GREAT BARRIER REEF
MARINE PARK AUTHORITY

RESEARCH PUBLICATION NO. 80

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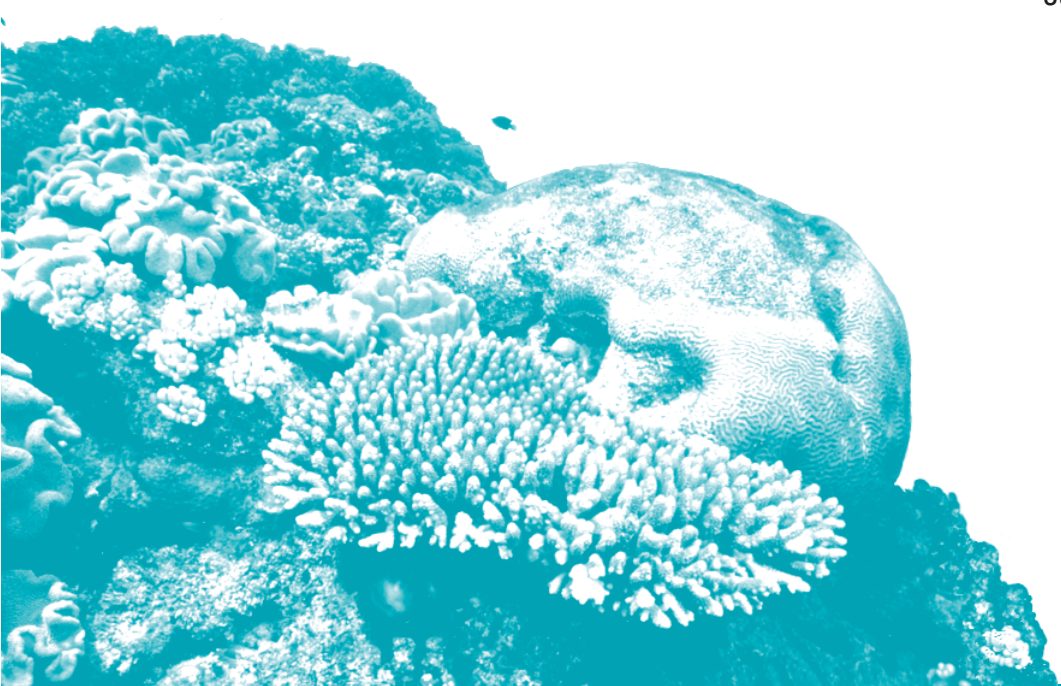

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EXECUTIVE SUMMARY

The goals of this project were to:

- Identify potential social indicators to monitor aspects of tourist and recreational use and impacts on human use of the Great Barrier Reef Marine Park (GBRMP) and World Heritage Area (WHA); and
- Design a broad monitoring program for these social indicators.

This report provides the background for, and details, of the proposed social indicators monitoring system for tourist and recreational use of the Great Barrier Reef (GBR).

This report uses the terms:

- **Commercial tour visitor -** to refer to visitors accessing the GBR with a commercial tour operator; and
- **Independent visitor** - to refer to visitors accessing the GBR with their own transport or with transport provided by family or friends.

Monitoring is defined as a type of descriptive knowledge and it involves the regular measurement of factors relevant to management actions and objectives.

Good indicators in a monitoring system need to be:

- measured regularly;
- cost effective and relatively easy to measure;
- comparable over time;
- reliable, accurate and sensitive to changes; and
- easy for managers to understand and use.

A review of both the relevant international literature, and information available on tourist and recreational use of the GBR, identified a number of variables that can influence visitor satisfaction and behaviour including:

- visitor characteristics such as place of residence, age, motivation and experience;
- on site experiences such as activity participation and encounters with other users;
- perceived quality of the natural environment including contact with wildlife, scenic quality and perceived human impacts; and
- perceived quality of tour operations.

The literature review and workshop conducted with the GBRMPA staff also identified some issues or challenges in developing a social indicators monitoring system.

These were:

- measures of actual patterns of use;
- ensuring that information from the monitoring was easily available to managers;
- having standard measures of key variables; and
- the need to have stakeholder support for any monitoring system.

After a review of various data collection options and locations, a monitoring system is proposed which is made up of three surveys.

INTRODUCTION

The Great Barrier Reef extends approximately 2300 kilometres along the north-eastern coast of Australia encompassing an area of almost 350 000 km. Representing the largest area of planned conservation in the world, the Great Barrier Reef is a biological treasure of coral reefs and continental islands which support a diversity of wildlife and marine life (Ottesen 1988). Proclaimed and zoned as a Marine Park in 1975, the Great Barrier Reef's significance was reaffirmed in 1981 when it was recorded on the list of World Heritage areas.

The Great Barrier Reef Marine Park Authority (GBRMPA) is the lead management agency responsible for the care and development of the Great Barrier Reef Marine Park (GBRMP) and the World Heritage Area (WHA). The GBRMPA's primary goal is to ensure the environmental well being of the Great Barrier Reef whilst providing for the wise use, understanding and enjoyment of the region (Craik 1992).

The Great Barrier Reef is an area of significant value not only environmentally, but socially, culturally and economically. In a recent study the Great Barrier Reef was reported to be a well-recognised and an important symbol in the eyes of the Australian public (Huf & Douglas 1995). Established as a multiple-use protected area, the GBRMP supports a variety of uses, including tourism, shipping, commercial fishing, cultural and recreational activities (Kenchington 1992). As managers, the GBRMPA strives to allow equitable access to all its users whilst attempting to ensure that the areas values are protected.

Challenges for the Great Barrier Reef Marine Park Authority

With growth in tourism predicted to continue into the foreseeable future (Driml 1994, Williams 1996) and increases in recreational use, and development of areas adjacent to the Marine Park, concerns have been raised about the ability of the Marine Park to sustain desired levels of biophysical and social quality. Evidence of anthropogenic impacts on reef environments, dating back 100 years, have been well-documented (Rasmussen, Cuff & Hopley 1992; Woodley 1992). This information has provided managers with an understanding of the nature and scale of the regions biodiversity and the types of uses with the potential to have an effect upon reef and island environments. Unfortunately, the Marine Park social environment has not received the equivalent amount of research attention. Knowledge about the relationship between human use and its influence on social values and amenity within the GBRMP is limited. Managers recognise that natural and social systems relating to the Great Barrier Reef environment are interdependent, and a greater emphasis is now being placed on how to achieve a balance between use, enjoyment and biophysical sustainability.

Management involves decisions about the types and amounts of use, access to a location, and the kinds of facilities provided. The GBRMPA enables selective control of activities at different sites through the implementation of zoning provisions. Any current or proposed use of the Park is assessed by GBRMPA in terms of potential impacts on the amenity of users in an area or areas adjacent to the site (Wachenfeld, Oliver & Morrissey 1998). The protected area management literature has long recognised that managers have a significant influence on user experiences through the way in which they provide settings and constraints for different activities (Hammitt & Cole 1998). From current trends it is clear that the Great Barrier Reef will continue to

attract more use in the future. Increases in user numbers may lead to significant amenity and biological losses, potentially degrading the very resource on which many recreational and commercial pursuits rely. It is essential that managers identify the factors that are the most crucial in changing the nature of peoples use and amenity of Marine Park areas. One tool to assist in maintaining the character and quality of users experiences is the development of appropriate social indicators that can be monitored for acceptable change over time.

About This Project

The goals identified in the project brief were to:

- identify relevant social indicators to monitor aspects of human use and the impacts on human use from the GBRMP and WHA; 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 approach taken involved the following steps and was based on the assumption that the major focus would be on tourism and recreational use of the GBR.

Stage 1: The Identification of Potential Indicators

This stage involved an extensive review of the available literature on tourist and recreational use of protected natural areas. This stage also involved a review of the information available on tourist and recreational use of the GBR including targeted analyses of data available to the authors through CRC Reef research projects. The aim was to identify a set of potential indicators that could be used and to assess their relevance to the GBR setting.

Stage 2: Examine Management Issues and Needs

This stage involved a workshop with the staff of the GBRMPA with the aim of identifying and discussing management information needs and issues related to the use of social indicators information.

Stage 3: Design of the Social Indicators Monitoring System

This stage required the authors to collate the information from the first two stages into a proposed system for monitoring tourist and recreational use.

