven to be difficult to use in practice because of the diversity of visitors and activities, and because there is rarely a simple or direct relationship between the number of users or amount of use and impacts.

Recent management models share the assumptions that protected areas should provide a range of opportunities for different types of experience and that these decisions about providing this opportunity spectra should be based on knowledge about the nature and extent of use.

In addition recent management models suggest basic steps for management:

- Understand the extent and range of uses and demands.
- Establish a range of settings for different uses and experiences.
- Determine a set of indicators to measure the quality of the environment and the experiences available in these settings.
- Establish acceptable or optimal levels for these indicators
- Monitor the indicators.
- When optimal levels are not met change management.

Over the past thirty years research has been undertaken to understand and manage visitor experiences in outdoor recreation environments. It should be noted that the majority of this work has been carried out in national forests, scenic rivers and other wilderness areas of the United States and has focussed on independent visitors rather than those with tour operators. The following sections outline the major concepts, systems or models that have been proposed for managing visitors to protected areas. They are presented in historical order.

2.1 Carrying Capacity

‘Carrying capacity’ was a concept developed in the 1950’s as a management technique to describe the maximum number of livestock that could be pastured without noticeable deterioration in the quality of the stock or the natural/agricultural environment (McManus 1998). With time the theory behind this concept expanded and has since been applied to a number of other disciplines. In natural areas crowding and overuse problems arising in the 1960’s and 1970’s led park managers to adopt the carrying capacity concept as a theoretical basis for limiting recreational use at particular sites. Hovinen (1982) defined carrying capacity as the maximum number of visitors that can be accommodated without causing excessive environmental deterioration and without leading to a decline in visitor satisfaction. Mathieson and Wall (1982) proposed that carrying capacity was the maximum number of people who could use a site without an unacceptable alteration in the physical environment and without an unacceptable decline in the quality of the experience gained by visitors. Although described in numerous ways, central to all definitions of carrying capacity, is the idea of maintaining the integrity of the resource base and the provision of a high quality recreation experience to all users (Sowman 1987).

The carrying capacity of recreation and tourist destinations generally follows the assumption that sooner or later a threshold will be reached after which the destination will become decreasingly desirable to individuals (Butler 1980; Martin & Uysal 1990).

In a recreational context, carrying capacity can be further distinguished into four types: physical, ecological, facility and social.

- *Physical carrying capacity* - is concerned with the maximum number of “use units” (e.g. people, vehicles, boats) that can be physically accommodated within an area. The upper limit of capacity is regarded as the amount of space required to ensure recreational activities are at a density that is efficient and safe for users (Sowman 1987).
- *Ecological carrying capacity* - (sometimes also referred to as physical, bio-physical or environmental capacity), was described by Pigram (1983) as “the maximum level of recreational use in terms of numbers and activities, that can be accommodated by an area or an ecosystem before an unacceptable or irreversible decline in ecological values occurs “ (Sowman 1987).
- *Facility carrying capacity* - involves the types and amounts of facilities intended to support visitors needs e.g. parking lots, boat ramps and administrative personnel. Facility capacity can in most cases be increased through expenditure (Shelby & Heberlein 1986).
- *Social carrying capacity* - (also known as perceptual, psychological or behavioural capacity) is a visitor’s perception of the presence, or absence, of others simultaneously utilising the resources of an area. The Countryside Commission defined social carrying capacity as ‘the maximum level of recreational use, in terms of numbers and activities, above which there is a decline in the quality of the recreation experience from the point of view of the recreation participant’ (p. 335 in Sowman 1987).

Although resource managers have tried to protect wilderness environments and their social qualities through efforts to define an area’s carrying capacity, its application has rarely been implemented effectively as a management strategy. Several problems have been identified with this concept. Firstly, managers of protected areas have found it very difficult to establish a single, objectively defined number that could be used as a ‘carrying capacity’. Research indicated that the carrying capacity of an area could vary, depending upon the objectives for which it was managed (Stokes 1991). Secondly, the point at which deterioration in the social or ecological environment occurred was not easily measured nor predicted. Thirdly, by the late 1970’s research had shown that there was no consistent relationship between the number of people using an outdoor environment and the influence, positive or negative, they had on recreational experiences (Graefe, Vaske & Kuss 1984; Stankey & McCool 1984; Shelby & Heberlein 1984). Much of the adverse impact caused by a specific number of users was not the result of too much use, rather a combination of other factors relating to the behaviour of users, their level of skill, types of activities and resilience of the biophysical environment (Washburn 1982; Hammitt & Cole 1998). Further, visitors varied in terms of the types of experiences they wanted and so, in any one setting different types of visitors could have different thresholds for social carrying capacity (Hammitt & Cole 1998).

In summary, such practical problems led many to comment that the carrying capacity concept was deficient in theory, unrealistic to implement and impossible to measure (Manning, Johnson & Vande Kamp 1996). The complex relationship between recreational use, experiences and site impacts makes the selection of a single figure or level of use difficult to determine.

2.2 The Recreational Opportunity Spectrum

The 'Recreational Opportunity Spectrum' (ROS) is a planning and management framework for inventorying and describing recreational opportunities in a variety of settings (Driver & Brown 1978; Clark & Stankey 1979; Kaltenborn & Emmelin 1993). Drawing upon observations and writings of researchers and managers, the U.S. Forest Service formulated the ROS in the early 1970's to manage for a variety of recreational demands placed on its wildland areas. The ROS system emphasises that quality in outdoor recreation can best be achieved by providing a diversity of recreational opportunities to satisfy people's varying preferences (Driver & Brown 1978; Clark & Stankey 1979; Sowman 1987). The ROS is a way of formalising this need for diversity by providing a spectrum of recreational opportunities. In terrestrial environments this spectrum of opportunities has been divided into six land management classes (see Table 1), which range from 'primitive' to 'urban' type settings (Driver & Brown 1978; Clark & Stankey 1979). Each setting has different levels of physical alterations to the environment, different levels of remoteness, size, encounters with others, and different levels and types of management actions (Kaltenborn & Emmelin 1993).

The 'primitive' setting, assumes that users attracted to the area prefer no developed facilities, a low level of management and a low density of other people (Clark & Stankey 1979). This primitive end of the spectrum is also presumed to facilitate experiences such as independence, tranquillity, isolation, self-reliance and closeness to nature and challenge. At the other end of the spectrum are 'urban settings' that are designated to provide high density, intensively managed experiences to its users in a developed environment. Greater opportunities toward this end of the continuum are provided for competitive involvement, affiliation and social enjoyment (Driver, Brown, Stankey & Gregoire 1987).

Physical, social and managerial settings can be used to further describe each of the various opportunity classes along the spectrum (Driver & Brown 1978). The physical setting includes the relatively permanent human structures of a site such as roads and dams, in addition to the area's biophysical and cultural-historic resources. Users and their behaviours, equipment and other personal possessions they bring along, identifies attributes of the social setting. The managerial setting can be described as the on-site presence of management personnel, the educational and informational services offered, and any movable structures or equipment used by staff. Features of these three characteristics of the ROS settings have the potential to influence the types of activities and experience opportunities provided along the spectrum.

Table 1. A Description of the Six ROS Settings for the US Forest Service.

Recreational Opportunity Spectrum Class					
Primitive	Semiprimitive Nonmotorised	Semiprimitive Motorised	Roaded Natural	Rural	Urban
<p>Area is characterised by essentially unmodified natural environment of fairly large size. Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorised use within the area is not permitted.</p>	<p>Area is characterized by a predominantly natural or natural-appearing environment of moderate-to-large size. Interaction between users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorised use is not permitted.</p>	<p>Area is characterised by a predominantly natural-appearing environment of moderate-to-large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorised use is permitted.</p>	<p>Area is characterised by predominantly natural-appearing environments with moderate evidences of the sights and sounds of humans. Such evidences usually harmonise with the natural environment. Interaction between users may be low to moderate, but with evidence of other users prevalent. Resource modification and utilisation practices are evident, but harmonise with the natural environment. Conventional motorised use is provided for in construction standards and design of facilities.</p>	<p>Area is characterised by substantially modified natural environment. Resource modification and utilisation practices are to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate densities are provided far away from developed sites. Facilities for intensified motorised use and parking are available.</p>	<p>Area is characterised by a substantially urbanised environment, although the background may have natural-appearing elements. Renewable resource modification and utilisation practices are to enhance specific recreation activities. Vegetative cover is often exotic and manicured. Sights and sounds of humans, on-site, are predominant. Large numbers of users can be expected, both on-site and in nearby areas. Facilities for highly intensified motor use and parking are available, with forms of mass transit often available to carry people throughout the site.</p>

Source: Hammitt & Cole 1998, pp. 211-212.

Implementing the ROS framework requires the following:

- Define setting characteristics for each setting or class which requires an understanding of the influence of setting characteristics on visitor experiences.
- Define appropriate activities for each setting or class which requires an understanding of the relationships between activities and impacts.
- Define experience which requires an understanding of visitor expectations.
- Develop management plans to reflect and preserve the opportunities.

Over the years, the ROS framework has caught the attention of recreation resource administrators in Asia, Northern Europe, North America and the South Pacific. Its integration of recreation activities, settings and experiences is consistent with how planners and managers have begun to see their job as facilitators of experiences and activities sought by users of different environmental areas (Driver et al. 1987). Even where the label ROS is not used, the idea of systematically managing the numbers of visitors and the amount and type of built facilities to provide for a range of experiences is common in recreation management. Table 2 provides a description of four settings used by the Great Barrier Reef Marine Park Authority in one of its regional management plans.

Table 2. Setting Descriptions for Whitsundays Plan of Management.

