



Australian Government
Great Barrier Reef
Marine Park Authority

RESEARCH PUBLICATION NO. 93

**A review of recreational activities undertaken
in the Great Barrier Reef Marine Park**
(Recreation Review Stage 1)

Madeline Fernbach



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Executive Summary

It is estimated that over 4.9 million recreational visits are made to the Great Barrier Reef each year. The Great Barrier Reef Marine Park Authority's goal is to provide for the protection, wise use, understanding and enjoyment of the Great Barrier Reef in perpetuity through the care and development of the Great Barrier Reef Marine Park (the 'Marine Park'). To assist in achieving this goal it is important to gain a better understanding of recreational users of the Marine Park. While there is a broad body of knowledge about managed, or tourist visits, little has been done to identify who independent recreational visitors are, where they go, what they do and why.

This paper reviews the published reports, data and literature relating to recreation in the Great Barrier Reef Marine Park to determine what knowledge exists about independent recreational activity within the Marine Park. Specific knowledge gaps are identified and research questions are proposed to fill these gaps.

Recreation was defined for the purposes of the paper as an independent visit for fun to the Marine Park. The majority of the research about the Marine Park related to boating and fishing. Over time there has been an increase in population of local resident visitors adjacent to the Marine Park, an increase in numbers of recreational vessel registrations and an increase in the size of boats registered, while a decrease in number of recreational fishers was identified. With respect to management, a number of areas of tension were identified, particularly centred around potential and current conflicting use of the Marine Park by different cohorts of users; the issues relating to varying levels of regulation for different Park users; and provision of infrastructure.

The main gaps in the information identified included the need for profiling independent recreational visitors through market segmentation; the knowledge, motivation and expectations of independent recreational visitors; the geographic spread of recreational activity in and around the Marine Park; and the changing use of boats and other recreational vessels. Projects are proposed that addressed these gaps.

Background

It is estimated that over 4.9 million recreational visits are made to the Great Barrier Reef each year (Norris, Moscardo & McCoy 2003). The Great Barrier Reef Marine Park Authority's (GBRMPA) goal is to provide for the protection, wise use, understanding and enjoyment of the Great Barrier Reef in perpetuity through the care and development of the Great Barrier Reef Marine Park (the 'Marine Park'). To assist in achieving this goal it is important to gain a better understanding of recreational users of the Marine Park. While there is a broad body of knowledge about managed, or tourism visitors, such as that created by Tourism Research Australia, little has been done to identify who independent recreational visitors are, where they go, what they do and why.

At present, measuring recreational activities is hampered by the variability in the published literature with respect to what is considered to be 'recreation' and how this relates to tourism. Currently information about recreational activity is collected by GBRMPA in two ways: (i) monitoring data such as the number of registrations of recreational vessels or the number of people who pay the Environment Management Charge; (ii) ad hoc surveys undertaken by GBRMPA or other organisations.

It is the purpose of this project to review the research effort around recreation in the Marine Park to establish what is already known about recreation; and then to identify what needs to be undertaken further to answer questions that are of importance to stakeholders who manage the Marine Park.

Project Aims

There are two stages to the project. The aim of the first stage of this project is to undertake a detailed literature review to determine what research has been done previously and to evaluate methods used and analyse results and data found. During this stage the term 'recreation' needs to be defined and research questions developed. Specific knowledge gaps and research questions are identified to answer these questions.

The goals of Stage 1 of this project are:

1. To define the term 'recreation' and its parameters in relation to Marine Park management
2. To provide insight into recreational activity occurring in the Great Barrier Reef Marine Park
3. To inform the Outlook Report about trends over time of recreational activity
4. To identify gaps in knowledge about recreation and sources of information relating to this.

The draft Stage 2 goals will be:

1. To develop a strategy to collect required information on recreation arising out of Stage 1 findings
2. If possible based on the literature review, to identify measures for recreational activity
3. To trial data collection to support the information collection strategy described above
4. To establish regular monitoring systems and processes for collection of relevant information.

These goals will be covered in a separate project proposal.

Literature Review

Key questions that need answering

In this section, the important questions relevant for management of the Marine Park are explored. To this end, consultations with the Tourism and Recreation Reef Advisory Committee (TRRAC) and senior representatives of GBRMPA operational and support groups were undertaken. The key questions extracted from this series of consultations are provided below and form the structure of the literature review.

A. Recreation-themed questions

The definition of “recreation”

Under the *Great Barrier Reef Marine Park Act 1975*, a ‘tourist’ is defined as “a person who is in the Marine Park principally for the purpose of recreation (which may include fishing or collecting) (section 3A(9)). In the literature relating to tourism and recreation in the Marine Park, recreation is defined in a number of ways and it is useful to explore the definition of recreation using five dimensions that cover the what, the where, the when, the how, and the who of recreational activity. These categories consist of (i) activity-based definitions; (ii) independent versus managed types of activity; (iii) local resident visitors versus non-local visitors; (iv) duration of activity; and (v) self-definition.

(i) Activity-based definitions

The literature that assumes “recreation” consists of particular activities often provides a list of activities that are generally subsumed into Jennings’ (1998) list: boating, recreational fishing, SCUBA diving, kayaking, tourist activity, spearfishing, snorkelling, sightseeing, camping or other, non-specified activities. The latter commonly include activities that can be undertaken either through a tourism operator or independently, such as fishing or snorkelling. Scherl, Valentine and Millard (2000) describe the range of recreational visitors as:

- Yachties (visitors who get to an island by private or hired boats and anchor nearby the island)

- Campers (visitors who stay overnight, sleep in tents, and get to the camping destination with regular tour operators or by chartered boats but, notably, do not include those who travel via their own means of transport)
- Day trippers (visitors who go on tour operations for one day only).

(ii) Independent vs. managed types of trip

Some definitions of recreation are dependent on the nature of the transport used to access the Marine Park (Moscardo & Ormsby 2004; Ormsby et al. 2004). Ormsby and others suggest a more useful distinction is between ‘commercial tour visitors’ who access the Great Barrier Reef with a commercial tour operator (thereby having access managed by a tour operator); and ‘independent visitors’ who access the Marine Park with their own transport or with transport owned by their family or friends. This definition draws indirectly on the belief that independent visitors are financially independent of tourism operators, a theme that is reflected in the commercial types of definitions described below. This definition is important for economic analysis and information purposes.