During the process of reviewing the existing literature and conducting a workshop with staff from the GBRMPA three challenges emerged.

Firstly, the review of existing literature did not provide a set of clear and specific potential social indicators. Much of the literature discussed the need to have social indicators and the stages involved in identifying social indicators but there was little evidence to support the selection of any specific indicators. In particular information on use and amenity in the GBRWHA was very limited. A very large number of potential indicators could be identified but there was very little evidence to base their relative importance or usefulness on.

Secondly, it was suggested in the GBRMPA workshop that development of social indicators to measure use and amenity required some understanding of the nature of use, and that research into this aspect of use of the GBR was limited.

Thirdly, there was need for managers to understand how any regional and site specific social monitoring program for tourism and recreational users could fit in to a broader framework for understanding human use of the GBRWHA.

In other words the foundations assumed to exist in the literature for the development of a small set of specific social indicators were not strong and there were few examples of systems in use elsewhere which could be used as models for the GBR. Thus the goals of the proposal were amended to propose a general system for tourist and recreational use of the GBR which could be used as a model for the development of social indicator monitoring systems for other uses.

The amended goals were to:

- identify potential social indicators to monitor aspects of tourist and recreational use and impacts on this use of the GBRMP and WHA; and
- to design a broad monitoring program for these social indicators.

About This Report

This report is one of a two-volume set and is focussed on the development of a reef wide social monitoring program. As such it includes the following components:

1. An overview of the types of knowledge, including monitoring, that are useful for protected area managers;
2. A status assessment of what is known about tourist and recreational use of the GBR;
3. A discussion of issues associated with understanding and monitoring tourist and recreational use;
4. A proposed social indicators monitoring system for tourist and recreational use of the GBR; and
5. A discussion of the monitoring of other use and users.

Several of these components are based on an extensive review of relevant international literature which is provided in the second volume, *A Review of Research into Tourist and Recreational Uses of Protected Natural Areas*. Each volume has been written to stand-alone, so some content is repeated in both.

The first three components provide the background and foundations for the fourth and major component, the proposed social indicators monitoring system. It is possible to read the proposed social indicators monitoring system without reading the other components.

USABLE KNOWLEDGE FOR PROTECTED AREA MANAGEMENT

The concept of 'usable' knowledge is taken from the United States National Park Services plan for developing social science in the management of National Parks (Machlis 1996). In this plan Machlis describes four types of 'usable' knowledge.

Information - which includes description and monitoring of users and use

In order to manage users, managers have to be able to identify them and to understand what sorts of outcomes they seek. Knowing user characteristics is also important in assessing the likely impacts of changes in management actions or in other uses it also provides guidance for the development of public participation and education / interpretation / extension activities. It is important to describe users in terms of:

- socio-demographic variables such as age, residence, income levels and sources, social group membership, use of information sources, and cultural backgrounds; and
- psychological variables including motivations or reasons for use, experience with the site and the activities engaged in, personal values relevant to use, attitudes towards management, understanding of management actions and strategies and the importance of the use to quality of life.

Managers also need to have information on patterns of use including the location, extent and temporal aspects of use.

Insights - which refers to understanding the existing patterns of use and user responses to the management of the setting

Describing users and their patterns of use is not the same as understanding use. Managers need to know not only who does what and where, but also why users chose particular locations, times and levels of use. Understanding the factors that contribute to the outcomes of use, such as satisfaction, changes in patterns of use and perceptions of the quality of the experience available, is also critical if managers aim to be able to influence these things. Insights can also be used to improve and adjust monitoring systems.

Predictions - the use of information and insights to forecast future patterns of use and to predict likely impacts of changes in use or management

Knowledge of current patterns of use and the factors that create these patterns can be useful:

- in building predictive models for determining likely future use;
- for considering the likely impacts of changes to management actions; and
- for a better understanding of biophysical impacts of use.

Solutions - the development and evaluation of management alternatives

Research in this category involves using knowledge from the previous three categories to design or develop new management strategies and to evaluate these and/or other proposed changes to management actions.

The Role of Monitoring

In Machlis's system, monitoring is a type of descriptive knowledge. It is the regular measurement of factors relevant to management actions and objectives. Thus if a management objective is to encourage greater conservation awareness amongst visitors to a site, then they might chose to monitor visitors' conservation attitudes.

Monitoring is a core component of many management models (see *A Review of Research into Tourist and Recreational Uses of Protected Natural Areas* for a more detailed review of major management models). 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 these target levels.

While the approach set out in the previous paragraph 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 some 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. Such a system also assumes that managers have at least a basic understanding of the nature of use and users. Given the limited information available on any of these topics it not surprising that it is very difficult to find any examples where a complete monitoring system has been developed and implemented.

In summary, the development of a social indicators monitoring system for the GBR requires the following:

- some knowledge of the nature of tourist and recreational use of the GBR;
- some insights into the factors which significantly influence visitors' experiences and responses to the available experiences; and
- some insights into the effectiveness and reliability of possible indicator measures.

CURRENT STATE OF KNOWLEDGE ABOUT TOURIST AND RECREATIONAL USE OF THE GBR

Definitions

The following discussion is based upon the definitions of tourism and recreation used by the World Tourism Organization (1997) as follows:

- **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; and
- **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 often referred to as **recreationists** rather than tourists, even if they are staying overnight.

To avoid confusion this report will use the following terms:

- **Commercial tour visitor** to refer to visitors accessing the GBR with a commercial tour operator; and
- **Independent visitor** to refer to visitors accessing the GBR with their own transport or with transport provided by family or friends.

Review of Available Research

Patterns of Commercial Visitor Use

The Environmental Management Charge records (EMC) provide information on the extent and location of GBR use by visitors travelling with permitted commercial reef tourism operations. This data set also provides information on the pattern of this use over time and its distribution across different sizes and types of tour operation. An investigation of this data reveals the majority of commercial tourist use occurs out of Cairns, Port Douglas and the Whitsundays, and that large day trip boats travelling to specific reef sites are the major way tourists access the GBR. This data does not, however, provide information on activity participation, the origins or characteristics of the tourists, use of the reef by tourists with their own boats, repeat visitation or visitor responses to the available experiences.

Some information on these aspects of use is available from the research conducted by the James Cook University (JCU) Tourism Program funded by the Cooperative Research Centre for the GBRWHA (CRC Reef). This research specifically targets visitors on commercial tour operations to the GBR. This data set provides socio-demographic and psychological profiles of reef tourists as well as their patterns of reef use, future reef use intentions, and evaluations and perceptions of their reef experiences. This data provides information, for example, on patterns of repeat reef visitation which can be used to develop models to predict likely changes in future reef use (See Moscardo 1999 and Pearce and Moscardo 2001 for further details). Information is also provided on activity participation by commercial tour visitors (see Table 1). The results reported in Table 1 show wide variation in activity participation for visitors from different places.

Table 1. Patterns of Reef Tourist Activity Participation

	Qld	Other Australia	North America	Europe	Asia
Snorkel	48%	59%	70%	69%	56%
SCUBA dive	17%	14%	45%	27%	19%
Sail	20%	15%	24%	27%	6%
Fishing	27%	18%	13%	8%	6%
Glass Bottom Boat	32%	46%	34%	25%	43%

Patterns of Independent Visitation

Until recently there has been limited systematic research into levels and patterns of recreational use. Research currently being undertaken by the GBRMPA, as part of the collection of data to guide the Representative Areas Program, will provide some information on the spatial distribution of recreational use, particularly recreational fishing. In addition information is available from two telephone surveys of residents of the coastal regions adjacent to the GBR that have been conducted by the JCU Tourism Program team and funded by CRC Reef. A technical report on this data is currently being compiled but some examples of the information available are presented in Table 2.

Using the results of these telephone surveys the researchers estimate that there are approximately 2.1 million visits to the GBR taken by regional residents independently of a commercial tour operation. Another finding of this research is that 42% of the regional residents surveyed used a commercial tour operation to access the GBR on their most recent visit.