Setting 1	Developed	Immediately adjacent to urban areas and resorts. These areas are the access points to the Planning Area and a focus for intensive tourism and recreation. These areas are heavily used by a wide range of craft, and contain permanent facilities (for example, marinas, jetties and boat ramps).	Group size (including crew) No limit	Vessel length Up to 70 metres
Setting 2	High Use	A natural setting that may have high levels of visitation. These areas are easily accessed and appropriate facilities (for example, pontoons, moorings, markers) may be required to manage impacts and assist in visitor interpretation of the area. These areas are regularly visited by larger vessels and aircraft.	Group size (including crew) No limit	Vessel length Up to 35 metres
Setting 3	Moderate Use	A natural setting that may have moderate levels of visitation, with appropriate moorings and management facilities to manage impacts. These areas are occasionally visited by larger vessels and aircraft.	Group size (including crew) Up to 40 people	Vessel length Up to 35 metres
Setting 4	Natural	A natural setting with low levels of visitation. These areas are generally free from facilities, larger vessels and aircraft.	Group size (including crew) Up to 15 people	Vessel length Up to 35 metres (unless limited by site)
Setting 5	Protected	A protected natural setting, for areas of outstanding or unique conservation value and areas of special management concern. Operation in these areas will be limited and managed according to individual site plans.	Group size (including crew) Limited by site	Vessel length Limited by site

Source: Great Barrier Reef Marine Park Authority 1999, p. 16.

The ROS approach to visitor management has the advantage of being a highly flexible approach that is easily incorporated into management plans. The ROS provides for sensitive areas to be identified and protected and other areas more capable of withstanding heavier levels of use to be used for more intense forms of recreation. Although this type of scale is useful for organising opportunity classes for an area, a number of problems with the system have been suggested. Research has revealed that recreationists do not necessarily report experiential changes as they pass through different ROS settings (Schreyer 1985; Yuan & McEwen 1989). This suggests that experience may not be as closely or directly linked to the managerial and physical setting attributes as is assumed in this model. The model also assumes that people choose a recreational site according to a particular experience they wish to gain and that they have sufficient knowledge and experience to do this.

2.3 Limits of Acceptable Change

An approach developed over the past two decades as an alternative to the carrying capacity concept, and an extension of the Recreational Opportunity Spectrum, is the 'Limits of Acceptable Change' (LAC). In comparison to the earlier concepts, the LAC approach is a system which designates more specific management objectives and standards, for natural and social conditions in a resource area. The LAC planning framework is more concerned with how much change in a resource is too much, rather than focusing on use limits and how many people are too many (Stankey, Cole, Lucas, Petersen & Frissell 1985). The LAC concept is based on the premise that recreational use of an area can diminish the quality of both the natural environment and the recreational experience. The aim of this system is to keep change due to human-use within acceptable levels in order to maintain the desired quality of an area's social and biophysical characteristics (Hendee, Stankey & Lucas 1990; Stankey et al. 1985). Central to the LAC concept is the recommendation that the quality of the resource (social or biophysical) be determined by the range of recreational opportunities prescribed by managers of the area and the conditions that best represent these opportunities (Stankey et al. 1985; Roggenbuck , Williams & Watson 1993).

The LAC process is a planning framework consisting of nine major stages. These stages are based on identifying and monitoring a small number of indicators that specify an acceptable level of naturalness and experiential quality for different environmental settings. The LAC model was developed for use by managers in the United States Forest Service. It is similar in its basic elements to the Visitor Impact Management (VIM) system developed for the United States National Park Service (see Kuss, Graefe & Vaske 1990) and the Visitor Activity Management Process used by the Canadian Park Service (Graham, Nilsen & Payne 1988).

The LAC process consists of nine major steps. These are as follows:

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

More detailed information about each of the steps can be found in Stankey and McCool (1984) and Shafer, Inglis, Johnson and Marshall (1998). In general, the first five steps in the LAC model are intended to guide managers through a process of identifying relationships between existing and desired or 'acceptable' conditions. The final four steps deal with implementing standards where they are appropriate and then monitoring the specified conditions to determine when and if change becomes unacceptable.

Major input from users and stakeholders is required for the first five stages of this process. The identification of concerns and issues, for example, requires consultation with other management agencies and planners, stakeholder groups, local interest group members or the general public. Any issues or concerns relating to the natural or social conditions of the area should be identified. These may include the identification of natural habitats or species that are unique or under threat in the area, details about the distribution of current use or any conflicting use, which may be occurring at the site. User concern for specific conditions of the resource area are also an integral part of planning for recreational experiences and may lead to a strengthening of relationships between society and the resource base (Shafer & Hammit 1995). As in the ROS system, the identification of opportunity classes requires information from users, on the range of opportunities or experiences they desire.

The selection of the indicators also requires a detailed understanding of the nature of the interactions between users and the environment. Indicators can be defined as a variable or feature of the situation which reflects the state of the situation. Visitor research is considered important in this process as it can help managers to identify what features of the natural, social, and managerial environment influence the visitor experience. The identified features (for example, number of people encountered, or proximity to wildlife) can then be incorporated into the LAC model as measurable indicators.

Indicators that represent the biophysical conditions of the natural environment may include the density or amount of surrounding vegetation, the types of flora and fauna, or the health and quality of the plant life. Other indicators may reflect social conditions relating to other people and their behaviours, conflicts between types of users, or the presence of structures in the area. The selection of good indicators is dependent on many factors (Merigliano 1990; Whittaker 1992). Indicators should:

- Relate to the amount and type of wilderness use
- Permit measurement in cost-effective ways at acceptable levels of accuracy
- Be potentially responsive to managerial intervention

- Be quantifiable and capable of detecting relevant changes in experience or wilderness condition
- Be representative of those highly valued by the user

Due to the complexity of wilderness environments, it is possible for managers to identify a large number of indicators for a specific site. Monitoring all of these indicators is not only unnecessary but also difficult. The LAC process suggests that it is only important to select a few quality indicators that represent the conditions of a natural/wilderness area (Stankey et al. 1985). The literature does not specify how many is a 'few' (Roggenbuck et al. 1993).

The standards set for each indicator serve as trigger devices for managers. It is important to note that a LAC standard is a maximum permissible level of impact or a critical threshold limit. If conditions deteriorate and a standard is approached, managers can take action to avoid unacceptable change. In the past when adverse impacts occurred to a social or natural environment, use limits were frequently applied. The LAC concept in comparison gives managers the flexibility to implement other kinds of action before enforcing limitations on use.

Some problems have been encountered with the implementation of the LAC approach in terrestrial environments. Many of these relate to the difficulties managers have experienced in selecting indicators. This has been due to the lack of knowledge managers possess about how visitors perceive various aspects of the natural and social setting and how these conditions in turn influence experience. What are the acceptable levels or standards for experience indicators according to users? This is another issue of uncertainty managers have faced in their attempts to set limits for specific indicators (Lucas & Stankey 1985). In the United States, questions remain about the extent to which experience indicators and standards selected for one area, may be generalised to other sites. According to Roggenbuck et al. (1993) a search for commonality in user and visitor opinions is required. Other factors limiting the wider adoption of the LAC Model for visitor management in natural areas, include, the high costs involved in collecting data on biological change and recreational use and difficulties in sustaining user involvement in the process over time.

2.4 Tourism Optimisation Management Model

A recently described management model that follows a similar process to the LAC is the Tourism Optimisation Management Model (TOMM) (McArthur 2000). Many of the components of the TOMM are similar to the LAC system. The main differences between these two models are: TOMM is designed to work at a regional level over a multitude of public and private land tenures, whereas the LAC system was designed to manage only a single natural area; and that TOMM specifically incorporates tour operators as a separate set of users in the system. Unlike other management approaches, the TOMM does not concentrate on impacts, is not about setting limits and recognises the importance of the viability of the tourism industry, the quality of the environment and the visitor experience (Manidis Roberts 1997).

The TOMM is comprised of three significant components: contextual analysis, a monitoring program and a management response. Contextual analysis identifies current policies and

emerging issues. It is a useful process to consolidate stakeholder support and identify information for predicting and managing future use. As part of this step, community values, product characteristics, growth patterns, market trends and opportunities, positioning and branding and alternative scenarios for tourism in the region are identified where appropriate (McArthur 2000).

Identifying optimum conditions, indicators, acceptable ranges and monitoring techniques are required for a successful monitoring program in the TOMM. An optimal condition has been defined as, 'a desirable yet realistic status for a sustainable future' (Manidis Roberts 1997). In other words an optimal condition is similar to an objective, which in this case is prescribed by managers and stakeholders, to indicate the environment in which tourism should be operating. Optimal conditions may be described under the headings: economic; experiential; market; environmental; or socio-cultural. For example, an optimal experiential condition may be one that states, 'The majority of visitors leave the site highly satisfied with their trip experience'. An 'optimal environmental condition' however, could be 'to ensure the wildlife species attracting visitors are maintained where tourism activity occurs' (Manidis Roberts 1997). Managers, stakeholders and consultants have to develop appropriate indicators and determine an acceptable range for each of the indicators selected. Indicators are used as measures to give an insight of how close tourism activity is to achieving its optimal conditions (McArthur 2000). A monitoring program is then designed to collect information about each indicator and its performance. As an example, the optimal condition 'The majority of visitors leave the site highly satisfied with their trip' may have an indicator that represents 'The proportion of visitors who were happy with their day-trip'. An acceptable range set for this indicator could be '90 – 100% of respondents should be satisfied'. A benchmark is usually developed for each indicator against which to compare new data collected from the monitoring program.

Before a monitoring program is implemented, managers need to assess the reliability, cost and validity of the indicator measures. Monitoring methods could include personal interviews or surveys with tourists or operators. Once monitoring data has been collected the annual status of each indicator is presented in terms of how close it is to the acceptable range.

Step three in the TOMM process is classified as a 'Management Response' to the findings of the Monitoring Program. A review of report charts will identify which indicators were not performing in that year, and will show the degree of discrepancy from the acceptable or optimal range. By reviewing previous annual report charts managers can examine whether the discrepancy is part of a longer-term trend (McArthur 2000). Additional research, site-based development, modification to existing practices, marketing and lobbying could be some of the options used to manage an identified problem (Manidis Roberts 1997).