The GBRMPA monitors tourist visits through the collection of an Environment Management Charge (EMC) which is payable by all individuals who pay a tourism or charter operator in order to access the Marine Park (e.g. tour of the Reef on a cruise boat) (GBRMPA STIG 2006). Thus, all ‘managed’ visits to the Marine Park are monitored through the EMC. In contrast, ‘independent’ visits are not monitored to the same degree.

The GBRMPA monitors independent recreational activity primarily through monitoring the number of registrations of recreational vessels (see report GBRMPA STIG 2006). Recreational boats are those used for the purposes of recreation and not for any type of business, trade or commerce (Maritime Safety Queensland 2007a). In contrast, commercial and fishing vessels are those “used in conjunction with any type of business, trade or commerce” and can include fishing ships, tourist or charter boats, work boats, ferries, water taxis, dive boats and sailing school boats (Maritime Safety Queensland 2007b). Commercial vessel registration data is available also but is not considered in this paper.

Jennings (1998) included an element of independent boat use as part of his definition of recreation, however he also included a description of a range of activities he considered to be ‘recreation’ including recreational fishing, boating, SCUBA diving, kayaking, spear fishing, snorkelling, sightseeing, camping and ‘tourist activity’. Thus for Jennings, tourism is a subset of recreation, consistent with the *Great Barrier Reef Marine Park Act 1975*.

Others also consider recreation to include all non-commercial or independent activity in the Marine Park (e.g. Hassall & Associates, 2001; Platten, Sawynok & Parsons 2007) or non-commercial use of a private boat (Blamey & Hundloe 1993).

The literature can be categorised into ‘independent’ and ‘managed’ activity-related information. Managed activities include those things that are considered to be tourism and, by definition, those activities where permitted operators collect the Environment

Management Charge. Independent activities are those where individuals and groups undertake activities that do not rely on paying a fee for services relating to recreation. While we have much information about managed activities (especially through Tourism Research Australia and GBRMPA data associated with the EMC), we have very little knowledge about independent recreational activity. It is the latter category that is of most interest in this paper.

(iii) Local resident users vs. non-resident users

The key element in this body of research is whether someone is a locally resident user of the Marine Park, or whether they are not locally resident. Variations on this definition are used widely within tourism literature. Consistent with the Australian Bureau of Statistics and Tourism Research Australia, Access Economics (2007) defined tourism to include “overnight travel” where the visitor stays away from home for at least one night, further than 40 kilometres from home. In contrast, a “day visitor” is someone who undertakes a round trip distance of more than 50 kilometres and is away from home for more than four hours. A “local recreational trip” is a short trip less than 50 kilometres from home. Anecdotal evidence indicates that there are some or many individuals who reside a greater distance away but who access the Marine Park as their primary venue for recreational boating and fishing. Thus, while widely used, this distinction requires further clarification.

(iv) Duration of activity

Taken from World Tourism Organisation (1997) and drawing on McIntyre’s (1993) definition, Moscardo and Ormsby (2004) define:

- A "Traveller" as any person on a trip between two or more locations
- A "Visitor" as 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
- A "Tourist" or overnight visitor as a visitor staying at least one night in a collective or private accommodation in the place visited
- An "Excursionist" or same day visitor as a visitor who does not spend the night in collective or private accommodation in the place visited.

Studies on recreational fishing tend to support the notion that recreation, or “recreational visitors” would fit into the Excursionist category of the World Tourism Organisation, where the average length of fishing trips in the Capricorn Reef area range between five and 12 hours depending on distance of the fishing locality from the boat ramp (Platten, Sawynok & Parsons 2007). However, it is not unusual for recreational fishers to stay overnight either on the boat or at alternative accommodation as part of the trip. The World Tourism Organisation definition is limited in the sense that it provides no insight as to how one might segment the recreation/tourism market for the purposes of making contact with recreational visitors.

(v) Self-selection

The final type of research about recreation avoids making an explicit definition of recreation and requires telephone respondents to self-select as a “recreational fisher” (Sutton, 2007; Roy Morgan, 1996) or in a literature review, more generally as “those who undertake recreation” (Watson 1988).

Who are the independent recreational visitors?

The purpose of defining recreational activity from the perspective of Marine Park management is for three reasons. Firstly, it is important to identify the various effects of individuals’ activities in the Marine Park. Secondly, we need to establish the extent of these effects so that trends in Marine Park use, and the corresponding impacts, can be understood. Thirdly, we need to understand the extent and breadth of recreational activity to look at the combined impacts of activity. This will lead to an understanding of the potential conflicts of use of the Marine Park and the ability to monitor and manage the activity if necessary.

Within the Great Barrier Reef Marine Park, there are reports of a diverse range of recreational activities being undertaken. These include activities such as fishing, diving and snorkelling, yachting and boating, motorised water sports, sea kayaking and windsurfing, photography and shell collecting. It is important to understand the *value* that these users place on the Marine Park, the *use* of and resulting *management* of the Marine Park. In addition, knowledge about recreational activity will improve our ability to engage these park users in the management process. In the literature a range of dimensions have been used to define recreational activity, and the most useful appear to be a combination of managed versus independent activity and visits by local residents versus non-local visitors. We have substantial information about managed activity (commonly referred to as ‘tourist’ visits) by local residents and non-resident visitors. Therefore the remainder of this paper will focus on the dimension we know least about: independent recreational visits.

Given that Queensland coastal residents interact with the Marine Park in different ways at different times, it is more useful to define the scope of activity as a ‘recreational visit’ or a ‘tourist visit’ rather than assigning a fixed label to the individual (such as ‘tourist’ or ‘recreational visitor’). In this paper, individuals who interact with the Marine Park will be referred to as ‘visitors’, and those who are taking a recreational visit will be referred to as “recreational visitors”. It is recognised that people who charter a boat and pay the Environment Management Charge (EMC) are undertaking tourist visits, whereas hiring a boat but not paying EMC (e.g. a self-drive ‘tinnie’) is considered a recreational visit. Where the term ‘tourist’ is used to describe a person, it is acknowledged that commonly used term refers to a person who undertakes a managed, tourist visit to the Marine Park.