Recreational Fishing

It has been suggested that there are over 24 000 privately registered vessels which fish in the GBR (Wachenfeld, Oliver & Morrissey 1998). Most research attention on fishing has a biological emphasis or has focused on the impact fishing has had on the fishery resource through assessment of catch rates. The development of a Recreational Fishing Information System (RFISH) by the Queensland Fisheries Management Authority (QFMA) is one of the first efforts to compile information about recreational fishing Queensland wide. Nevertheless, little is known about recreational users and their fishing activities within the boundaries of the GBRMP.

Table 2. Some Examples of Information Available on Reef Recreation

The survey (of the regional residents) found:
- 22% had not ever been to the GBR
- 36% had not been in the last 12 months
- 12% had been once in the last 12 months
- 18% had been two to five times

On their most recent trip
- 42% went to the GBR with a commercial tour operator
- 11% went to the GBR with a ferry / barge
- 27% went with their own / friends / family transport

The five most common activities on their most recent GBR visit were
- Fishing (27%)
- Snorkelling (23%)
- Swimming (14%)
- Nature / wildlife Enjoyment / appreciation (11%)
- Social activities (6%)

Of the most recent GBR trips:
- 8% were less than half a day
- 61% were day trips
- 8% were overnight trips
- 12% lasted two to three nights
- 13% lasted four nights or more

Source: data made available from CRC Reef Project B2.5: Public Perceptions of the GBR and its Management

Characteristics of Visitors

The CRC Reef tourist use research and regional telephone surveys provide some information on the socio-demographic characteristics of reef visitors.

In the case of the surveys of visitors on commercial tour operations there is also information on visitor motivations or expected benefits. This research found, for example, that the expected benefits from a reef trip were ranked as follows from most to least important:

1. See the beauty of the GBR
2. See coral in its natural surroundings
3. See / swim with marine life
4. Get close to nature
5. Do something new and different
6. To have a learning / educational experience
7. Fun and excitement
8. Rest and relax
9. Be with friends / family

The patterns of expected benefits or motivations reported above are consistent with the results of other studies of reef visitors. These other investigations report that 'experiencing nature' is the greatest benefit provided to reef visitors (Ormsby & Shafer 1999; Shafer, Inglis, Johnson & Marshall 1998). Ormsby and Shafer (1999) reported that tourists to Whitehaven Beach evaluated the natural environment as the most important influence on their day trip and the thing they received the most benefit from. Reef visitors in a study by Shafer and colleagues (1998) scored the beauty of nature, being in a natural place and learning about nature as the most important benefits obtained from their trip. Interviews with visitors to Lady Musgrave Island found that when visitors were asked to talk about their trip, their most positive statements related to the physical environment, contemplating nature and the reef and island ecosystems. (Scherl et al. 2000). In all these studies benefits relating to rest, relaxation and escape were also reported as important expected benefits.

Little information is available on the psychological characteristics of recreational fishers. It is often assumed that the reason people fish is primarily to catch fish, and the amount of enjoyment received from a fishing trip is proportional to the quantity and size of fish caught (Fedler & Ditton 1994). While more recent research has shown that the desire to catch fish is certainly one of the major goals of anglers, non-catch motivations associated with the experience are also very important (PA Management 1984; Johnson & Orback 1986; Fedler & Ditton 1994). In a recent Queensland Fish Management Authority (QFMA) study, the strongest motivations for pursuing fishing activities by Queenslanders, and more specifically GBRMP anglers were 'to rest and relax', 'to enjoy nature' and 'to be outdoors (Ormsby 1999). These non-catch motivations which related to psychological, physiological and natural experiences were rated as being of higher importance than catch dominant motives.

Although previous findings illustrate the significance of non-catch motivations, catching a fish was still very important to GBRMP anglers surveyed in the QFMA recreational fishing study (Ormsby 1999). A preliminary investigation of recreational fishing activities in the North Queensland area offshore from Ingham reflected that catch related experiences were some of the strongest aspects in the overall rating of a fishing trip (Ormsby 1998). According to results from QFMA's study, fishing for the 'pleasure of catching a fish' was very important, however the majority of respondents agreed that a fishing trip can be successful 'even if no fish are caught' and 'if all the fish caught aren't kept' (Ormsby 1999). These findings strongly suggest that the pursuit of fishing was not about catching fish on every trip, but having the opportunity to be able to catch a fish (Ormsby 1999). The social aspect of fishing was also very important to the majority of GBRMP anglers surveyed (Ormsby 1999). Most trips were a single day outing accompanied by friends and family members. While boaters wanted to get away from other people, they preferred to be fishing with friends and family.

Managers have little information available to them about the site preferences of recreational boaters and fishers in the GBRMP. A review of related GBRMP research shows that the reasons why recreational boaters chose to use Shoalwater Bay in South Queensland are related to the quality of fish stocks and the amenity provided by the area (Jennings 1996). By amenity, recreational users were referring to the scenery, and the peace and solitude that the environmental setting provided. Offshore Ingham boaters preferred to visit particular sites because of their proximity to local towns, sheltered waterways, good fishing and the aesthetic qualities offered by the surrounding environment (GBRMPA 1998). Shafer and Benzaken (1998) surmised that the most frequent users of the Ingham offshore waters, visited areas which were the most accessible. It would be valuable to explore in more detail the location by recreational boaters and anglers most visited, and to obtain some information about indicators of site preference on the GBRMP.

Some other available information on reef visitor characteristics includes images of the GBR (Moscardo 1999), levels of knowledge of minimal impact behaviours (Moscardo, Woods & Pearce 1997) and beliefs about the environmental status of the GBR and threats to this status (Green et al. 1998).

Factors That Influence Visitors' GBR Experiences and Satisfaction

Some of the previously noted studies also provide some insights into the relative importance of various factors that influence reef visitor experiences and their satisfaction with these experiences. Shafer and colleagues (1998) asked their respondents to rate the amount of influence that various setting features had on their experience. The features are presented in Table 3 from the most positive to the least positive impact. As can be seen, aspects of the natural environment and reef tour operations staff were the most important influences on visitors' experiences.

The research conducted by the JCU Tourism Program team on commercial tour visitors investigated the relative contributions of a series of factors on visitors' overall satisfaction it found that overall satisfaction was related to the:

- levels of experience with coral reef settings;
- place of residence;
- type of experience sought or expected;
- tour staff ability and friendliness; and
- quality of interpretation / information available.

Table 3. Features That Influence a Reef Experience

Condition Item	Mean*	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

*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.

The JCU Tourism Program commercial visitor research also found that aspects of the natural environment, including the coral, fish and other marine wildlife, were the most common things reported by people as the 'best' features of their experience (Moscardo 1999).

In the telephone survey of regional residents the JCU Tourism Program team found that a regional residents satisfaction with their most recent GBR trip was significantly related to:

- the perceived quality of the environment at the visited site;
- the length of the trip;
- their age; and
- the way in which they accessed the reef.

Limited research undertaken on the GBR provides some evidence that 'other people' have the potential to influence a visitor's satisfaction. In a recent study, Shafer and Benzaken (1998) reported that GBR users felt that human presence (i.e. perceived presence of other people in the area) was the most important condition contributing to wilderness quality of the Marine Park. In a study undertaken at several reef sites, Shafer and others (1998) identified 'the number of other people on the trip' as the most promising condition indicator. In this investigation 12% of visitors scored 'the number of other people' as having a negative influence on their experience. In a study of Whitehaven Beach, 12% of day use visitors perceived that there were 'too many people' on the beach (Ormsby & Shafer 1999). In research by Gooch (1991), 21% of recreationists said there were more visitors than they expected on Whitehaven Beach.

Indicators Suggested in the International Literature

The companion report to this one (*A Review of Research into Tourist and Recreational Uses of Protected Natural Area*) provides a detailed review of the available international literature on tourist and recreational use of protected natural areas. That review found that visitor behaviour in, and satisfaction with, protected areas was influenced by:

- visitor characteristics especially motives and levels of experience with both the places visited and activities participated in, and cultural background;
- visitors' perceptions of the quality of the physical environment especially judgements of scenic beauty and human impacts on the setting;
- viteractions with other people including tour and park staff;
- effectiveness of interpretation programs;
- perceived quality of the service provided by tour operations; and
- perceived quality of the facilities and built infrastructure.