There are only three known applications of the TOMM to date and all are in Australia (McArthur 2000). As such, very little is known about the successes or failures of this model. One of the systems most obvious limitations is its size. As the TOMM may be implemented at a regional level it covers a wide range of issues, environments and uses. Therefore a great deal of effort is involved in managing data and the stakeholders involved. Extensive coordination efforts are required to cater for a diversity of stakeholder interests and expertise. Like the LAC model, selecting the right indicators to use in the assessment of

optimal conditions is difficult. The TOMM uses a wide range of optimal conditions and therefore generates a wider range of indicators. To keep the model manageable, limitations must be placed on the number of indicators per condition, thereby potentially reducing the ability of each condition to be adequately represented. There is also room for subjectivity from decision-makers when choosing the acceptable range for indicators (Manidis Roberts 1997; McArthur 2000). One area where the TOMM has been implemented is South Australia's Kangaroo Island. Table 3 is an excerpt of the list of indicators, acceptable ranges and monitoring options designed for the management of tourism on Kangaroo Island.

Table 3. Summary of TOMM Monitoring System for Kangaroo Island

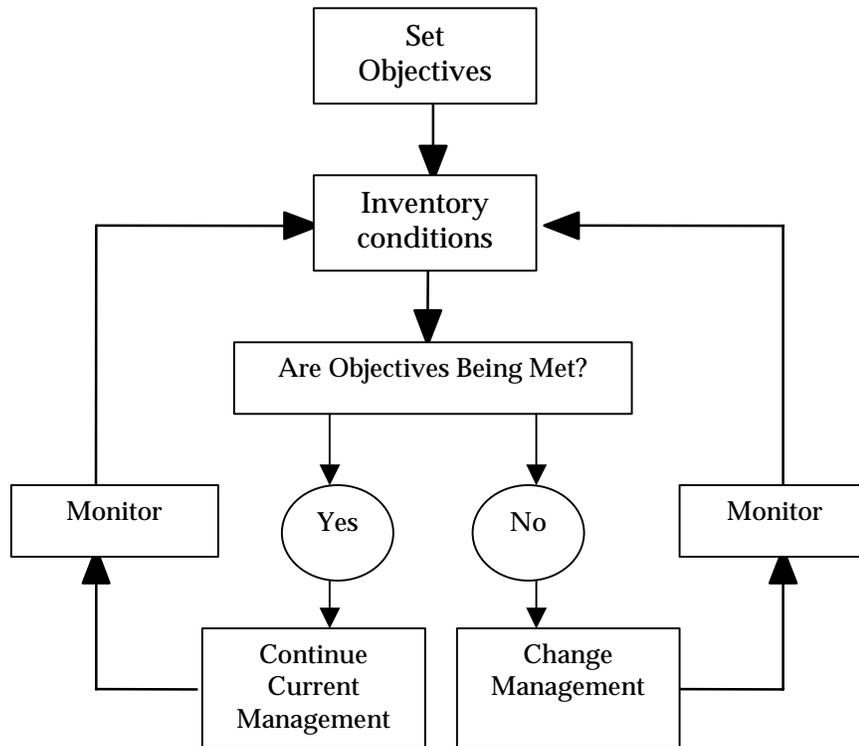
Optimal Conditions	Indicator	Acceptable Range	Monitoring Method	Details of Monitoring
ECONOMIC				
The majority of visitors to KI stay longer than two nights.	Annual average number of nights stayed on KI.	2 to 7 nights	Direct question in exit survey.	One of core questions administered in annual exit survey, administered at airport and two major ports. In the interim, use figures from the Domestic Tourism Monitor.
The tourism industry is undergoing steady growth in tourism yield.	Annual average growth in total tourism expenditure on KI per number of visitors.	4 to 10% annual average growth.	Expenditure estimate in exit survey.	Annual average growth to be in real terms. Average of last three years regional figures to be taken as benchmark. Divide growth by total the number of visits.
The growth of local employment within the tourism industry has been consistent.	Annual average growth in direct tourism employment.	1 to 3% annual average growth.	Annual survey of TKI operators.	TKI to administer survey and collate details.
MARKET OPPORTUNITIES				
Operators use market data to assist in matching product with market segment opportunities.	Number of operators using market data in TKI and operator plans.	50 to 100% of operators.	Annual survey of TKI operators.	TKI to administer survey and collate details. Use Likert scale of monitoring on usefulness.
A growing portion of visitors come from the cultural/ environmental segments of the domestic and international markets.	Proportion of visitors that match ATC cultural/ environmental segmentation profile. The number of visits to Kangaroo Island.	60 to 80% of total visitors to KI. 0 to 7% annual growth in the number of visits.	Exit survey. Number of passengers carried on transport between KI and mainland.	Compare total number of visits with proportion of segment visits to create an overall proportion. Two to three market segmentation questions that explore motivation, interest in learning and activities participated in. Ensure data is kept confidential and only presented in generic form (consider collation by an impartial body).
ENVIRONMENTAL				
Ecological processes are maintained or improved (where visitor impact has occurred) in areas where tourism activity occurs.	Net overall cover of native vegetation at specific sites.	0 to 5% increase in native vegetation from base case.	Annual ground survey, supported by GIS data.	Survey three sites for threatened endemic species, twice/annum, present results separately. Suggested sites are main access point at Little Sahara Desert, area adjacent to Vivonne Bay Camping Area; area adjacent to D'estress Bay; and area surrounding Harriett Camping Area. Base case will be estimated by those with expertise of species in local area.
Major wildlife populations attracting visitors are maintained and/or improved in areas where tourism activity occurs.	Number of seals at designated tourist site. Number of Hooded Plover at designated tourist site. Number of Osprey at designated tourist site.	0 to 5% annual increase in number sighted.	Count visible population in designated area.	Regular observations of seal numbers at Seal Bay and Cape De Couedic, observations of Hooded Plover at a sandy beach site and observations of Osprey at coastal site. Base case will be estimated by those with expertise of species in local area.
The majority of tourism accommodation operations have implemented some form of energy and water conservation practice.	Energy consumption /visitor night / visitor Water consumption / visitor night / visitor.	3 to 7 kilowatts. 20 to 40 litres of water.	Electricity and water consumption averaged across three operations.	Monitor average consumption per visitor per night at a hotel self-contained unit, bed and breakfast and lighthouse keeper's residence. This will be coordinated via an annual ecotourism best practice survey conducted by a university.
EXPERIENTIAL				
Tourism promotion of visitor experiences at Kangaroo Island's natural areas is realistic and truthful to that actually experienced by most visitors.	Proportion of visitors who believe their experience was similar to that suggested in advertisements and brochures.	85% to 100% of visitors.	Closed question in exit survey.	Ask the question "Were there any significant differences between what advertisements and brochures suggested about Kangaroo Island and what you experienced?"
The majority of KI visitors leave the Island highly satisfied with their experience.	Proportion of visitors who were very satisfied with interpretation provided on a guided tour.	90 to 100% of respondents.	Closed question exit survey.	Ask the question "If you took a guided tour while on Kangaroo Island, did you find it to be informative, interactive and entertaining?"
SOCIO CULTURAL				
Residents feel they can influence tourism related decisions.	Proportion of visitors who were very satisfied with their overall visit.	95% to 100% of respondents.	Satisfaction question exit survey.	Ask the question "Were you very satisfied, satisfied or unsatisfied with your visit to KI?"
Residents feel comfortable that tourism contributes to a peaceful, secure and attractive lifestyle.	Proportion of the community who perceive positive benefits from their interactions with tourists.	70 to 100% of respondents.	Closed question within an Omnibus survey of local residents.	Telephone survey of 500 residents per year using a proportional distribution as per population distribution. TKI to coordinate.
Residents are able to access nature-based recreational opportunities that are not frequented by tourists.	Proportion of residents who feel they can visit a natural area of their choice with very few tourists present.	80 to 100% of respondents	Closed question within an Omnibus survey of local residents.	Telephone survey of 500 residents per year using a proportional distribution as per population distribution. Ask respondents "During the past year did you continually feel that you could find somewhere natural on the Island to escape that felt local and had few to no tourists?" TKI to coordinate.

Source: Manidis Roberts, 1997, pp. 26-27.

2.5 Summary

Early attempts to manage visitors to protected areas sought to establish carrying capacities. Negative impacts are not, however, directly associated with numbers of visitors. Visitors are not homogenous in terms of their motives or their perceptions of settings and experiences. Thus in the case of social carrying capacity, different visitors in the same setting, can have different thresholds. Changes in management actions, such as limits to certain behaviours and activities and the provision of built infrastructure, can alter both the nature of visitors' interactions with the physical setting but also the nature of their experiences available.

Recognising that visitors vary in terms of their desired experiences many management models and systems aim to provide a variety of opportunities to suit a variety of different visitor groups. In addition to this idea of an opportunity spectrum, most of the management models proposed have the idea of identifying critical features of the physical and social environment, that can act as indicators of the quality of the environment and the experience available. These systems usually suggest ways to determine optimal levels of these indicators and then monitoring programs to check that the indicators remain within the acceptable levels. Figure 2 provides a summary of these approaches.



Source: Hammitt & Cole 1998, p. 215.

Figure 2. A Simplified Visitor Management Model

While the model set out in Figure 2 may be simple in terms of the basic steps in the process, there are some major challenges in determining the relevant indicators, deciding on optimal or acceptable levels and then developing cost effective, reliable and valid monitoring techniques. Choosing the appropriate indicators requires a detailed understanding of the nature of visitor environment interactions. In the case of social indicators it requires an understanding of the factors that are important in visitors' evaluations of their experiences. The management systems proposed also often assume that managers have at least a basic understanding of the nature of use and users. Given the limited information available in general on any of these topics it not surprising that it is very difficult to find any examples where an entire system has been developed and implemented.

3.0 WHAT IS KNOWN ABOUT TOURIST AND RECREATIONAL USE OF PROTECTED AREAS?

Key Points

Visitor behaviour in, and satisfaction with, protected areas is influenced by:

- Visitor characteristics especially motives and levels of experience
- Perceived quality of the physical environment especially judgements of scenic beauty
- Interactions with other people
- The effectiveness of interpretation programs
- Perceived quality of the service provided by tour operations
- Perceived quality of the facilities and infrastructure

Crowding alone does not seem to be strongly related to dissatisfaction and is not directly related to use density.