Thus, in this paper, our definition of recreation is: an independent visit for fun to the Marine Park.

The recreation information contained within this discussion paper and in the project(s) arising out of this paper, will be useful to address a series of categories of questions about recreation. These categories, together with some associated research and management questions, are provided below.

Coastal Development	Why are people moving to the Queensland coast? How will this increased population impact on levels of recreational activity, water quality and Marine Park biodiversity?
Conservation	What is the impact of recreation on biodiversity? What are the changes in recreational patterns and the corresponding likely impact on the Marine Park?
Visitors	What activities are currently being done as recreational activity? How much of each is being done? What is the impact of recreational use of the Marine Park? How can we monitor this activity?
Education	Who are recreational visitors? What are their demographics? How do visitors know where to go? How do visitors know what to do? How can we best reach them for education and communication?
Traditional culture	Are the current and future recreational activities affecting biodiversity? To what extent does traditional use conflict with tourism and recreation, and how can this be managed? To what extent is current management practice keeping up with cultural shifts?
Community	How can we engage recreational visitors with decision-making processes that relate to the Marine Park?
Management	What is the carrying capacity of particular areas for combinations of specific recreational activities? What are the trends or changes in these carrying capacities? What are the future infrastructure and management needs in these areas? How can we best manage, monitor and regulate these activities?

It is acknowledged that significant segmentation of “recreational visitors” is necessary in order to achieve the aims described earlier. Ormsby and Shafer (2000) explain it thus:

“it is imperative that managers have a clear understanding of the values, perceptions and experiences of those that use and come to visit the area. In this context, it is useful for innovative planning to be able to forecast the factors that are likely to influence people’s experiences and perceptions of ... [the Marine Park]. For management, an understanding of environmental imagery and the meaning of place opens many new avenues in planning for a balance between tourism use/development and the marine environment.” [Ormsby & Shafer 2000 p.6].

We should become aware of the relative impact of each activity, the relative density of people doing each activity and the mix of activities that is acceptable for any given area. These issues will be dealt with in the following sections. First, however, it is important to investigate, based on this definition, who is undertaking recreation and what they actually do.

Characteristics of independent recreational visitors

Using our definition of “recreation”, the characteristics of independent recreational visitors are not well known. Several studies have established the demographics of

- Tourists (e.g. Bailey et al. 2003)
- All visitors (Hunnam 1990; Ormsby & Shafer 2000; Scherl, Valentine & Millard 2000)
- Recreational fishers (Blamey & Hundloe 1993; Higgs & McInnes 2003; Roy Morgan 1996; Ormsby 2004, 1999; Sutton 2007).

However, several researchers have reported difficulty in identifying who is undertaking independent recreation, how many of them are doing so, and what their characteristics are.

Moscardo and Ormsby (2004) attempted to quantify independent recreational visitor activity. They estimated that there are 2.1 million recreation visits each year to the Great Barrier Reef Marine Park, independent of formal tourism. Moscardo and Ormsby reported that on Queensland coastal residents’ most recent trip, 27 per cent undertook independent recreation activity while 42 per cent used a commercial tour operation to access the Reef.

Dimensions of recreation

There are three dimensions on which it is useful to examine recreational activity. These are:

1. Spatial: Where do recreational visitors recreate? Is this different to tourists' locations? And where do they live: locally or not locally but coming to the Reef from elsewhere?
2. Behavioural: What activities are being done? Are they managed (such as a formal tourist trip where the EMC is incurred) or independent (where the visitor brings their own transport).
3. Temporal (when, how often and for how long do recreational visitors recreate?).

These dimensions will be discussed in turn.

1. Spatial dimension

Several large scale telephone surveys have established that Queensland residents of areas close to the Marine Park ('local residents') visit the Marine Park more frequently than any other group (e.g. AEC Group 2005; Young & Temperton 2007). Note: a 'local resident' of Mackay is not considered local if their recreation occurs in Cairns. On the other hand, there is little information about non-local recreational visitors such as miners and post-retirement travellers. More research is needed to assess or describe other segments of recreation or particular regions of interest.

The places people choose to live are relevant to GBRMPA because of our interest in coastal development. In the 10 years from 1997 to 2006, the population of Queensland coastal areas¹ has grown 16 per cent, from 936 351 to 1 086 990 (Australian Bureau of Statistics 2007), and the annual rate of population growth is increasing. It is important to examine why people choose to move to the Queensland coast so that coastal development and management of the Marine Park can be better planned. For example, are new residents moving for a change of pace and lifestyle, for the surroundings, or in order to access the Marine Park for recreational purposes?

It should be recognised that the type of activity or the location of an activity varies according to the weather. On a still, sunny day one may choose to go swimming or fishing, while a windy, wet day may prompt a recreational visitor to decide against recreating in the Marine Park, or to move to a different part of the Park. Certainly, satisfaction with a trip to the Marine Park for recreational boaters was dependent on their perceptions of quality of the weather and the environment (Sutton, 2005²).

A geographical profile of the existing literature is not terribly illuminating as to where recreational visitors go. Where research focuses exclusively on independent recreation, it

¹ Queensland coastal areas relevant to the Marine Park are included but not others: those included are Far North, Northern, Wide Bay-Burnett, Fitzroy, and Mackay statistical divisions.

² This research paper drew on data obtained by Norris, Moscardo & McCoy (2003) unpublished paper through CRC Reef Research Centre.

relates almost entirely to fishing. The majority of fishing-related work covers either the whole of the Great Barrier Reef catchment area (e.g. Sutton 2007; Blamey & Hundloe 1993; Ormsby 1999) or the whole of Queensland (Roy Morgan, 1996; Higgs & McInnes 2003). A small number of studies targeted a particular area such as the Capricorn Reef (Platten, Sawynok & Parsons 2007) and Townsville (Murphy 2002).