In addition a substantial amount of the available literature has focussed on understanding perceptions of crowding. The overall conclusion of this work is that perceptions of crowding alone do not seem to be strongly associated with visitor dissatisfaction and is clearly not directly related to the number of other visitors. It appears that perceptions of crowding are related to visitor expectations, the type and behaviour of other visitors encountered and perceptions of human impacts on the physical setting. It also seems that there are several responses to increasing levels of use in protected areas including:

- **discontinuation,** where visitors stop using an area completely;
- **displacement,** where users move to other parts of an area with lower use levels; and
- **product shift**, where users adapt their expectations to suit the situation encountered.

One of the challenges to studying the potential impacts of increasing use levels is that users who are displaced or who chose to discontinue their use will no longer be in the setting being studied.

Summary

A number of key points can be made about the research reviewed in the previous sections.

Firstly, it is clear that there is some information on the levels and patterns of tourist and recreational use. In the case of recreational use, the data is very recent and not yet widely available.

Secondly, there is some preliminary knowledge available with regard to Machlis category of insights. That is, some researchers have begun to investigate the reasons why the existing patterns of use are the way they are.

Thirdly, from the available information the following have been identified as important influences on visitor satisfaction and behaviour:

- Visitor characteristics
    - usual place of residence;
    - cultural background;
    - age;
    - motivations / expected benefits;
    - experience with the site and activities; and
    - knowledge of the site and minimal impact behaviours.

- Actual on site behaviour
    - activity participation; and
    - encounters with other users.

- Perceived quality of the natural environment including contact with wildlife, scenic quality and perceived human impacts; and

- Perceived quality of the reef tour operations
    - staff friendliness and competence; and
    - amount and quality of information / interpretation.

A SOCIAL INDICATORS MONITORING SYSTEM FOR TOURISM AND RECREATIONAL USE OF THE GBR

Key Issues to Consider

The review of the literature and the workshop with GBRMPA staff highlighted a number of issues or challenges in developing a social indicators monitoring system for tourist and recreational use of the GBR. The key themes that emerged were:

- **The need to include measures in the system to provide information on or descriptions of patterns of use**
  In the existing literature on protected area management, most of the discussion of indicators tends to be focussed on measures of the outcomes of the visitor experience or on potential areas of negative environmental or social impacts. Such systems are usually based on North American research and examples.This emphasis may reflect the fact that in many US protected areas visitor numbers and patterns of use are measured by a variety of means including surveys of permit holders, and entry and exit surveys. Recreational users in the GBR do not require permits for their activities and there are multiple entry and exit points making it very difficult to use these options to track patterns of use.

- **The need to ensure that information collected in a monitoring system is easily available for managers to use**
  The GBRMPA is currently exploring options for the design of GIS information systems that could provide all managers with easy access to information about a range of types of use. This will require the development of a standard protocol for GBR researchers which provides guidance on how data should be coded and entered into data bases. Currently there is no standard approach and this makes it difficult to collate the available information.

- **The need for standard measures of key variables**
  Another obstacle to the use of the available information on tourist and recreational use of the GBR is that there are few variables that are measured in any standard fashion. To date there have been a number of site and activity specific studies conducted in the GBR region but it is currently not possible to combine, collate or compare these data sets. Each individual study is site or activity specific and often has a small sample size. If some standard measures were common to these studies they could be combined to provide larger and more comprehensive data sets.

The workshop with the GBRMPA staff suggested some variables that should be measured in a standard fashion. These included:

- the location of the data collection (if collected on site) or the location of the reef experience or activity being described;
- the type of tour operation (for visitors on commercial tour operations) or the type of transport to the GBR (for independent visitors); and
- the type of setting preferred by the users (with setting descriptions to match the settings in use in the plans of management).

Characteristics of good indicators

Good indicators in a monitoring system need to be:

- measured regularly;
- cost effective and relatively easy to measure;
- comparable over time;
- reliable, accurate and sensitive to changes; and
- easy for managers to understand and use.

It must also be stressed that these indicators are meant to describe what is happening, not to explain or predict patterns of use.

The need for stakeholder support for the monitoring system

One of the lesson learnt in those situations where managers have attempted to develop and use any type of monitoring system is that the stakeholders need to support the use of the system. This support is necessary for two reasons.

Firstly the measurement of many aspects of use of protected natural areas will usually require the cooperation of stakeholders either in providing access to visitors or through conducting the data collection themselves.

Secondly, stakeholders have to believe that the system is sound and equitable and understand how the information gathered will be used to support management decisions.

Suggested Data Collection Options

Given the previously listed constraints and requirements for indicators and monitoring systems, the main methodological options are structured visitor surveys or interviews. Information on other major social science data collection techniques can be found in appendix A.

Surveys are the most widely used method of collecting data in the social sciences (Singleton et al. 1993). In a typical survey, the researcher selects a sample of respondents and administers a standardised questionnaire to them. Sometimes respondents complete the questionnaires themselves and other times the interviewers ask questions and record answers. In order to enhance the reliability of the data, the procedures tend to be standardised for all respondents (Singleton et al. 1993). Surveys may be used for descriptive, explanatory or exploratory purposes (Babbie 1989), and are excellent for measuring attitudes, intentions and beliefs from either a representative sample or a total population (Wadsworth 1997). Survey research in general can be a very efficient data-gathering technique, in terms of economy and the amount of data that can be collected (Babbie 1989).

Three main options exist with regard to the administration of surveys. These include:

- face to face;
- telephone; and
- mail.

Face to Face Surveys/Interviews

A face-to-face interview is one of the oldest and most highly regarded methods of social research. This data collection technique involves the administration of a survey in which the interviewer questions an interviewee using a structured set of questions (Baker 1994). Two options are available; either the interviewer asks the questions and records the answers, or the interviewer explains the survey and gives the respondent the survey form to complete. Face-to-face interviews typically obtain high response rates (especially when compared to mail surveys), and overall this means less bias is introduced into the data. Visual aids such as photographs, drawings and response option cards can be presented providing another means of collecting information (Singleton et al. 1993).

There are several advantages of using an interviewer to administer a survey:

- the interviewer can ensure that respondents attempt to answer all questions and don't skip over questions, as can occur in a self-administered survey;
- the interviewer can clarify any questions or interpret more complicated questions that the respondent doesn't fully understand; and
- in the case of the interviewer asking and recording the questions, they can probe for answers which generally decreases the number of "don't know" responses (Singleton et al. 1993).

The greatest disadvantage of face-to-face surveying for a monitoring system is the cost (Babbie 1989). Conducting interviews with a large sample of individuals can be expensive in terms of recruiting, training and supervising personnel. Interviewer wages and travel expenses can also become costly.

Mail Surveys

In comparison to face-to-face interviewing and telephone surveying, the self-administered mail format is the least expensive of the data collection techniques. No interviewers or supervisors are needed, there are no travel or phone expenses, and very little office space is required (Singleton et al. 1993). It is possible to obtain a very large sample size, and provides access to those people who may be difficult to reach in person or by telephone (Singleton et al. 1993). The anonymity and privacy of mail surveys may prompt respondents to provide more candid responses, especially to sensitive or controversial issues (Babbie 1989).

Mail surveys, however, receive a notoriously low response rate (Babbie 1989). While interviewer bias is eliminated, so are the advantages of using an interviewer. There is no opportunity to clarify questions, probe for more adequate answers or control the conditions under which the questionnaire is completed or even who completes it. Compared with personal interviews, more questions are filled out incorrectly or left unanswered when using mail surveys (Dane 1990; Singleton et al. 1993).

Telephone Surveys

A telephone survey follows most of the same guidelines as interviewing in a face-to-face situation. The interviewer asks a series of prescribed questions to a person over the phone and records their answers on the survey form (Babbie 1989). In comparison to a face-to-face interview, the language used in a telephone survey may need to be a little different, and require a few more verbal clarification statements. Trained interviewers proficient in the use of the surveys interview schedule are essential (Singleton et al. 1993). Two advantages of undertaking telephone surveys are substantial savings in time and money (Singleton et al. 1993). They are cheaper to carry out, require less time and effort, and smaller staff numbers than face-to-face interviewing (Baker 1994). It is easier to access certain populations by telephone than to go out and interview people in their homes or in the street. Unlike mail surveys, interviewers can clarify misunderstood questions and probe for answers to obtain a better response. Telephone surveys are more impersonal than face-to-face interviews which means that the respondent may feel more willing to divulge their views about certain issues (Baker 1994; Babbie 1989).