A number of gaps exist in the literature including:

- The influence of culture
- The nature of outcomes other than satisfaction

Almost no research has been conducted that compares a range of different variables in terms of their relative importance for visitor behaviour and satisfaction. Many studies have concentrated on one set of variables, for example perceptions of crowding. Few studies, for example, have compared the relative contributions of crowding, visitor motives, perceptions of scenic quality, exposure to interpretation, and perceptions of the quality of service and infrastructure to outcomes.

3.1 An Overview of Factors and Theories

In the introductory section a general descriptive model of human use of protected areas was proposed. That model can be further developed to deal more specifically with tourist and recreational use of protected areas. This is represented in Figure 3. This model not only demonstrates the major relationships between various features in the system, it also provides a way of organising a review of the existing literature.

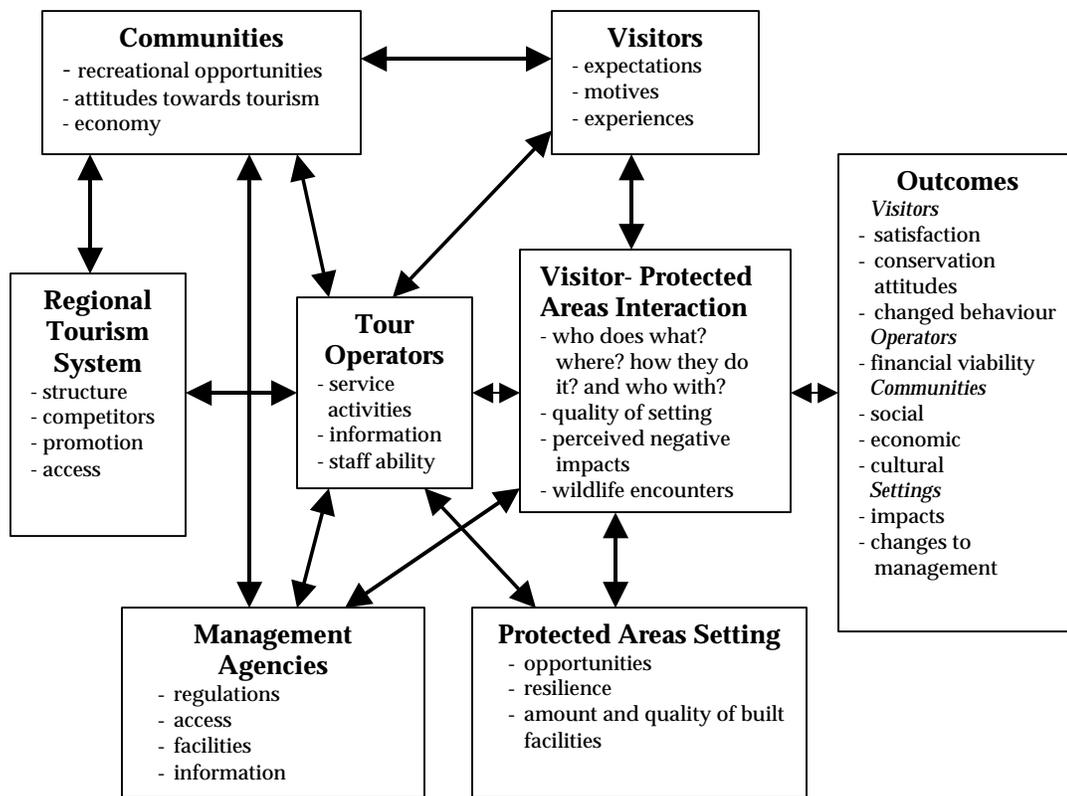


Figure 3. A Model of Visitor Use of Protected Areas

This model represents a simplified summary of the major components that have been proposed by various authors and that have been identified from research. It is worth noting that within each box there are likely to be complex interrelationships between the specific features. Further, there are many conceptual debates and discussions that exist in the academic literature. Low and Altman (1992) have suggested that there are three stages in academic research.

- Early adoption and enthusiasm when a concept, such as place attachment or recreation specialisation, is seen as having great potential to explain visitor behaviour.
- The development of taxonomies and subtypes as research evidence reveals a more complex and multi-dimensional picture than first proposed.
- The development of systemic, holistic theories, which offer specific predictions and real world applications.

According to Low and Altman (1992) much of the academic literature on recreation and tourism exists in the first stage with some areas having advanced into the second stage. A detailed reading of the publications focussed on any feature in the model set out above provides ample evidence to support Low and Altman's analysis. It is common to find advocates for a particular concept, enthusiastically emphasising the potential of the concept for guiding management decisions, in the absence of convincing empirical evidence.

3.2 Tour Operators and the Larger Tourism System

Tour operations are a growing component of many protected area systems, especially in Australia. Not surprisingly, this is matched by an increasing management agency focus on how to best regulate and/or influence tour operators and their activities. The focus of most management models in the literature, however, is on the individual visitor. It can be easy to ignore the constraints and forces that influence operators and how these can, in turn, effect the direct visitor-protected area interaction. Figure 4 sets out these forces in a flow model of tourism. This model highlights the steps involved in getting a tourist from their usual place of residence to a particular place or on a particular tour. Viable tour operations require a relatively stable demand from tourists willing to pay a price that will cover the operators' costs. Threats to this viability can come from any of the constraints in the model and other sources. These challenges include:

- Difficulties in getting and keeping suitable staff
- Access to credit at an affordable price
- Competitive pressures from other operators and other destinations
- Limited direct access to the potential tourists
- Poor regional/destination infrastructure
- Poor service quality in other services

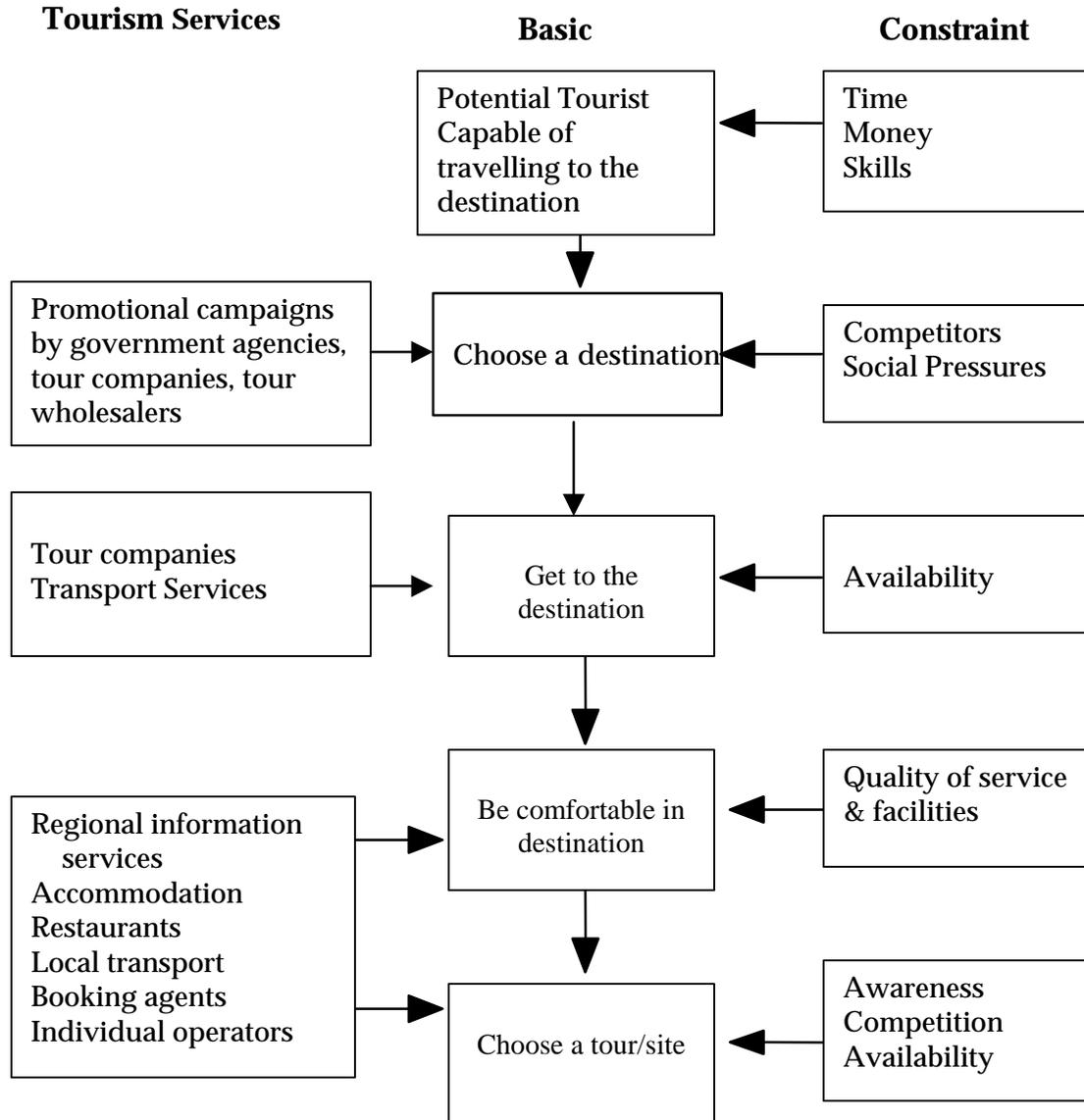


Figure 4. A Flow Model of Tourism

Examples can help illustrate these constraints and forces. As indicated previously in Table 3, one of the optimal conditions set down for a tourism monitoring system for Kangaroo Island, was that the majority of visitors to the island stay longer than two nights. However, some major challenges exist for this target including the lack of accommodation available, limitations to rental car availability and limited spaces on vehicle ferries. A second example can be found in various debates over the value of accreditation for tour operators. It is often argued that accreditation can be a competitive advantage. This advantage will only exist however, if tourists are aware of the accreditation system, value it and can afford to pay for it.