It would be useful to develop a map of where and when recreational visitors visit the Marine Park. To some degree, this is being addressed through a research project on recreational fishing currently in progress (Sutton, unpublished). However, the development of a comprehensive map of Marine Park recreational visitation would be resource intensive and would require a lot of planning and coordination.

Platten, Sawynok and Parsons (2007) reported that the majority of fishing trips made in the Capricorn Reef area were within 40km of the coast, two thirds of these to the islands and 23 per cent to inshore locations with the final 12 per cent to offshore reefs. Over 20 000 offshore fishing trips (66 per cent) occurred per year from the two main ramps in the Capricorn Reef area, suggesting that the fishing is concentrated into areas that are easily accessible from these main boat ramps. However, Platten et al report that travel to locations "well offshore" around the Gladstone area has decreased, suggesting that patterns of use may have changed.

Blamey and Hundloe (1993) reported that almost three quarters (71 per cent) of survey respondents (recreational fishers) lived no further than 10 kilometres from the boat ramp they used, and almost 40 per cent lived within five kilometres of the ramp. In contrast, fewer than four per cent of respondents lived further than 50 kilometres away from the ramp. More detail about how far people travel to the boat ramps from home, how far they travel on water, and where these trips take place (i.e. spatial mapping) is required if we are to gain greater understanding of distance as it relates to recreation.

2. Behavioural dimension

Independent recreational visitors are found to undertake similar activities to managed recreational visitors except that they tend to do these activities on their own, in family or small groups rather than paying a tourism operator to organise these activities for them. Fishing, going to the beach, visiting the reef, SCUBA diving or snorkelling, going on charter boat rides, cruises or ferry rides were the main recreational and tourist activities reported throughout the Great Barrier Reef Marine Park in a large survey by Bailey, Riley, Heaney et al. (2003 but see also Green, Moscardo, Greenwood et al. 1999; Hunnam 1990). In a study of tourists at Norman Reef, reef trip visitors are characterised by being passive (i.e. carried from point to point) rather than being active explorers of new sites (Hunnam 1990). Likewise, Ormsby and Shafer (2000) describe tourists as undertaking passive activities such as swimming, relaxing, sunbathing, taking photographs and walking along the beach.

In contrast, Queensland coastal residents tend to be more active. According to Jennings (1998), recreational fishing was the most common recreational activity at Shoalwater

Bay, followed by boating, sightseeing, camping and tourist activities. This finding is geographically specific, as in general, Queensland coastal residents tend to swim (62 per cent), use motor boats (67 per cent), fish (45 per cent), go snorkelling (41 per cent), yachting (18 per cent), diving (13 per cent) or jetskiing or use other vessels (14 per cent) (AEC Group, 2005). Different proportions are reported by other studies, however fishing, about which we have the most data, does not comprise more than 36 to 45 per cent of total recreational activity in the Great Barrier Reef Marine Park (Young & Temperton, 2007; Scherl, Valentine & Millard 1997). Motor boating is also popular, with proportions ranging from 36 per cent (Young & Temperton 2007) to 67 per cent (AEC Group 2005).

It is important to establish any differences in infrastructure, management and information needs of independent recreational visitors compared to managed recreational visitors so that management and communication is tailored to the right people.

3. Temporal dimension

The activities undertaken by independent recreational visitors to the Marine Park vary over time: for example, in the early 1980s Means (1984) reported a broader range of land-based activities on islands around the Gladstone area, such as camping, line fishing, snorkelling, SCUBA diving, spearfishing, exploring the islands' interiors, shell collecting, bird watching and nature photography. More recent surveys would include more mechanically-based activities such as jetskiing, hovercrafts, wave riding and so on (e.g. AEC Group 2005). New activities such as geocaching are emerging and it is important to develop policy positions on these trends before they become an issue for the Marine Park.

However, very little data is available on what independent recreational visitors actually do, who they are, why they do what they do, or where they go. The only data relates either to registration of boats and other vessels (Maritime Safety Queensland 2004; 2007a) or to fishing (Blamey & Hundloe 1993; Higgs & McInnes 2003; Sutton 2006; Ormsby 1999; Sutton 2007). We know that in 2005, 32 per cent of local residents undertook recreational activity in the Marine Park in the past 12 months and that 67 per cent of this involved motorised boating while fishing comprised 45 per cent of the activity (AEC Group, 2005, but see Young & Temperton 2007)³. We have almost no published data on swimming, which 62 per cent of residents undertook, or snorkelling, 41 per cent.

The only information we have on when independent recreational visitors use the Marine Park is drawn from fishing data by Platten et al (2007). Most trips occurred during

³ In 2007, a study by Young and Temperton for the Marine ParkA indicated that 42 per cent of Queensland coastal residents visited the Marine Park but this data did not specify "for recreational use". The proportions of these "visitors" who undertook motor boating (36 per cent) and fishing (37 per cent) and all other activities were lower than those reported by the AEC Group (2005) despite similar methodology (i.e. a telephone survey of Queensland residents). However, the top four activities are the same as the earlier study (motor boating, fishing, snorkelling and swimming). Thus, the differences in proportions are likely to be an effect of different types of data filtering and analysis and are unlikely to qualitatively change the conclusions in this report.

autumn (33 per cent), with the fewest in summer (19 per cent). Three times as many trips occurred at low wind speed (<10kn) on weekends and public holidays than on higher wind days, or weekdays, or combinations of the two. Boating and fishing covers a substantial proportion (but by no means all) of the activity undertaken by independent recreational visitors. Further data will need to be collected in order to provide more detailed information.

Boating data

The length of boating trips in 2005 was, in general, fairly short, with the majority of boaters undertaking a full day trip (45 per cent) or a trip of half a day or less (19 per cent) (AEC Group 2005). Sutton (2005) reported a higher number of people who took boating trips lasting a day or less (79 per cent compared with 64 per cent from the AEC group 2005). Overnight trips accounted for only nine per cent of the total, with two to three night trips at 11 per cent and four or more nights at only eight per cent. Blamey and Hundloe (1993) reported that while independent recreational fishers' average trip length was 6.33 hours, only ten per cent fished for more than 10 hours. Likewise, Platten, Sawynok and Parsons (2007) reported that for fishing trips in the Capricorn Reef area, the average length of trip was 7.64 hours, (5.5 hrs for inshore locations; 12.1hrs at the wide grounds). These data are reflected in the size of boats but not in the distance travelled.