Telephone surveys are, however, prone to sampling limitations especially with regard to those people who don't have telephones or who have unlisted numbers. In terms of sampling quality, the telephone survey mode falls between the face-to-face interview and the mailed questionnaire (Singleton et al. 1993). Another disadvantage of the telephone interview is the relative ease with which the respondent can break off the interview or simply hang up (Dane 1990). The telephone survey mode lacks the advantages of the face-to-face mode with regards to the types of questions that can be asked. Complex questions should be avoided and open-ended questions yield shorter, less complete answers over the telephone (Dane 1990). Because respondents can't see the interviewer in person, they may lack motivation and this may lead to higher rates of non-response to some questions (Singleton et al. 1994).

Table 4. A Summary of Advantages and Disadvantages of Survey Techniques

	Face to Face	**Telephone**	**Mail**
Response rate •	***	**	*
Completion rate •	***	**	**
Cost	**	***	*
Question flexibility	**	*	***
Time required	**	***	*
Location options	Range of locations	Off site only	Range of locations

• Response rate refers to the number of target respondents agreeing to participate in the survey.

• Completion rate refers to the number of questions in the survey completed.

Suggested Data Collection Locations

Table 4 provides summary of the various tradeoffs between the three different survey techniques and includes a discussion of location of data collection. For an area such as the GBR three main types of data collection locations exist:

- at specific reef or island settings (on site);
- at key entry / exit points, such as boat ramps, jetties and marinas (key points); and
- at other places where users can be found, including their place of residence, major transport nodes or gathering places such as shopping centres and other tourist attractions (off site).

As with the types of survey technique, there are advantages and disadvantages associated with data collection in each of the three different types of location. On site surveys will not capture those visitors who have discontinued or shifted their use. For low use sites it may be impossible to gather data from a sufficiently large sample size for reliable results. On site surveys are, however, conducted when the experience is still fresh in the minds of the visitors and so responses may be more accurate. Telephone surveys are conducted off site and this can provide an advantage in that it is possible to identify those users who have discontinued or changed their patterns of use. On the other hand, telephone survey samples cover a wide range of users who vary in terms of their amount of use, from none to frequent and in terms of specific locations for use. This can mean that a very large sample may be required so that enough users for specific sites are included. Surveys conducted at key points offer something of a compromise with the possibility for some displaced users to be included as well as the opportunity to survey visitors to low use sites.

It can also be argued for the GBR that different locations are likely to provide different access to different types of users. On site surveys should gather information from both commercial tour and independent visitors. Key point surveys conducted at boat ramps will favour independent users, while key point surveys conducted at major tourist attractions and boat departure points will provide a better coverage of commercial tour visitors. Off site surveys such as regional telephone surveys will favour independent visitors.

The Proposed System

The proposed system contains three component parts which are described below. The system is designed to have overlapping components so that the full range of tourist and recreational use is monitored. This is consistent with the concept of triangulation which supports the use of multiple forms of measurement which can allow the validity and reliability of results to be confirmed (Brewer & Hunter 1989; Woodside & Sakai 2000). In addition the use of a range of locations for data collection will allow for the detection and measurement of changes in use patterns, such as discontinuation and displacement.

The system includes three main data collection components. These three data collection components are described in more detail in the following sections but each should include measures of the following key variables:

- **visitor characteristics,** including age, usual place of residence, motivation or experience preferences, and setting preferences;
- **patterns of use,** including main locations and points of departure, frequency of use, types of activity, travel party, forms of transport, encounters with other users, changes in use patterns, and intended future use; and
- **evaluations of the experience,** including overall satisfaction, perceived human impacts on the setting, perceived quality of the environment, infrastructure, tour operation service, interpretation and information available, and management actions.

Information should also be recorded with each survey that would allow for its inclusion in a GBR management information database. The location of each survey place, and the destinations referred to should be coded in a consistent fashion allowing the data to be easily compiled into the GBRMPA's GIS systems. The date of each survey should also be recorded and where appropriate the type of reef tour operations should be recorded in categories matching those used by the GBRMPA.

Component 1: Offsite Regional Telephone Survey

This component is designed to monitor aspects of recreational and tourist use of the GBR amongst a sample of regional residents. Such a survey would allow for indicators related to patterns of use, and particularly changes in patterns of use, to be measured. This component would have a specific focus on displacement and discontinuation, as well as overall patterns of use.

Component 2: Key Locations Survey

This component would involve face to face surveying of visitors at major access points for the GBR, such as major tour departure points, boat ramps, marinas and other places where independent users may access the GBR. This survey would concentrate on patterns of overall use and the respondents most recent trip to the GBR.

Component 3: Onsite Survey

This component would combine the use of interviewers both on site and on commercial tour operations to administer self completion survey forms. This component should focus on surveying visitors at the end of their trip.

Table 5 provides a summary of the key questions to be included in each component. It must be remembered that for each location or setting the specific questions will have to be adapted to the particular setting and activity being monitored. In several cases the measures will require some further research and / or consultative effort to be developed.

Six major actions have been identified as necessary prior to the development of the proposed social indicators monitoring system for tourist and recreational use of the GBR. These are to:

1. Develop a standard protocol for data coding for entry into GIS systems.
2. Further develop setting preferences measures.
3. Further develop our understanding of key social and physical setting conditions to be monitored.
4. Organise a series of regions and target sites for a sampling frame.
5. Develop stakeholder support for the system.
6. Explore possible connections to existing research projects to maximise returns for resources used.

Table 5. Summary of Key Questions for Each Component

	Offsite Regional Telephone Survey	**Key Locations Survey**	**Onsite Survey**
Visitor Characteristics			
Age (either year in which people were born or in 10 year categories with less than 21, 21-30, 31-40, 41-50, 51-60,61-70, over 70)	•	•	•
Gender	•	•	•
Boat / vessel ownership (need type of boat, sailing, jet ski, motor and length of boat in metres)	•		
Usual place of residence (are they an international visitor – country of residence, an interstate visitor – postcode, QLD resident – postcode)		•	•
Number of nights away from home		•	•
Recreation experience preference (see appendix B)		•	•
Setting preferences (see appendix D)			•
Frequency of Use			
Number of previous visits to the GBR	•	•	•
Number of visits in the last 12 months	•	•	
Most Recent Visit (when, where from and where to and type of transport used)	•	•	•
Details of Most Recent Trip			
Who with	•	•	•
How long	•	•	
Activities participated in	•	•	•
Number of other users encountered	•	•	•*

	Offsite Regional Telephone Survey	Key Locations Survey	Onsite Survey
Evaluation of Most Recent Trip			
Overall satisfaction	•	•	•
Best feature	•	•	•
Suggested improvement	•	•	•
Quality of various social and setting conditions(see appendix C)	•	•	•
Perceived crowding(see appendix E)	•	•	•*
Likelihood of repeating experience & recommending the experience to others	•	•	•
Changes in Patterns of Use			
Are there places they used to visit that they don't visit now	•	•	•
If yes why did they stop visiting	•	•	•
Future Use			
Next intended visit	•	•	•
When	•	•	•
Where from and where to	•	•	•
Main type of transport	•	•	•
Main activity	•	•	•
Setting preferences (see appendix D)	•	•	

• Indicates if this question would be asked in each component

***** Indicates this question would not be applicable to some settings and / or visitors from outside the region

Quality Issues

It is important that the data collected is of a good quality to be used in management decisions. To ensure this, there must be minimal standards for representativeness and reliability. To achieve these standards the following guidelines are proposed.

Response rates for surveys should be recorded and the target response rate should be 50% or higher (see Dillman 1991 and Dolsen and Machlis 1991, for further discussions of this). Wherever possible reasons for non response should be recorded so that it is possible to determine if any particular groups of visitors are being excluded from the system.

Wherever practical, sampling systems should cover different seasons and include weekdays and weekends, public holidays and school holidays, and as wide a range of different key point locations and reef tour operations as possible. The selection of respondents should use some systematic random sampling procedure within the units chosen for study. Thus in the case of the regional telephone survey, a random selection procedure should be used to choose telephone numbers within each of the major coastal regions. In the case of surveys conducted with reef tour operations, a system should be designed so that there is random choice of target respondents within each operation. The aim of the sampling procedure is to ensure that all the respondents within a location have an equal probability of being asked to participate and that the

choice of target respondents is determined by the sampling system and not by the interviewers.