3.3 Communities and Management Agencies

The key characteristics of communities that are relevant to understanding tourist and recreational use are:

- The range of recreational resources or opportunities available
- The cultural and historical values associated with local environments
- The economic structure
- The relationships between communities and management agencies

As noted previously, little research exists in this area. The limited material that does exist suggests that in many settings there are usually conflicts between communities and agencies that can present major challenges for effective management (Harrison, Burgess & Clark 1998). Two of the most commonly reported obstacles for managers in dealing with communities and visitors are differences in their values and perceptions (see Shelby & Shindler 1992, for a review of the research available on this topic) and a focus by managers on actual direct use. Places can have values for people that are not closely linked to actual use.

One example of the problems that can occur is in managing community reactions to limits to access. A focus on use can lead managers to underestimate community backlash if they believe that alternative places exist to pursue activities. If the place has meanings beyond those activities then alternatives or substitutes may not exist (see Gee 1994, for a discussion questioning the concept of a user).

3.4 Characteristics Visitors Bring With Them

Visitors vary in a number of ways, and many visitor characteristics have shown to be significantly related to their choices of activities and sites or destinations, their experience preferences and their responses to their experiences. The visitor characteristics that appear to have the most impact on visitor interactions with the natural environment and their evaluations of these interactions are: their motives or reasons for seeking a nature based experience; their cultural background; the social structure of the groups they visit with; their experience with either the activity or the setting; and their attachment to the place and their environmental awareness and concern.

3.4.1 Experience

Experience has also been studied in some detail. Experience can refer to either experience with a particular activity, which is often referred to as specialisation, or experience with a particular site, which is studied under the label of repeat visitation. In both cases it appears the increasing experience with either a site or an activity is associated with changes in motivations, expectations, experience preferences and evaluations of available experiences. In general increased experience is associated with less tolerance for other users, higher demands for quality and greater interest in more remote and less developed sites (see Hammitt & Cole 1998; Ewert & Hollenhorst 1994; Cole & Scott 1999; and Martin 1997, for a review of this literature).

3.4.2 Social and Cultural Factors

The other two variables that have been suggested to be important are the social structure of the visiting group and cultural backgrounds. Hammitt and Cole (1998) review a number of studies showing that different types of social groups use natural environments in different ways. Work by McManus in the United Kingdom on family and other groups in a variety of leisure settings supports these findings (McManus 1998). The research into cultural differences in tourism and recreation is much more limited than that on experience but the available research does suggest some major differences in the way cultural groups seek and participate in tourist and recreation activities (see Greenwood & Moscardo 1999; Kim & Lee 1998; Lakhani 1990; Morrison 1996; Moscardo, Woods & Pearce 1997; Woods & Moscardo 1998, Yang & Brown 1992)

3.4.3 Motives or Desired Benefits

Recreation motives are the reasons people have for visiting an outdoor area and are based upon their perceived needs. By examining motives it is possible to determine preferences for the various elements that comprise the recreational setting. Once these motives and preferences for visiting a recreational site are understood, the researcher or planner can connect these motives to environmental settings and the ability of the resource to provide such experiences. Expectancy has been described as the belief that a particular behaviour or act will be followed by a specific outcome (Schreyer & Roggenbuck 1978). Motivation is translated into behaviour or action based upon the expectancy that a given action will result

in desired outcomes (Schreyer & Roggenbuck 1978). Recreation may be considered as an activity in which individuals engage, with the expectation of receiving certain rewards or experiences such as excitement or solitude (Driver & Tocher 1970; Knopf & Driver 1973). It is important to note that few people engage in a recreational activity to satisfy only a single expectation. Bush walking for example, may provide several rewards or experiential outcomes e.g. solitude, a chance to experience nature, physical exercise and so forth.

Motivation plays a role in both choice of settings and activities and in satisfaction (see Moscardo, Morrison, Pearce, Lang and O'Leary (1996) for a review of destination choice models and research into the influences of motives on destination and activity selection). Tarrant, Haas and Manfredo (1995), for example, found that visitors who placed a greater emphasis on the motives; enjoying nature and experiencing solitude, evaluated certain conditions such as noise or the sight of human structures, more negatively than people who were less dependent on achieving these motives. In an Australian study conducted with visitors to the Wet Tropics Rainforests, Moscardo, Pearce and Haxton (1998) identified three types of rainforest visitor, based on the importance of a variety of expected benefits from their rainforest visit. The three groups differed in terms of:

- Socio-demographics
- Choice of activities
- Travel patterns in the region
- Images of rainforest
- Satisfaction with the available experiences

Over the years several measures have been designed to assess visitor motivations. Driver and his colleagues and Pearce and his colleagues, have undertaken some of the most systematic work, to develop measures of motivations for outdoor recreation and tourist activities. A number of studies of both; recreation in natural environment and tourist activities in general, have consistently revealed a number of different motives which are met by participation in activities in natural environments. (Knopp, Ballman & Merriam 1979; Lucas 1985; Manfredo, Driver & Brown 1983; Pearce 1997; Pearce, Morrison & Rutledge 1998; Schreyer & Roggenbuck 1978). These include:

- Solitude, privacy, escape from noise and crowds
- Freedom and control
- Adventure, risk taking and excitement
- Social interaction with family and people with similar values
- Escape from physical and social pressures of work and daily routines
- Enjoyment of nature and scenery
- Physical fitness
- Learn about nature
- Develop skills and personal competence
- Social status and respect

A number of researchers listed in this section and lead by Driver have developed a standard survey instrument to measure these motives, or expected benefits, from leisure participation. It is referred to as the Recreation Experience Preference Scale (REP) and has been developed and tested over a period of more than 25 years using thousands of survey respondents in more than 50 empirical studies (Manfredo, Driver & Tarrant 1996).

An alternative way to think about the reasons for participation in tourism and recreation is to examine the actual benefits that people get from their activities or experiences (Driver & Brown, 1978; Driver, Nash & Haas, 1987). Driver (1992) describes “benefits” as the specific ways in which a particular activity (e.g. use of a recreational opportunity) either improves the condition or quality of an individual or group, or prevents a worse condition or state from happening.

3.4.4 Place Attachment

A number of authors have argued for the importance of “place attachment” in explaining people environment interactions. Place attachment refers to the emotional or affective ties or bonds people can have with particular places. People can develop strong attachments to places that go beyond their actual use or time spent in the place (Low and Altman 1992). A number of elements or features have been associated with place attachment. These include:

- A strong emotional response to the place
 - A belief that the place expresses some aspect of an individual’s identity
 - The place provides the individual with a sense of control, privacy and serenity
 - The place provides stability over time
 - Important social relations or interactions are associated with the place.
- (Low & Altman 1992; Allen 1999; Brown & Perkins 1992; Fishwick & Vining 1995; Giuliani & Feldman 1993)

Strong place attachments are associated with more frequent use, a focus by the individual on the setting, a lack of substitute places and lower incomes (Williams, Patterson, Roggenbuck & Watson 1992). Strong place attachments have also been found to be important components in the way people assess their overall quality of life (Hummon 1992).

3.4.5 Environmental Awareness and Concern

It seems sensible to assume that visitors’ awareness of the actions that can have negative impacts on a setting and their concern for the environment will influence their on-site behaviours and their perceptions of the quality of the environment. Such an assumption is consistent with the existing theories, which link values, knowledge and behaviour (see Stern 2000 for a summary).

It should be noted, however, that very little research exists in this area. Two exceptions are studies by Floyd, Jang and Noe (1997) on visitors to U.S. Parks and Moscardo, Green and Greenwood’s (2001) research on tourists to the Great Barrier Reef. In the former case the researchers found that visitors, with a higher level of environmental concern, were less tolerant of indicators of negative environmental impacts such as litter and vegetation damage. The authors also noted that visitors generally do not notice impacts. In a similar fashion, Moscardo, Green and Greenwood (2001) found that tourists generally had high levels of concern for the wellbeing of the reef settings they visited, but low levels of knowledge of how they could lessen negative environmental impacts.

3.5 The Actual Experience

At the centre of the visitor environment system is the actual interaction between the visitor and the physical environment. Much of the management focus here is on the relationships between use and environmental impacts. Generally, research into tourism and recreational biophysical impacts has been concerned with identifying and measuring actual impacts. While such research is important to establish a description of the existing situation it does not, by itself, provide guidance for the development of management strategies to deal with the impacts. In particular it is important to examine the patterns of actual visitor behaviour to develop an understanding of what exactly it is that tourists do that results in the impacts. The following factors have all been identified as having an influence on how tourist and recreational uses impact the environment (Hammitt & Cole 1998):

- Type of vegetation and wildlife
- Topography and climate
- Soil characteristics
- Amount of use
- Distribution of use
- Time of use
- Type of use
- User behaviour
- User experience and competence
- User knowledge of minimal impact behaviours
- Design of the infrastructure to support use

A common conclusion of reviews into the environmental impacts of tourism and recreation is that while managers typically assume a simple linear relationship between amount of use and degree of impact, the available research suggests such a relationship does not exist (Brake & Williams 1990; Graefe 1991; Kuss, Graefe & Vaske 1990). Impacts usually depend on when and where the tourism is concentrated. Research into the effect of tourists on colonies of Herons in New Jersey, provides a clear example of how important timing and location of tourist visits can be. In this case, major disturbance to the birds was only detected when visitors approached the bird colonies after hatching and/or when visitors actually walked through the colonies. Visitors who viewed the colonies from 50 metres and/or who came at other times in the breeding cycle had no discernible impacts on the herons (Burger, Gochfeld & Niles 1995). The researchers note, for example, that people moving through an area at a constant speed or pace will often disturb the birds less than if people stop or slow their pace. The birds' attention is more readily drawn to changes in movement (Burger, Gochfeld & Niles 1995). In order to manage use and impacts and to choose and measure indicators of the quality of the physical environment, managers need to understand the nature and extent of use and how this is linked to impacts.