Of the registered recreational vessels in 2007, the majority were relatively small: over two-thirds were between four and six metres in length (69 per cent), with a small proportion between one and three metres (15 per cent). Seven per cent were larger, between seven and nine metres long, six per cent were between 10 and 12 metres, and only three per cent were longer than 12 metres (Maritime Safety Queensland 2007a).

The average distance travelled in these boats was relatively large although this had regional differences. Almost half of the trips were over 9.3km (five nautical miles), with a quarter between 4.6km and 9.3km (2.5 and 5nm), the remainder between 0.93km and 4.6km (0.5 to 2.49 nm) (20 per cent). Only four per cent made trips that were shorter than this (Maritime Safety Queensland 2007a).

Blamey and Hundloe (1993) reported regional differences in average distance travelled on vessels. Distance travelled in Cairns was substantially higher than the average (29.1km compared to 26.2km), while Mackay and Rockhampton areas were lower than the average (both 21.1km), as was the Townsville region (22.1km).

Regional differences were also found in the way people used their registered vessels. Ninety per cent of boats registered in Queensland coastal areas in the Great Barrier Reef Marine Park catchment are used for fishing or crabbing, with a much lower proportion reported for fishing and crabbing in the Great Barrier Reef Marine Park (68 per cent). Townsville boats were used less for this purpose (63 per cent) and in Cairns they were used more (72 per cent) (Blamey & Hundloe 1993). This information is useful and

interesting, however it is quite dated and should be collected again to be sure of its validity 15 years later. More recently and in contrast, only 38 per cent of independent recreational fishers reported that they owned a boat (Higgs & McInnes 2003), indicating that there is a substantial amount of fishing taking place from land, from chartered boats or from boats of friends or family. Sutton's paper supports this, with 78 per cent of people going on boat trips being accompanied by friends or family on their most recent trip (Sutton, 2005). Thus, the following data about fishing may include some data that relates to fishers who do not own their own boats.

Fishing data

Queensland recreational fishers are mostly men and studies have indicated that men over 15 years comprise 78 to 82 per cent of the recreational fishing population (Ormsby 1999; Blamey & Hundloe 1993; Sutton 2006; 2007). Children under 15 years tend to comprise around seven to 10 per cent of the recreational fishers, with female recreational fishers providing the balance. There are few regional differences in the literature, with the highest proportion of women being in Townsville and the lowest being in Cairns and Rockhampton (Blamey & Hundloe 1993).

In several studies that randomly sampled Queensland coastal residents, it is possible to establish the proportion of the population who fished in the past 12 months. Further, we can compare these proportions over time as there have been several studies that used similar methods and asked equivalent questions. The proportion of local residents who fished has decreased, where 15 per cent fished within the past 12 months on the Great Barrier Reef in 2007 (Young & Temperton 2007), down from 20 per cent in 2005 (AEC Group 2005) and 39 per cent in 2001 (Higgs & McInnes 2003). Similar decreases in Queensland as a whole are found in a number of household surveys: 33 per cent of households in 1996 reported that at least one member had been fishing in the past twelve months, decreasing to 30 per cent in 2001 (Higgs & McInnes 2003) and 28 per cent in 2006 (Sutton, 2006).

The age of fishers has decreased over time, with 15 per cent of independent recreational fishers in 1999 being under 30 years (Ormsby 1999) and 25 per cent in this age group in 2004 (Sutton 2006). The majority of recreational fishers are aged between 30 and 49 years (55 per cent in 1999; 50 per cent in 2004) (Ormsby 1999 and Sutton 2006) (see Figure 1). Interestingly, the number of years of fishing experience has also reduced, with the proportion of fishers with 30 or more years experience shifting from 46 per cent in 1999 (Ormsby 1999) to 34 per cent in 2004 (Sutton 2006). The low percentages of people with up to 10 years experience in 2004 and 1999 indicate relatively few people taking up fishing in the 1990s and 2000s. However, the proportion of fishers with fewer than five years' experience has doubled from four per cent to eight per cent over the same time (See Figure 2). This suggests that there is a cohort of new fishers emerging.

There are clear sub-groups of recreational fishers that may need to be targeted in different ways or with different information. What is interesting to observe is that, in a (somewhat dated) recreational boat fishing survey, Blamey and Hundloe (1993) found that half of the

recreational fishers catch only six per cent of the total fish caught. On the other hand, a quarter of fishers catch 75 per cent of the total fish caught. Peat and Sutton (submitted for publication) describes a range of dimensions that different cohorts of fishers rate as more or less important, providing support for the notion that there are different motivations of recreational fishers. It is important to explore in future studies the extent to which these high volume and low volume recreational fishers impact upon the Marine Park.