The suggested minimum sample size for each location or setting being monitored is 400 (see Oppenheim 1992, and Warwick and Lininger 1975, for more details on this point).

Finally some notes of caution need to be repeated. The proposed system is based upon the existing evidence and suggested indicators reported in the international literature. Both of these sources are currently limited and it is therefore important that the proposed system be reviewed and adjusted in the light of new information and insights with regard to tourist and recreational use of the GBR.

ACTIONS FOR IMPLEMENTATION

Six major actions have been identified as necessary before the details of the proposed social indicators monitoring system for tourist and recreational use of the GBR can be completed and commenced. They are:

1. ***Develop a standard protocol for data coding for entry into GIS systems***
   It has been noted in several previous sections that the information gathered in any monitoring system must be easily accessible to managers. It has further been suggested that one option to achieve this accessibility is to ensure that data collected can be easily entered into existing GBRMPA GIS based information management systems. To meet these proposals it will be necessary to develop a standard protocol which identifies how data should be coded and stored so that this can be achieved.

2. ***Develop setting preferences measures further***
   A key set of variables to be measured in the system is the visitors' setting preferences. Setting preferences are an important way to identify different types of visitors. An understanding of the distribution of visitors in terms of their setting preferences can assist in identifying areas of mismatch between visitor preferences and management actions. Possible conflicts between visitors and between visitors and other types of users, can also be identified.

Currently there is no single system for determining different settings across the GBRMP and so it is difficult to complete questions which measure setting preferences. A suggested format follows (see appendix D for more details) but this question will need to be further developed in consultation with GBRMPA staff working on new management systems for tourist and recreational use.

The Great Barrier Reef Marine Park Authority aims to provide reef visitors with a wide choice of different types of setting because they recognise that not all visitors are looking for the same kind of reef experience. Please read the following descriptions of the five different types of reef experience that are available and the answer the questions that follow.

- **Setting 1** These reef sites are close to towns and resorts and easily accessible. They are places where a wide range of tourist and recreational activities are allowed. These areas have a wide range of permanent facilities for visitors such as marinas, jetties and boat ramps. There is no limit to the numbers of people who can visit these areas and they can be accessed by large vessels.
- **Setting 2** These are natural reef sites that are also easily accessible. These areas have some facilities for visitors such as reef pontoons and opportunities for visitors to learn about the Great Barrier Reef. While there is no limit to the size of the groups that visit these areas in general there will be fewer people than in setting 1.
- **Setting 3** These sites have some limited facilities and will only be visited occasionally by larger vessels and aircraft. Group sizes in these areas are limited to 40 people including the crew.
- **Setting 4** These sites have very low levels of use and usually there are no facilities provided for visitors. Group sizes in these areas are limited to 15 people and they are not usually visited by larger vessels or aircraft.
- **Setting 5** These are highly protected sites with very limited use and no facilities.

Which one of these five settings is the most appealing to you?

☐ **Setting _____ is the most appealing.**

☐ **All the settings are appealing**

☐ **None of the settings are appealing.**

☐ **Is there one setting that you definitely would not want to visit?**

☐ **None**

☐ **Setting ____**

3. *Further develop our understanding of key social and physical setting conditions to be monitored*

A set of possible social and physical condition indicators are listed below (see appendix C for more details) based on the review of the international literature and information available on GBR visitors. As has been noted on several previous occasions the available literature and GBR specific information is limited and further targeted research on the relative importance of these setting conditions would be useful in the development of the social indicators monitoring system.

Please rate the quality of the following features of your reef experience? Scale from 1 (very poor) to 5(very good).

- ☐ Staff friendliness
- ☐ Staff knowledge
- ☐ Water quality
- ☐ Cleanliness of environment
- ☐ Scenic beauty of the site
- ☐ Educational activities
- ☐ General information provided
- ☐ The coral
- ☐ The environment in general
- ☐ The built facilities provided
- ☐ The access provided

How would you rate the following aspects of your reef experience?

Scale	**Too few**	**About right**	**Too many**	**Didn't matter**
Number of other people				
Number of other boats				
Number of aircraft				
The built facilities				
Wildlife encounters				
The amount of information provided about the reef				
The number of activities available.				

Note: These questions would need to be matched to questions asking how many other people, boats, aircraft and wildlife were seen and to an assessment of the built facilities, available activities and information at the site.

4. ***Organise a series of regions and target sites for a sampling frame***
One major feature missing from the proposed monitoring system is the identification of target sites or regions. Monitoring needs to be tied to locations. Given the area concerned it is necessary to determine a series of target sites and regional breakdowns, so that a specific sampling frame can be developed for the various component surveys. As with the setting preferences question this would have to be done in consultation with GBRMPA staff.

5. ***Develop stakeholder support for the system***
The proposed system needs to be further developed with input from key stakeholders, particularly commercial tour operators. It is suggested that a workshop (or series of workshops) be held to explain the need for a monitoring system and the background that has been covered in this project. The workshop/s would also seek stakeholder input into the development of the sampling frames and the setting preferences and condition evaluation questions.

6. ***Explore possible connections to existing research projects***
Finally, it is important to pursue options for including aspects of the proposed social indicators monitoring system into existing research projects to maximise the outcomes of research effort.

Within the CRC Reef research program a major opportunity exists to use the surveys conducted in Project B2.1.1 to monitor commercial tour visitors. This project is a continuation of a survey project conducted in the previous CRC Reef, which asked similar questions to those suggested in the monitoring system. One of the major objectives of this project is provide some form of visitor monitoring for management use.

A brief examination of other proposed or actual projects within the CRC Reef did not suggest any others that might be useful for monitoring aspects of tourist and recreational use. There are, however, projects that may be useful in monitoring other use and users.

Other options that could be explored include:

- joint projects with other management agencies in the region;
- the development of projects as teaching exercises for tertiary classes in tourism and recreation management; and
- targeting research support funding to projects which can include monitoring questions.

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APPENDIX A: SOME COMMON SOCIAL SCIENCE DATA COLLECTION TECHNIQUES

Observation

Field research may be described as the direct observation of social phenomena, or the observance of everyday events that occur in a natural social setting (Singleton, Strait & Strait 1993). Observation therefore, is the primary method of data collection in field research. A field researcher often aims to observe, describe and understand the social world, as subjects would see it. The early phase of most field research involves relatively unstructured observation (Kellehear 1993). Using observation, the field researcher would seldom approach a task with precisely defined hypotheses to be tested. Instead, the observational process is often developmental in its approach (Singleton et al. 1993).

Observational research also enables data to be collected on the frequency of certain behaviours and events (quantitative data). While observation yields the fundamental data, field research differs in terms of the extent to which the researcher actively participates in the social setting being observed. At one extreme is the passive and intentionally 'unobtrusive non-participant observer', at the other end of the continuum is the active and intentionally involved 'participant observer' (Singleton et. al. 1993).

Unobtrusive Observation

Unobtrusive measures are ways of studying social behaviour without affecting it in the process. The non-participant observer is someone who attempts to observe people without interacting with them and typically without their knowledge that they are being observed (Singleton et al. 1993). In some cases, the fact that people are aware that they are under observation will influence their responses in a variety of situations (Dane 1990). Observations without participation are generally used as a supplementary source of data in a research project (Baker 1994). This form of observation is especially useful in the early stages of research as preparation for a more intensive study of a social setting and may often be used in conjunction with participant observation (Singleton et al. 1993).

Outlined below are the advantages and disadvantages of unobtrusive observation.

Advantages are:

- Ooservations made are discreet and non-involving, and because of the undisruptive nature of this research technique people do not react to the observer (Baker 1994); and
- because unobtrusive methods do not disrupt others, they are easily repeatable.

Disadvantages are:

- problems may occur from the interpretation of observations by the researcher;
- observation cannot measure the meanings of individual or group behaviour; and
- unobtrusive observations have limited application range. Unlike surveys or interviews they don't have the ability to reach into all content areas (Kellehear 1993).