The environmental impacts of tourism and recreation are also closely related to the types of planning and management associated with tourism. It is important to understand that many of the negative impacts of visitation have occurred in areas where there has been little control and either poor or no management of tourism development (Buhalis & Fletcher 1995; Gunn 1994). According to Archer and Cooper, negative impacts usually result from 'excessive and badly planned' and 'poor and ill-conceived forms of tourism development' (Gunn 1994 p. 84). In protected areas the activities and practices of our operators can

influence what visitors do and thus their impacts. Therefore understanding impacts also requires some understanding of tour operator practices.

3.5.1 Perceptions of the Physical Environment

An important motivation for visits to natural areas is to see and experience the environment. Successful management of these areas relies greatly on maintaining a place's natural values. It therefore seems sensible that some of the indicators chosen for site monitoring should comprise of those natural attributes which contribute mostly to people's enjoyment and appreciation of an area. Several studies have shown that features of an environment such as its vegetation, geology, scenic beauty, views and wildlife can be important natural attributes that have the ability to shape recreationists' experiences and their evaluations of a site (Hammit & McDonald 1983; Shafer & Hammit 1995; Papageorgiou & Brotherton 1999).

A survey conducted with more than 10,000 US residents found that the quality of the scenery at natural settings was the third most important factor in their recreation experiences after clean facilities and safe settings (USDA Forest Service 1998). A survey conducted with visitors to the Great Barrier Reef in Australia asked respondents to rate the amount of influence that various setting features had on their experience (Shafer, Inglis, Johnson & Marshall 1998). The features are presented in Table 4 from the most positive to the least positive impact. As can be seen some of the most important features were those related to the natural environment.

Table 4. Features That Influence a Reef Experience.

Condition Item	mean¹	std. deviation
Helpfulness of the staff	6.14	0.91
Types of fish I saw	6.12	0.95
Size of the coral I saw	6.11	0.95
Total amount of coral I saw	6.09	0.94
Number of different kinds of coral	6.03	0.98
Information provided by the staff	5.98	1.01
Colour of the fish I saw	5.90	1.08
Clarity (visibility) of the ocean water	5.88	1.22
Colour of the corals I saw	5.85	1.17
Appearance of the staff	5.81	1.05
Total number of fish I saw	5.80	1.18
Behaviour of the fish	5.64	1.15
Size of the fish I saw	5.62	1.12
Temperature of the air	5.29	1.44
Depth of the water	5.28	1.23
Temperature of the water	5.20	1.46
Number of animals other than coral or fish that I saw	5.16	1.39
Sea conditions during the trip from/to shore	5.05	1.60
Number of people on the main boat	4.65	1.33
Number of people snorkelling	4.65	1.40
Currents in the water around the reef	4.62	1.26
Number of people on the pontoon	4.61	1.35
Amount of wind	4.50	1.45
Number of human-made objects in the water	4.34	1.47

¹ Mean was calculated based on a seven point response format where 1 = very negatively, 2 = negatively, 3 = somewhat negatively, 4 = no influence either way, 5 = somewhat positively, 6 = positively, 7 = very positively.

Source: Shafer et al., 1998, p. 36.

3.5.1.1 Scenic Beauty/Landscape Aesthetics

It has been suggested that the aesthetic dimensions of viewing landscape and experiencing scenic beauty are an integral part of an individual's overall experience in natural surroundings and can be closely related to other psychological benefits (Mace, Bell & Loomis 1999). In this area of research a number of different terms have been used including aesthetic value, scenic beauty and landscape preferences. While each is slightly different (see Preston & Jenkins 1999 for a review and discussion of the use of these terms) researchers in each of these areas have been concerned with understanding the factors that contribute to a judgement that a landscape is beautiful. Three major conclusions can be drawn from the research that has been conducted.

The first is that judgements of scenic beauty are the result of interactions between the physical features of the landscape being considered and the characteristics of the individual looking at the landscape. Research has found that judgements of scenic beauty vary according to cultural background, personal experience and familiarity, age and education (Eleftheriadis, Tsalikidis & Manos 1990; Hull & Revell 1989; Mugica & de Lucio 1996; Preston & Jenkins 1999; Purcell 1992; Yang & Brown 1992).

The second major conclusion is that despite individual and cultural differences some physical features of landscapes seem to be consistently associated with judgements of scenic beauty or preferences for landscapes. These common features are:

- Perceived naturalness or degree of perceived human alteration of the scene with less alteration and greater naturalness associated with preference and beauty judgements.
 - Presence of water and land water edges, especially coastlines.
 - Landform and topographic variation with more variety and the presence of mountains associated with preference and beauty judgements.
 - Extent of views with wider and more distant views preferred.
- (Eleftheriadis, Tsalikidis & Manos 1990; Gobster & Chenoweth 1989; Hull & Revell 1989; Mugica & de Lucio 1996; Preston & Jenkins 1999; Purcell 1992)

The final major conclusion of the existing research is that, although there are features which appear to be common to all landscapes, there are also features associated with scenic beauty which are unique to particular landscapes. In forest landscapes, for example, dense and green vegetation is preferred (Eleftheriadis, Tsalikidis & Manos 1990; Gobster & Chenoweth 1989; Mugica & de Lucio 1996).

3.5.1.2 Wildlife

Observing wildlife has been cited as one of the primary motives people have for engaging in outdoor recreation activities. According to Shafer and Hammitt (1995) people often behave in particular ways when in natural environments in order to increase their chances of seeing wildlife. Encountering wildlife is a condition rated very positively by people in terrestrial environments. A study by Roggenbuck and others (1993) found that among wilderness recreationists the number of wild animals seen was very influential, and surmised that these occurrences were 'critical to the experience' (p. 191). A review of demand for wildlife viewing and interaction opportunities, reported that 38% of German,

25% of Japanese, 24% of British and 36% of Dutch international tourists, rated the opportunities to see wildlife as always important in their choice of a holiday destination (Moscardo, Woods & Greenwood 2000). In addition, recent survey research conducted by the US Forest Service (1998) reported that 83% of visitors to protected natural areas in the US agreed that the opportunity to see wildlife is important in their choice of an outdoor recreation setting. A further 90% agreed that seeing wildlife while they were in natural settings made them more satisfied with their experiences.

A telephone survey of 600 domestic holiday makers conducted for the Queensland Tourism and Travel Corporation (now Tourism Queensland) in 1996 found that 21% of the sample described 'a place where I can get close to nature and see wildlife' as essential in their choice of a holiday destination. 42% described this item as very appealing in a holiday destination. A survey of more than 2200 international and domestic visitors to the Whitsunday region of Queensland found that 34% of visitors rated 'opportunities to see wildlife/birds I don't normally see' as very important in their choice of a holiday destination in general (Moscardo 2000). In another study at a popular site within the Whitsundays region, sightings of dolphins, turtles and sand goannas all elicited positive responses from day-trip visitors (Ormsby & Shafer 1999).

A number of studies have been conducted to investigate in more detail the factors that are related to satisfaction with wildlife encounters. Some consistent factors have emerged including:

- The variety of animals seen
 - Being able to get close to the wildlife
 - Seeing large, rare or new species
 - The natural setting
 - Being able to learn about the wildlife or the setting
- (Duffus & Dearden 1993; Davis, Birtles, Valentine, Cuthill & Banks 1997; Leuschner, Ritchie & Stauffer 1989, Foxlee 1999 & Hammitt, Dulin & Wells 1993).

3.5.2 Perceptions of Other Visitors/Users

Over the past two decades, the issues of crowding and its impacts on visitors' experiences have been one of the most extensively researched topics of outdoor recreation in terrestrial environments (Graefe, Vaske & Kuss 1984; Shelby & Heberlein 1986; Kuss, Graefe & Vaske 1990; Stankey 1973; Nielson & Endo 1977; Schreyer & Roggenbuck 1978). A review of the early crowding literature suggested that perceptions of crowding and frequent encounters with other users elicited negative reactions from people visiting natural areas (Stankey 1973). Specifically, these early studies reported that large numbers of other people were judged as intrusive and crowding which degraded the user's perceptions of an environment's natural beauty (Zube 1984). This inverse relationship between crowding and visitor satisfaction generated much concern from recreation resource managers and, therefore crowding became an important indicator of experiential quality for different users in natural environments.

The problem with this early approach was that managers often confused use levels or density with crowding. To clarify, crowding is defined as a negative evaluation of a

particular density or number of encounters and involves a normative or value judgement that a particular number of other people is too many (Shelby & Heberlein 1986). Density is a descriptive term that refers to the number of people per unit area (Shelby, Vaske & Heberlein 1989). Density is the number of people in a space and crowding is the perception or judgement that this number is too many.

The major challenge for managers and researchers in this field has been that there is often not a direct relationship between density and crowding. Graefe, Vaske and Kuss (1984) for example, reviewed thirteen investigations which examined the association between use levels and ratings of crowding. A significant positive effect was reported in ten of these studies, illustrating that as user numbers increased recreationists were more likely to evaluate the experience as being crowded. However, the three other studies reported no correlation, suggesting that variation in perceived crowding was not simply caused by use levels. No significant relationship was found between user density and ratings of visitor satisfaction in other investigations of crowding (Shelby & Heberlein 1986).

The research has discovered that a number of variables have a significant effect upon visitors' perceptions of crowding (Schreyer & Roggenbuck 1978; Absher & Lee 1981). Firstly there are the expectations that visitors have for a recreational experience (Schreyer & Roggenbuck 1978). Expectancy and discrepancy theories argue, that visitor dissatisfaction in recreation due to crowding occurs when the number of others one actually encounters, exceeds the number of contacts one expects or prefers (Shelby et al. 1989). As such, people's different expectations and motivations produce various sensitivities to crowding. For example, in research undertaken by Schreyer and Roggenbuck (1978), recreationists expecting to achieve solitude and relieve stress reflected the greatest sensitivity to use density. In a similar study, visitors motivated to seek contact with nature were less tolerant of other people and crowds than individuals less wilderness-oriented (Papageorgiou & Brotherton 1999). Just as different groups of visitors do not share the same expectations and perceptions of crowding, it is also the case that managers and visitors are likely to be different in their perceptions. It has been found that managers' own experiences and standards are not a reliable source of crowding evaluation. Visitor densities that make a manager feel crowded may not have the same effect on the typical visitor (Graefe, Vaske & Kuss 1984).