Figure 1 Age distribution of recreational fishers

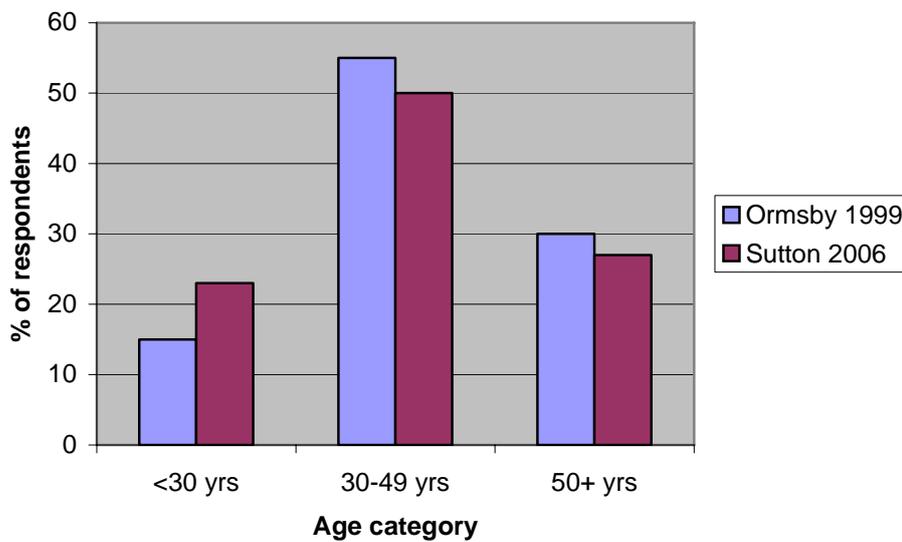
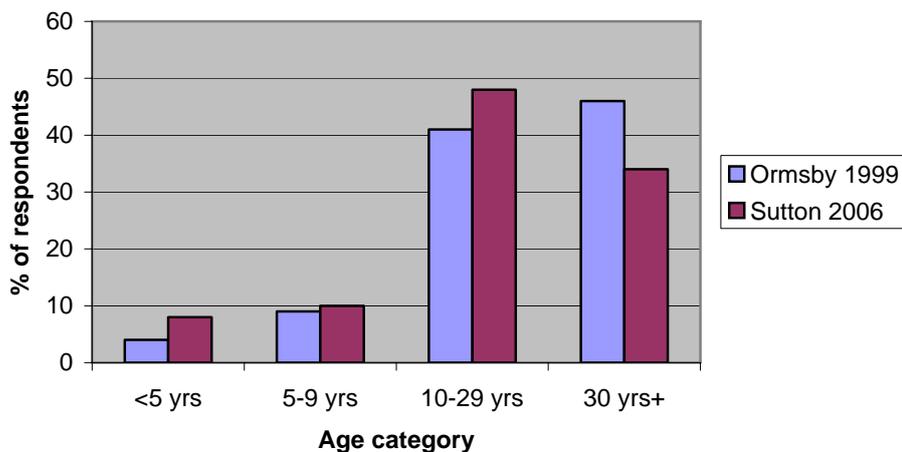


Figure 2 Years of experience in recreational fishing



Other demographic data on independent recreational fishers is available for 1999 but not later. We know that in 1999 independent recreational fishers had, in general, completed only primary (10 per cent), secondary (50 per cent) or a trade or TAFE qualification (23 per cent) (Ormsby 1999) (see Figure 3). In terms of employment type, excluding those who are unemployed or retired, the majority of recreational fishers in 1999 were labourers, transport or production workers (26 per cent) or were in trades (22 per cent), but a substantial proportion were in professional (16 per cent), clerical (15 per cent) or managerial (9 per cent) employment types (see Figure 4) (Ormsby 1999).

Figure 3 Education level of recreational fishers

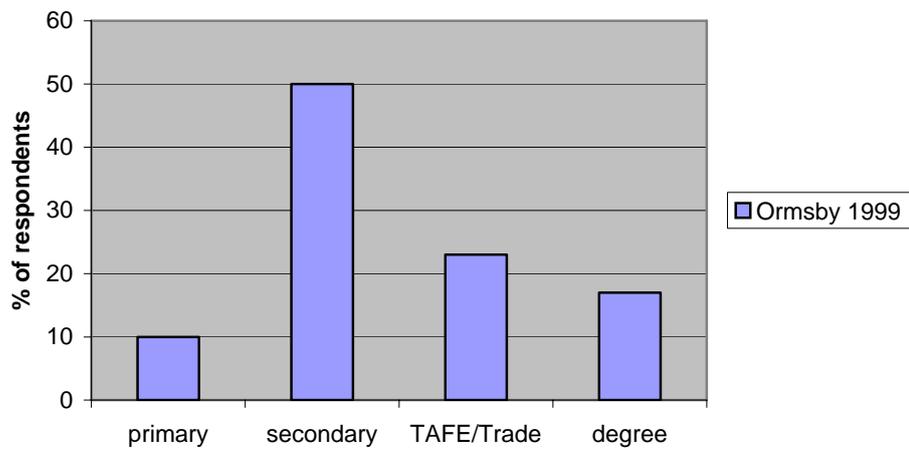
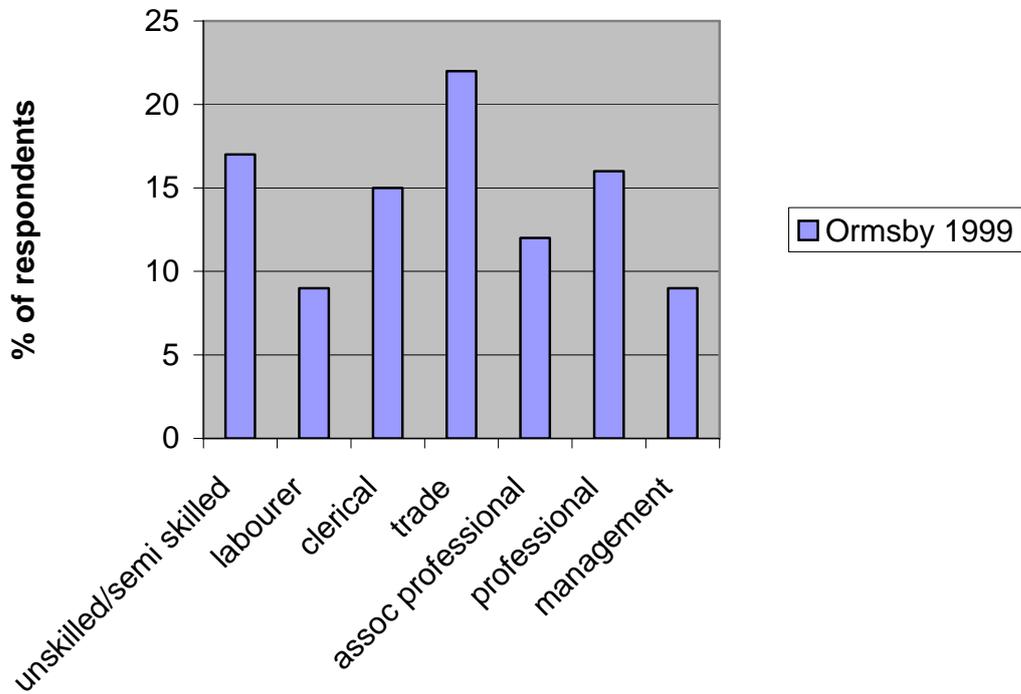