Participant Observation

Participant observation is a method of doing field research in which the researcher becomes as much as possible a participating member of the group she or he is studying (Baker 1994; Wadsworth 1997). Participant observation is one of the main techniques used by qualitative researchers. The research design in this kind of investigation remains flexible and the details of the approach are often modified as the research proceeds.

Outlined below are the advantages and disadvantages of participation observation.

Advantages are:

- one of the key strengths of participant observation is the comprehensiveness of perspective this approach gives. By observing the social phenomenon as completely as possible, the social researcher can develop a deeper and fuller understanding of it;
- participant observation may complement other approaches by offering suggestive leads for explanatory research and by adding depth and meaning to survey and experimental results (Babbie 1989); and
- because of its flexibility this approach lends itself well to studies of dynamic or rapidly changing complex situations.

Disadvantages are:

- to participate is to risk altering the events one observes and perhaps even losing sight of ones role as a researcher. Care must always be taken to objectively consider the influence of a researcher when interpreting data collected through participant observation (Dane 1990); and
- findings cannot be generalised as safely as those based on rigorous sampling and standardized questions as the results are highly dependent upon the observational and interpretive skills of the researcher (Singleton et al. 1993).

A further weakness to using this approach is that it seldom yields precise descriptive statements about a large population. Observations are usually only with small groups.

Focus Groups

Focus groups (also referred to as group depth interviews), are widely used in the social sciences (Stewart & Shamdasani 1990). This technique consists of a small number of individuals (generally six to twelve) drawn together to express their views on a specific set of questions in a group environment (Baker 1994). These people are normally selected by the researcher because of their experience and knowledge about a certain subject, or due to their ability to represent the views of some interest group. The questions or topics for discussion are prepared by the researcher in advance, who typically takes the role of a moderator. The group session allows all the participants to interact and air their views (Morgan 1988). Focus groups are useful either as a self-contained means of collecting data or as a supplement to both quantitative and other qualitative methods.

Focus groups are particularly useful for:

- obtaining background information about a topic of interest;
- stimulating new ideas and concepts;
- generating research hypotheses that can be tested using more quantitative research approaches;
- revealing potential problems in a research design;
- a new strategy or program; and
- interpreting previously obtained quantitative results (Baker 1994; Stewart & Shamdasani 1990).

Outlined below are the advantages and disadvantages of focus groups.

Advantages are:

- focus groups are very flexible and represent an important tool for discovery and exploration when little is known about a particular subject or social phenomenon. They can be used to examine a wide range of topics with a variety of individuals and in a range of settings; and
- focus groups are easy to conduct and can provide a quick and inexpensive approach for obtaining information (Morgan 1988).

Disadvantages are:

- the moderator may bias responses by knowingly or unknowingly providing cues about desirable answers (Stewart & Shamadasani 1990);
- because focus groups are in small numbers, generalization to a larger population is significantly limited;
- a very dominant or opinionated member who may intimidate other more reserved group members may bias results obtained in a focus group; and
- the open-ended nature of responses provided by focus groups can make the interpretation and summarisation of results difficult.

Unstructured Interviews

An unstructured interview is essentially an interactive conversation between an interviewer and a respondent. The interviewer has a general plan of inquiry and the questions are mostly developed as the interview proceeds (Singleton et al. 1993). This type of interview is unfocused and non-directive with little or no guidance provided by the researcher. The respondent is encouraged to discuss topics raised during the interview, so ideally it is the respondent who does most of the talking (Babbie 1989). Probes are often used by the interviewer to prompt the respondent to elaborate on a particular response. Unstructured interviews are very useful for exploratory research and are preferred when the purpose is to acquire preliminary data or understandings (Singleton et al. 1993).

Outlined below are the advantages and disadvantages of unstructured interviews.

Advantages are:

- the interview flexibility, because individual questions and topics for conversation are developed spontaneously during the course of the interview, the interviewer is able to capitalise on the insights, experience and special knowledge of respondents (Dane 1990; Singleton et al. 1993).

Disadvantages are:

- reliability and generalisation are two problems of using this technique. Because not every respondent will be asked exactly the same questions, it is difficult to compare responses and interpret differences across respondents (Dane 1990); and
- obtaining information using this technique can be time consuming.

APPENDIX B: THE RECREATION EXPERIENCE PREFERENCE SCALE

Three interrelated labels or terms are used in the literature in discussions of the experiences that
seek in natural settings; motivations, expected benefits and experience preferences. Motives are defined as internal factors that impel people to action and then direct that action. They can include physiological drives such as hunger or thirst, and learnt needs such as social status. Motivation theories usually argue that these drives and needs direct peoples choices and actions. Thus people choose certain courses of action with the expectations that their needs will be met (Mannell & Kleiber 1997). Expected benefits can be defined as a predicted 'improvement in condition or gain to an individual' (Mannell & Kleiber 1997) as a result of making a choice. As can be seen expected benefits are an alternative expression of motives. The third label of experience preferences is in turn based on expected benefits. It has been argued that experiences are a combination of visitors' expected benefits or motives, their desired activities and the type of settings they seek (Mannell & Kleiber 1997; Driver, Brown & Peterson 1991).

Driver has undertaken some of the most extensive and systematic research to develop a scale that defines and measures the motives for, or expected benefits from, taking a wilderness trip. This recreation experience preference scale has proven to be reliable and valid, and therefore very useful for investigating peoples motivations for visiting the GBRMP. Driver's list of desired experiences is extensive, and a copy of the full scale is given in Driver, Brown and Peterson (1991). Below is a modified version of Driver's scale adapted by researchers from the CRC Reef Research Centre to investigate GBR visitors. This particular example uses a subset of the complete scale and it is suggested that surveys use at least this subset. The scale depicted is a five point rating scale (not a Likert scale). Driver uses a six point scale ranging from one to indicate not at all important to six to indicate extremely important. There is no empirical evidence or theoretical argument for using a certain number of points on a rating scale except that respondents tend not to use the extra discriminating points in scales with more than ten points (Oppenheim 1992). As fewer than four or five points limits the types of statistical analyses that can be used on the data it seems that any scale with between five and ten points is acceptable. It is, however, highly desirable for a monitoring system to have a standard scale. Given that there is some existing GBR specific data using the five point scale it is recommended that this rating scale should be used.

It should be noted that this measure is not suitable for the regional telephone survey because of its length. The order of presentation of the items should also be systematically changed to avoid possible order effects.

We would like to know how important each of the following reasons are to you for visiting the Great Barrier Reef. Please mark the number that best describes how important each statement is to you.

Importance rating	**Not at all 1**	**2**	**3**	**4**	**Very 5**
To be close to friends & family					
To get some exercise					
To experience the beauty of nature					
To meet new people					
To have some excitement					
To experience an undeveloped environment					
To rest and relax					
To learn more about nature					
To experience some solitude					
To be with others who enjoy things I enjoy					
To develop skills					
To escape normal routine					
To be in a natural place					
Experience something new and different					
Learn about a coral reef					
To be physically active					

(Based on Shafer et al. 1998. See also Ormsby & Shafer 1998 and Moscardo 1999)

APPENDIX C: MEASURING CONDITIONS

What Conditions to Monitor

Two issues need to be resolved in the development of a survey instrument to monitor various aspects or conditions of GBR tourism and recreational experiences. The first is that of what to monitor, while the second is how to monitor the conditions chosen. A review of the available literature and reef visitor data suggests that all the following social and physical conditions could have an influence on visitor behaviour and amenity.

- No. of people on the boat
- No. of people snorkelling
- No. of people on the pontoon / beach
- Distance away from other people (on island / beach and in water)
- Noise from others
- Size of groups
- Frequency of encounters with others (on island, beach)
- Inappropriate human behaviour
- Amount of Litter / rubbish
- Evidence of pollution in water (oil slicks, floating rubbish)
- Amount of damage to coral / vegetation
- Amount of vandalism
- Aircraft (sight, numbers, noise)
- Size and types of vessels
- No. of human made objects in the water (e.g. pontoons, moorings)
- Appropriateness of site infrastructure / support facilities
- Quality of sand / beach
- Water quality
- *Depth of water
- Cleanliness of environment
- Scenic beauty
- Environmental degradation
- Safe and easy access to site
- *Number of encounters with wildlife
- Seeing fish and marine-life
- Fish (abundant fish life, large fish species)
- Corals (underwater flora and fauna, variety of form and colour, intricacy and delicacy of the coral, size, shape and colour)
- Damaged coral colonies (loose fragments of corals, reattached coral fragments, partially dead corals)
- Staff friendliness
- Staff knowledge
- Amount of education / information available
- Quality of education / information provided
- Range of activities provided
- *Amount of wind
- *Waves

- *Air Temperature
- *Water temperature
- *Water currents
- *Cloud cover / amount of shade

While there is little empirical evidence to suggest a sub set of these indicators it is possible to shorten this list by excluding those conditions that managers cannot influence (marked with an *).