Actual and potential conflict between different uses is also a contributing factor to perceptions that an area is crowded (Hammit & Cole 1998). Some studies have found that anglers, for example, are less tolerant of other people using the area, in comparison to individuals in other water related sports such as canoeing, tubing and water skiing (Gramann & Burdge 1981).

A third conclusion is that the number of other people encountered travelling to and from sites, and the people one comes into contact with whilst visiting a site is more important than the actual number at the site (Shafer et al. 1998). Measures of reported contacts have produced the strongest and most consistent effects on perceived crowding (Hammit, McDonald & Noe 1984). a study by Schreyer and Roggenbuck (1978), it has found that as encounters with other people rose, so did user's perceptions of crowding. Roggenbuck and others (1993) discovered that the number of large groups seen along trails and the number of other people camped were highly influential on wilderness evaluations.

There is also evidence that the type of other people encountered is significant in perceptions of crowding (Kuentzel & McDonald 1992; Stankey 1973; Roggenbuck *et al.* 1993; Manning *et al.* 1996). These researchers recommended that such social conditions (e.g. number of encounters with others) were crucial to monitor as site indicators because of their impact upon visitor experiences.

3.5.3 Perceptions of Human Impacts

Evidence of the inappropriate behaviour of others is also a factor which can contribute to perceptions of crowding. Damaged vegetation and the presence of rubbish are among the most common signs of inappropriate behaviour (Anderson & Brown 1984; Daniel & Boster 1976; Roggenbuck *et al.* 1993). These conditions have been found to have a high potential to decrease wilderness quality and the recreational enjoyment of users. Environmental conditions that reflect the modification of natural settings by others include:

- Scarred or cut trees
- Trampled vegetation
- Soil compaction and erosion
- Presence of litter and human waste.

(Roggenbuck *et al.* 1993; Shafer & Hammit 1995; Stankey & Schreyer 1987).

In Australian research, behaviours such as a lack of courtesy, under-supervised children, presence of domestic animals, feeding wildlife, and walking off tracks, were all negative environmental transactions mentioned as detracting from visitors enjoyment of natural environments (McIntyre & Boag 1995).

Other people and their behaviours do not always produce negative reactions from recreational visitors. Several studies have reported positive interactions between people enjoying the same wilderness environment. In a study undertaken at Uluru National Park for example, visitors commented on the friendly interactions, courtesy, help and encouragement they received from sharing the experience with other people (McIntyre & Boag 1995). Visitors to a Marine Park beach setting in Australia reported that they gained pleasure from watching other people enjoying themselves. Meeting new people and the quietness, courtesy and support of other day trip visitors also positively influenced visitors' experiences in this setting (Ormsby & Shafer 1999).

One of the most highly disruptive conditions to be experienced by recreationists in natural environments is noise caused by other people and their activities (Roggenbuck *et al.* 1993). Human induced noise is perceived quite differently from natural sounds. Unlike anthropogenic noise, natural sounds such as the movement of water, bird calls or wildlife may be evaluated positively by users even at extremely high noise levels (Anderson & Brown 1984). Noise has been acknowledged as a serious problem throughout National Parks of the United States because of its significant negative impact upon wilderness users and their amenity (Mace, Bell & Loomis 1999). It has been well documented that people travel to natural areas in order to escape from the stresses and noise encountered in everyday life (Driver, Nash & Haas 1987). Convincing evidence from over one hundred studies have found that natural environments are important in facilitating recovery from urban stress (Mace *et al.* 1999). Stress reduction, tranquillity, peace, quiet and solitude have consistently emerged as key benefits received from experiencing a wilderness area (Ulrich,

Dimberg & Driver 1991). By definition, noise is described as that of an unwanted sound (Mace et al. 1999). So, when sounds are loud, uncontrollable and considered inappropriate for a given environment, people's feelings of solitude and tranquillity are often interrupted. In the presence of noise, the natural environment no longer provides an opportunity for peace and restoration. Noise as such, becomes an environmental stressor, capable of detracting from other preferred wilderness experiences such as the enjoyment of nature and feelings of reduced tension (Mace et al. 1999; Kariel 1990).

Irregular and unpredictable sounds have been reported by recreationists as the most annoying types of noise (Mace et al. 1999). Engine driven transportation is perhaps the most common example of this type of noise encountered in natural environments. Australian research conducted by Dellora, Martin and Saunders (1984) examined the issue of noise from the perspectives of 4-wheel drive users, bushwalkers, picnickers and other recreationists. Results from this study showed that motorcycle noise was the main cause of conflict between recreationists. Consistent with this finding, research conducted in Canada's National Parks also indicated that technological noise was most disruptive to wilderness experiences (Kariel 1990). In particular, motorised trail bikes, cars, chainsaws, snowmobiles, generators, motorboats, radios and aircraft overflights, were the top eight annoying noises according to the responses of park users. From this study, Kariel (1990) concluded that human-induced and technological sounds in outdoor recreation environments should be kept relatively low, 'in order to safeguard a recreational milieu' (p. 148).

Negative attitudes have been expressed by recreationists towards hearing and seeing aircraft overflights in National Parks and wilderness areas (Tarrant et al. 1995). In the United States, aircraft noise has become the focus of much concern from wilderness users, the public and natural resource managers. In response to complaints about aircraft noise, the National Parks Overflight Act (Public Law 100-91) was passed in 1987. A wave of research was conducted to assist the National Park Service and the Forest Service understand the effects of noise on recreationists and identify acceptable levels of overflights in federal wilderness areas of America (Mace et al. 1999). A study by Tarrant and others (1995) found that the presence of only a single aircraft incident could be sufficiently memorable to affect a wilderness trip experience. Other studies showed that even at low levels of noise, aircraft overflights could reflect undesirable sounds of urbanisation or technological intrusion, and therefore be evaluated negatively by visitors (Tarrant et al. 1995; Mace et al. 1999). Although research found that sensitivity to aircraft sound was very much site and setting specific, wilderness visitors tended to respond differently to airflights based on their attitudes, past experiences and experience preferences (Tarrant et al. 1995). Noise from aircraft overflights was also discovered to influence the perceived aesthetic quality of landscapes. Research by Mace and colleagues (1999) showed that as helicopter noise increased, the landscape was viewed as less natural and its noise restricted visitors' perceptions of freedom, solitude and tranquillity. The results of Mace and colleagues (1999) again supported notions that noise encountered within natural environments represents an auditory stressor.

In addition to the presence of other people, noise and evidence of inappropriate behaviour, another condition which was found to cause significant concern amongst recreational users in wilderness areas was the presence of clearly visible human-made structures (Stankey

1973). Buildings and other facilities are said to cause a visual intrusion on the naturalness of wilderness landscapes and depreciate users' perceptions of environmental quality (Daniel & Boster 1976). In a study by Becker (1978), campers and hikers were less tolerant and held consistently negative views toward developed sites and the presence of sanitary facilities along primitive trails. Perceptions about an inappropriate mix of facilities in particular types of environments have also been found to detract from visitors' enjoyment of a destination (Anderson & Brown 1984; Daniel & Boster 1976). A study conducted at Green Island by Pearce and James (1990) found that the naturalness of the infrastructure was an important consideration in tourists' enjoyment of activities. In other words, the more natural the appearance of structures, the less visual intrusion and the more positive the visitor ratings were.

Shafer and colleagues (1998) have undertaken preliminary research to assess how people perceive built facilities in marine settings. Findings reflected that those sites with more human-made objects were perceived differently by day-trip visitors. Specifically, respondents who visited a pontoon were more likely to rate built facilities as having a negative impact on their enjoyment. This study also found that the number of human-made objects in the water received the highest percentage of negative responses.

3.5.4 Summary

In summary, perceptions of crowding are more common when visitors:

- Encounter large groups of others
- Have multiple encounters with others
- Encounter more other people than expected
- Are seeking experiences centred on needs to escape crowds and to experience solitude
- Perceive that the activities of other people are likely to interfere with their own activities
- Believe that other people are seen as behaving inappropriately
- See evidence of other people's inappropriate behaviours
- Perceive the mix, nature and extent of built facilities as inappropriate

It should be remembered, however, that perceived crowding has not been found to play a major role in overall satisfaction with experiences (Kuss et al. 1990; Kuentzel & Heberlein, 1992).

3.5.5 Perceptions of Service Quality

Another area of research which is of relevance to understanding tourist and recreational use of protected areas is that of service quality. Service quality is relevant both to those visitors who experience a protected area with a commercial tour operation and those who visit independently. For all visitors it can be argued that the protected area management agency provides a service made up of the built facilities they provide, the interpretation programs they offer and the staff that are encountered as well as the quality of the environment itself. In the case of those visitors who experience the site with a tour operator then there is the extra element of the quality of the services provided by the tour company.

In an earlier section we reported on a study of visitors to the Great Barrier Reef in Australia which asked respondents to rate a series of features in terms of how positive or negative an influence the features had on their experience (Shafer et al. 1998). In this study the feature that had the greatest positive influence on experience was the helpfulness of the staff. In a US Forest Service (1998) survey of American outdoor recreationists, the highest importance ratings were given to the cleanliness of the facilities and the safety of the setting. Otto and Ritchie's (1996) study of visitors on a variety of tours found that comfort and safety items were the second most important items in terms of their influence on overall satisfaction. The most important items were the extent to which the tour provided opportunities to meet visitors' motives. In various studies of the relative importance of various factors on tourist satisfaction it has been found that important components are:

- The tour guides' knowledge and competence
 - The scheduling and organisation of the tour
 - The quality of the physical facilities of the tour.
- (Agrusa 1994; Geva & Goldman 1991; Quiroga 1990).