Figure 4 Employment type of recreational fishers



Based on the age distribution, it is evident that the majority of independent recreational fishers are middle age workers. An examination of median incomes of recreational fishers was conducted by Blamey and Hundloe in 1993. While the actual figures describing the income are not highly relevant in 2007, the data provide a sense of regional differences in income. Median income in Cairns was much higher than in Townsville or Rockhampton. In addition, based on the age categories given in Figure 1, there are many recreational fishers who are retired. Regionally it is interesting to observe the proportion of people whose income was lower than \$5000 per annum in 1993 (or in today’s terms, less than \$7460). In Mackay this was 40 per cent, 27 per cent in Rockhampton but nobody in Cairns and Townsville (Blamey & Hundloe 1993).

"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... [but] non-catch motivations associated with the experience are ... very important." [p.8] (Ormsby 1999)

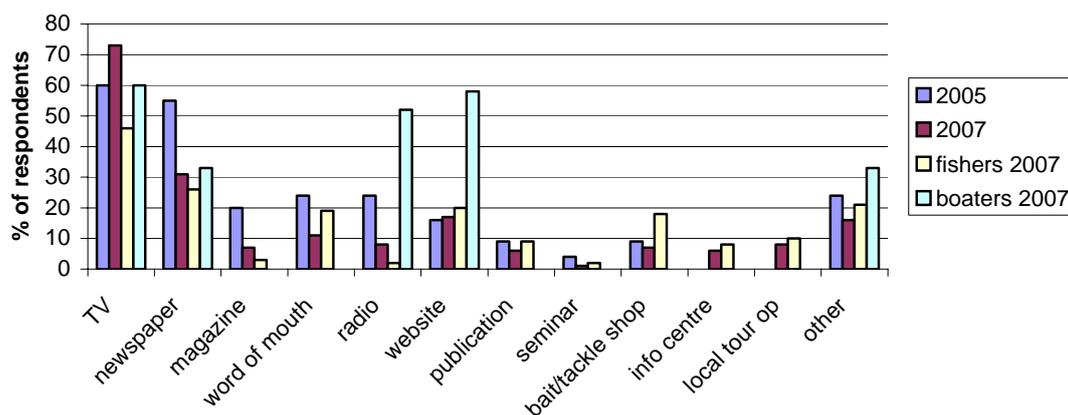
The purpose of fishing does not seem to have changed over time, with the primary reasons people go fishing being, primarily, recreation and socialization (94 per cent in Higgs & McInnes 2003; 78 per cent in Sutton 2006), followed by catching fish and obtaining food (34 per cent, Higgs & McInnes 2003), excitement and competition (Ormsby 1999; 4 per cent Higgs & McInnes, 2003; 15 per cent in Sutton, 2006) and other reasons (1 per cent in Higgs & McInnes). The proportions provided by Higgs and

McInnes were consistent with Ormsby 1999 data. Overall satisfaction with their trips was high but recreational fishers who caught sufficient fish to meet their needs (in terms of size, number, or type of fish caught) were more satisfied than those who rated fishing quality lower (Sutton, 2005).

Sources of information about the Marine Park

In surveys of residents of Queensland, results showed that television was the main source of information about the Marine Park, with newspapers, word of mouth, websites and bait and tackle shops also popular (AEC Group 2005; Young & Temperton 2007). When checking the weather, this list reduced to television, website, radio, newspaper, and other organisations such as marine rescue organisations and phone information services (Maritime Safety Queensland 2007a). See Figure 5.

Figure 5 Current sources of information about the Marine Park



Note: Data from AEC Group (2005); Young & Temperton (2007) for 2007 and fisher data; Maritime Safety Queensland (2007a).

Other recreation in the Marine Park

Queensland Transport provides regular updates of vessel registration data that is available in detailed formats (see Figure 6). An analysis of recreational vessel registrations (i.e. not used for commercial purposes), as shown in Figure 7, indicates that most registrations are for boats between 3.0 and 4.5 metres in length. Over the past five years, there has been an increase in registration of all sizes of recreational vessel except the smallest, where there has been a clear pattern of decreasing registrations (see Figure 8). Recreational visitors are now buying larger boats than previously. Given that there are more recreational visitors and more, larger boats, it is important to understand who these visitors are, what they are doing with these boats and how this differs to boating activity in the past.