How To Monitor Conditions

A number of different approaches have been taken in attempts to measure visitor perceptions of the various aspects of their recreational experiences. One approach has been to measure levels of concern about the conditions encountered (see example 1). One of the difficulties with these approaches is that for some conditions it is not clear what the nature of the influence is. For example if someone rates the number of fish as having had a negative influence on their experience it is not possible to know if this was because there were too many or too few. Another option is to ask visitor to rate how acceptable the conditions were to them (see examples 2 & 3). This approach may appear to be more accurate but must be coupled some measure of the actual conditions to be useful. In addition all these approaches assume that the conditions are of equal importance to the visitors.

Example 1:
What is your level of concern for specific conditions?
From 1 not at all concerned to 7 extremely concerned.

The number of different species you see	
The amount of litter found in campsites	
No. of vehicles you see at the trailhead	
The distance of campsites from trailhead	

(Shafer & Hammitt 1995)

Example 2:
Please rate some conditions that may have influenced your experience today. Rate each item indicated by ticking one of the spaces provided.

I feel:	**Too few/little**	**About right**	**Too much/many**
The total amount of coral I saw was			
The total amount of fish I saw was			
The total amount of animals other than			
coral and fish I saw was			
The visibility of the water was			
The depth of the water was			
The number of different kinds of coral I saw was			
The number of different kinds of fish I saw was			
The number of people on this trip was			

(Shafer et al. 1998).

Example 3:
Please rate each of the following conditions by circling one of the numbers provided.

The amount of noise from:	**Too Noisy**	**About Right**	**Too quiet**	**Didn't matter**
Aircraft (helicopters and seaplanes)				
Large motorised boats (15 m – 35 m)				
Medium motorised boats (<15 m)				
Small motorised boats (<6 m)				
Other people				

(Ormsby & Shafer, 1999)

Proposed Questions

Oppenheim (1992) notes that there tends to be halo effect when survey respondents are asked to rate large numbers of features on a scale of satisfaction or perceived quality. In these cases it appears that respondents tend to rate all the component features in a similar fashion which is in turn consistent with their rating of the overall experience of the setting. In other words, if respondents believe that they have visited a quality environment they will tend to rate all the component features of that environment as high on rating scale of perceived quality. Oppenheim (1992) suggests having different scales and breaking the features into different sets. Thus it is proposed that the conditions be placed into two sets and measured as follows.

Please rate the quality of the following features of your reef experience?
Scale from 1 (very poor) to 5(very good).

Scale	**No.**
Staff friendliness	
Staff knowledge	
Water quality	
Cleanliness of environment	
Scenic beauty of the site	
Educational activities	
General information provided	
The coral	
The environment in general	
The built facilities provided	
The access provided	

How would you rate the following aspects of your reef experience?

Scale	Too few	About right	Too many	Didn't matter
Number of other people				
Number of other boats				
Number of aircraft				
The built facilities				
Wildlife encounters				
The amount of information provided about the reef				
The number of activities available.				

Note: These questions would need to be matched to questions asking how many other people, boats , aircraft and wildlife were seen and to an assessment of the built facilities, available activities and information at the site.

APPENDIX D: MEASURES FOR ASSESSING SETTING PREFERENCES

Understanding the factors that influence site choice in recreation has important implications for the types of decisions made, and the kinds of strategies implemented by management agencies (e.g. redistributing use, ensuring that quality experiences such as solitude / tranquillity are maintained, or reducing user conflicts and congestion) (Lucas 1990). Eventually the importance of applying research knowledge to different settings will be important for predicting change and responses to change in Marine Park areas. Presently little is known about the types of setting attributes that are preferred by Marine Park recreational users, or the factors likely to influence site choice behaviour. Identifying the importance of site characteristics that shape trip choices is important for managers in their attempts to meet user preferences by providing the right types of recreation settings.

Typically such questions involve the provision of a list of features which match the setting criteria used in management plans. Respondents are then asked to rate the importance of these features in their setting choice (See Example 1).

Example 1:
When you choose a lake for a boating trip, how important are each of the following features to you?

Not Important (1) to Extremely Important (7)

Lake attribute	1	2	3	4	5	6	7
Uncrowded on the water							
Helpful staff							
Camping facilities							
Quality of fishing							
Boaters behave well							
Size							
Scenery							
Water clarity							

(Siderelis & Moore 1998)

Currently the GBRMPA uses two catergories of settings in their management plans. The Whitsundays Plan of Management uses five settings (table 6) while the Cairns Area Plan of management has three levels of use; Low (maximum number of people including crew per vessel or aircraft is 15), Moderate (maximum number of people is 60), and Intensive (limit is set by environmental sustainability). In general the aim is to provide for a range of experiences along a dimension of contact with other users and noise.

Table 6 Setting Descriptions From the 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). There is no limit to group size and vessels can be up to 70 metres in length.
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. There is no limit to group size and vessels can be up to 35 metres in length.
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) can be up to 40 people and vessels can be up to 35 metres in length.
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) can be up to 15 people and vessels can be up to 35 metres in length (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 plan.

It is proposed that setting preferences for the GBR be assessed as follows.

The Great Barrier Reef Marine Park Authority aims to provide reef visitors with a wide choice of different types of setting because they recognise that not all visitors are looking for the same kind of reef experience. Please read the following descriptions of the five different types of reef experience that are available and the answer the questions that follow.

- **Setting 1** These reef sites are close to towns and resorts and easily accessible. They are places where a wide range of tourist and recreational activities are allowed. These areas have a wide range of permanent facilities for visitors such as marinas, jetties and boat ramps. There is no limit to the numbers of people who can visit these areas and they can be accessed by large vessels.
- **Setting 2** These are natural reef sites that are also easily accessible. These areas have some facilities for visitors such as reef pontoons and opportunities for visitors to learn about the Great Barrier Reef. While there is no limit to the size of the groups that visit these areas in general there will be fewer people than in setting 1.
- **Setting 3** These sites have some limited facilities and will only be visited occasionally by larger vessels and aircraft. Group sizes in these areas are limited to 40 people including the crew.
- **Setting 4** These sites have very low levels of use and usually there are no facilities provided for visitors. Group sizes in these areas are limited to 15 people and they are not usually visited by larger vessels or aircraft.
- **Setting 5** These are highly protected sites with very limited use and no facilities.

Which one of these five settings is the most appealing to you?

☐ **Setting _____ is the most appealing.**

☐ **All the settings are appealing**

☐ **None of the settings are appealing.**

☐ **Is there one setting that you definitely would not want to visit?**

☐ **None**

☐ **Setting ____**

APPENDIX E: MEASURES FOR ASSESSING PERCEPTIONS OF CROWDING

Little research has been undertaken to address in detail how users and visitors to the GBRMP perceive the numbers of other people at specific Marine Park locations. However, with expected increases in Marine Park use, crowding may become more of an management concern in the future. Crowding can be measured at various levels, here are some examples of questions / measures which have been used to assess perceptions of crowding in natural environments elsewhere.

Over the years, perceptions of crowding have been assessed using several different measures, some through multiple-item scales and others by a single-item format. A simple measure of perceived crowding developed by Heberlein and Vaske (1977) asks people to indicate how crowded the area was at the time of their visit. This single item measure has been applied in numerous studies conducted across North America, New Zealand and Australia and has provided crowding ratings for a variety of settings and activities. Investigators have found this single crowding item to be universally useful, easy to interpret and comparable across studies (Shelby, Vaske & Heberlein 1989), and therefore represents a viable measure of crowding to utilise in GBRMP survey research.

How crowded was the area at the time of your visit?

1	2	3	4	5	6	7	8	9
Not at all Crowded		Slightly Crowded		Moderately Crowded			Extremely Crowded	