3.6 Outcomes

3.6.1 An Overview

A number of outcomes can be identified as resulting from the interactions between visitors and the protected environments. These outcomes can be organised according to the component of the system they most directly relate to. Thus there are outcomes for individuals such as overall satisfaction, achievement of goals, changes in conservation attitudes, and changes in subsequent behaviour. There are also outcomes for tour operations including financial returns, repeat and/or recommended business and changes in patterns of travel behaviour. For managers there can be changes in support for management actions and for communities there are a range of economic, social and cultural impacts. Finally there are environmental impacts.

Much of the published literature has been concerned with visitor satisfaction or dissatisfaction with experiences. There are also several reviews of the potential negative environmental impacts of tourism and recreation (see Hammitt & Cole 1998). While there is a large body of literature concerned with the economic, social and cultural impacts of tourism (see Pearce, Moscardo & Ross 1996, for a summary of this literature) much of it has

been focussed on regional destinations and not on visitors to protected areas specifically. There is also a large body of literature on the effectiveness of interpretation programs on visitor learning and attitudes but that has focussed mostly on determining the characteristics of the interpretation that are related to visitor enjoyment and learning. Few studies in this area have examined changes in attitudes and even fewer have examined changes in attitudes in cases where there is no interpretation available (see Moscardo 1998 for a review of this literature). These two topics and the topic of financial returns for operators represent major gaps in our understanding of visitor interactions with protected areas.

3.6.2 Outcomes for the Individual Visitor

3.6.2.1 Satisfaction

Much of the discussion on satisfaction has focussed on theoretical models to explain satisfaction, with surprisingly little empirical investigation of what are the things that contribute to visitor satisfaction. Instead, in the protected areas literature, the major focus of research has been on the consequences of dissatisfaction such as displacement and discontinuation. These are discussed in the next section.

One exception is a series of studies being conducted by Noe and colleagues in National Parks and protected areas in the US (see Noe 1999, for a review of this work). In this work, a distinction is drawn between instrumental and expressive components in visitor experiences. Instrumental components can be considered to be the means to an end, while expressive components are the end states that visitors seek. Thus expressive components are those parts of the experience that are related to the expected or desired benefits that people are seeking. Instrumental components are the physical and service features of the setting that allow those expressive components to be achieved. Instrumental components can include things such as the infrastructure and facilities provided, the information and access provided and the competence and responsiveness of staff. A series of studies have been conducted examining the interactions between these two sets of components and overall satisfaction. The most consistent findings are that the expressive comments make the greatest contributions to visitors' overall levels of satisfaction. Instrumental components become important when visitors are dissatisfied. This suggests that instrumental components may only be considered by visitors when the components fail to meet minimum expectations.

3.6.2.2 Displacement, Discontinuation and Product Shift

Researchers suggest that user's employ various coping strategies as ways of responding to their dissatisfaction with a nature based experience (Shelby & Heberlein 1986). The most common strategies that participants use are classified as displacement, product shift and discontinuation. Displacement is described as movement to new areas or sites due to perceived negative changes in the social, managerial or resource conditions of the recreation environment (Schreyer 1985). Displacement indicates a failure of present recreational opportunities to provide desired experiences. Displacement may be intrasite, whereby

people use an alternative location within the same site (Anderson & Brown 1984) or intersite, in which people leave an area presumably to participate in the same types of activities at a different site altogether (Becker 1978). Behavioural coping mechanisms such as displacement occur because recreation is largely voluntary, so people choose places that are satisfying according to their evaluations (Schreyer 1985). If a site is perceived as less than acceptable, because of overcrowding or resource degradation for example, users will move to other more remote sites. Other more tolerant recreationists will replace these users at the displaced site. It is possible that sites, once regarded as remote, will become popular over time due to increases in recreational demands or the absorption of displaced users. Recreationists may then react by adjusting to new conditions or finding a new site. However, in some circumstances the area may be unique and there may be no alternative substitute locations for recreational purposes. In this case displacement may not occur, and the user has to employ other options such as discontinuance or product shift.

When participants are dissatisfied with a site, they may either choose to continue using an area (continuance) or not to continue using it (discontinuance) (Backman & Crompton 1990). If people continue to use a site they have been previously displeased with, they may have gone through what researchers have called a 'product shift' (Shelby, Bregenzer & Johnson 1998). A product shift is a cognitive coping mechanism that involves a change in an individual's expectations and preferences with regards to a particular area used for recreation or leisure (Shelby & Heberlein 1986).

There are many factors or conditions that may contribute to displacement, discontinuance or a product shift amongst recreationists. Some of the most commonly cited factors influencing displacement include litter, noise and evidence of inappropriate behaviour and overuse (Anderson & Brown 1984). In terms of an area's social setting, displacement can be affected by conditions relating to increased density, crowding and facility development (Shelby et al. 1998). Increased numbers of other users bring about added social pressures and competition for space. Coming into contact with noisy users, seeing other people at entry points, encountering large groups and tourist parties and competing for a campsite, are all examples of some social conditions which increase the likelihood that recreationists will be displaced from an area (Kaltenborn & Emmelin 1993).

Evidence of adverse changes in the physical environment or resource setting has also been reported as a significant cause of displacement. Modification to the physical make-up of the natural environment such as damaged trees, social compaction, worn-out campsites, erosion of shorelines and river banks are some of the types of negative impacts influencing displacement (Anderson & Brown 1984). Displacement or product shift may also occur as a result of changes in the direction of the management setting, for example limited permits, new regulations and increased law enforcement (Shelby et al. 1998). Some investigations have found that displacement appeared to be very much related to user characteristics, such as activity specialisation and the number of years they had participated in activities at the site (Roggenbuck et al. 1993). It is interesting to note the factors that have had little impact upon displacement, which include cost, difficulty in access, weather and lack of challenge. The total monetary cost of participation has however, been identified as a variable that influences discontinuation (Shelby et al. 1998).

Much displacement research has been focused on examining the relationship between the concept of crowding and displacement. Nielson and Endo (1977) actually described displacement as the behaviour where people leave a crowded area for a less crowded area. Although Nielson and Endo's (1977) findings identified crowding as the primary motive for displacement, other factors quite unrelated to user density and perceived crowding also influenced displacement such as searching for more challenging rivers. Becker (1978) supported suggestions that crowding is one of the main reasons people leave one area to participate in recreational activities elsewhere. In Becker's study, boaters moved from areas perceived as being of high use, to more acceptable low use areas, illustrating that the presence of others appeared to be an important cause of displacement for river users. In similar findings, Shelby and others (1998) reported that 22% of Illinois River users in Oregon had been displaced from the nearby and more popular Rogue River. A review of findings shows that many river users moved to new areas of declining densities, however causal links between crowding and displacement cannot be made because in many of these studies respondents perceptions of crowding was not measured.

Other research has shown mixed support for the notion that people are displaced from an area because of perceived crowding. For example, Kuentzel and Heberlein (1992) found that people were not willing to give up boating at the Apostle Islands in America because of crowding. In a span of ten years (1975-1985) the number of boaters in the area had quadrupled. In spite of this increase in user numbers, Apostle Island boaters were more inclined to adjust their activity patterns rather than stop activities altogether. In a study of the Rogue River, 34% of users reported that they would change the way they thought about the river before becoming displaced because of unexpected encounters with other recreationists (Shelby et al. 1998). Additional research undertaken by Robertson and Regula (1994) showed that boaters avoided specific reservoirs because of the high-use levels, and in doing so appeared to make the choice to accept high siltation impacts in exchange for lower use levels at the lake. Consistent findings have been reported by other studies whereby recreationists had changed the way they used an area, altered their itineraries, avoided peak times, planned trips when fewer other people were expected and made trade-offs in site characteristics, before being displaced because of high numbers of other users (Hammit & Patterson 1991; Anderson & Brown 1984; Becker 1978). Displacement arguably, is not an all or nothing proposition. It seems that there are degrees of displacement and different levels of 'product shift'.

4.0 A SUMMARY OF RESEARCH ON TOURIST AND RECREATIONAL USE OF PROTECTED AREAS

The available published literature has been heavily focused on understanding visitor motivation, specialisation and perceptions of crowding. In the case of crowding this is somewhat ironic as the two major conclusions that can be drawn are that crowding is rarely directly related to the number of people in a setting and that when visitors do report crowding this is rarely significantly related to overall satisfaction. Much of the published research has been conducted in forests and terrestrial National Parks in North America with independent visitors.

Table 5: Summary of Existing Published Research Into Visitor Uses of Protected Areas

Category of Variables	Extensive Research	Some Research	Little or No Research
Visitor characteristics	Motives or expected benefits Specialisation or experience with activities	Social groups Experience with sites/places	Cultural backgrounds
Perceptions of the physical environment		Features associated with scenic beauty judgements in forests and some other northern hemisphere settings	Marine and southern hemisphere settings
Use density and crowding	Number of encounters Use conflict	Noise Evidence of inappropriate behaviour and impacts of others	Social group identity
Perceptions of service		Quality of facilities and infrastructure Quality of staff interactions	Features of tour operations

Table 5 provides a summary of the main factors that have been researched in attempts to understand visitor behaviour in, and responses to, protected areas. Major gaps exist in our understanding of the outcomes of visitor experiences in protected areas. In particular there is virtually no published research that has systematically compared the relative contributions of a range of factors on satisfaction. Research into crowding has, for example, focussed on the relationships between various measures of crowding and satisfaction but has not compared crowding to other variables such as perceptions of the quality of the environment, perceptions of staff service or the quality of facilities an infrastructure. This makes it difficult to choose potential social indicators. In addition the lack of research in settings other than terrestrial parks and forests in North America means that there are possibly more indicators that have not been considered.

In general there is very little research designed to develop and test systematic measures of variables that could be used as indicators. The focus on North American parks and forests further means that there is little research available on the reliability, validity and sensitivity of social indicator measures.

Although it is clichéd to conclude a review with the statement that more research is needed, it is clear that in the case of human use of protected areas, much more research is required. In particular research is needed in three areas:

- Studies into the relative contributions of the full range of factors to outcomes such as satisfaction. Such work is necessary to choose the best indicators
- Studies into outcomes other than satisfaction, displacement and discontinuation
- Studies aimed at refining measures for social indicators

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