Figure 6 Recreational vessel registrations 2002-2007

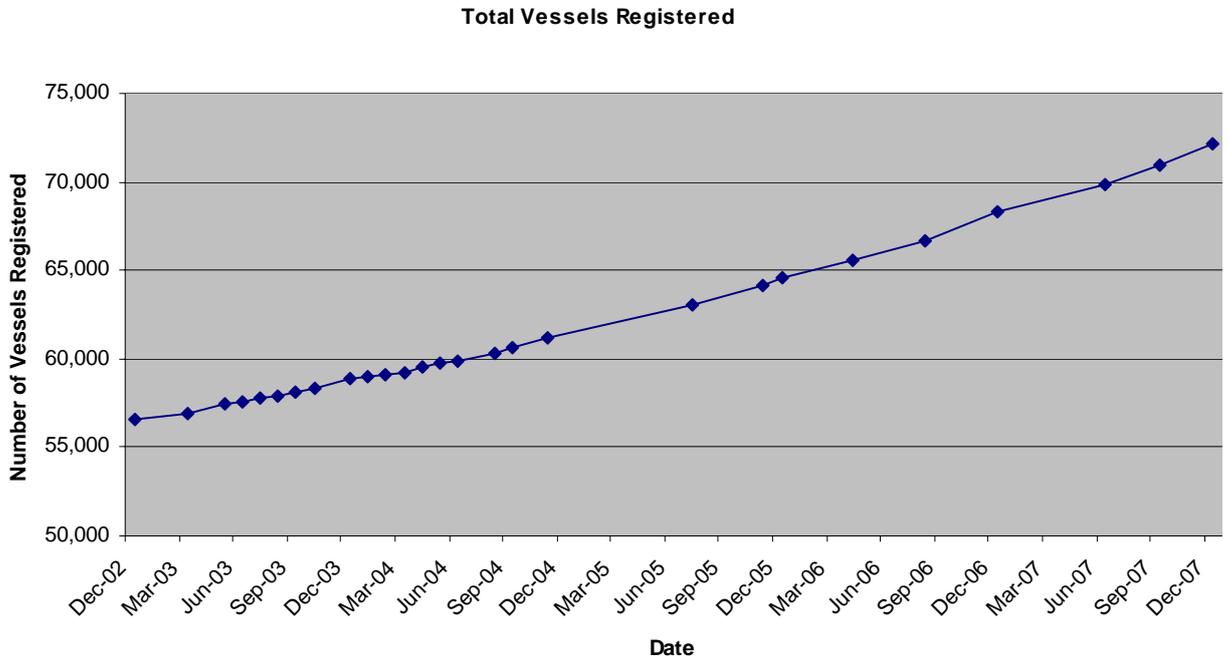


Figure 7 Numbers of recreational vessel registrations by size, December 2007

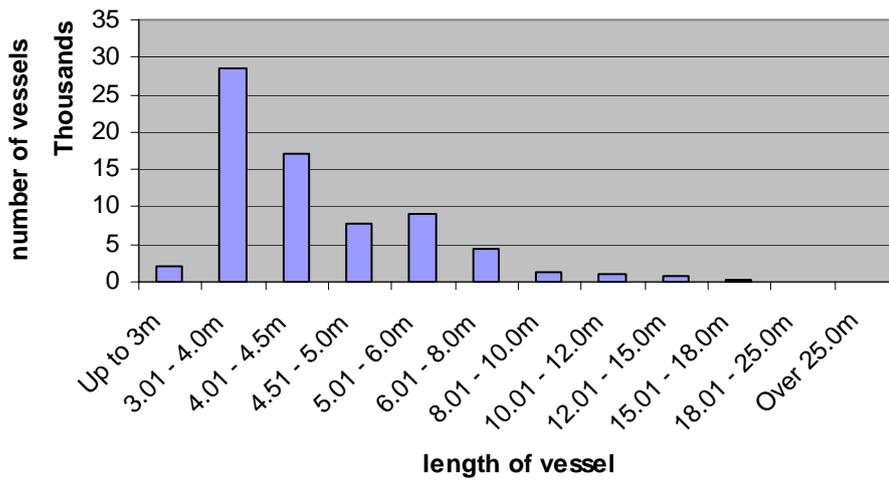
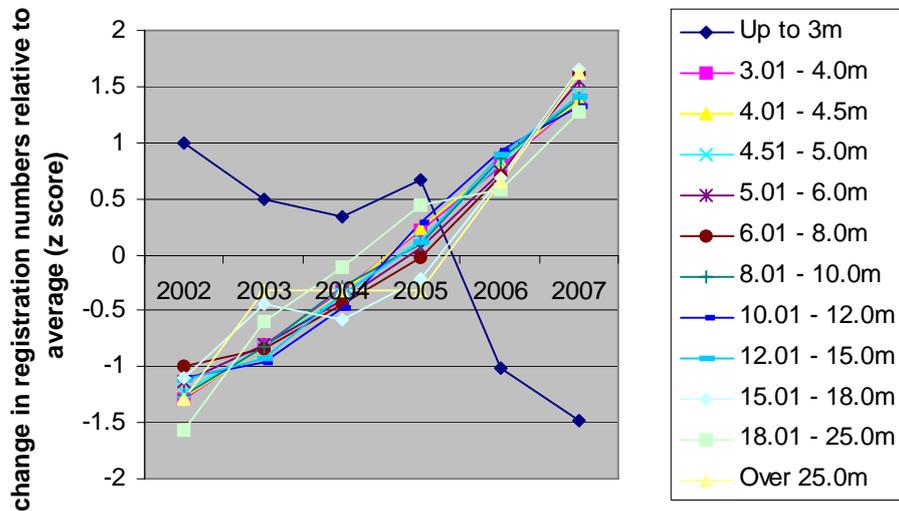


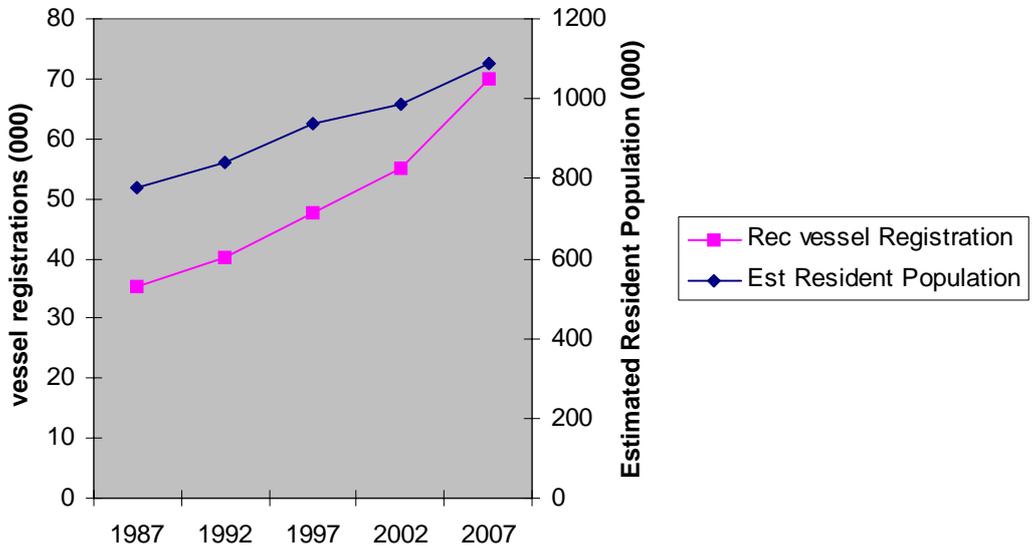
Figure 8 Patterns of recreational vessel registrations by size (z score)



How is recreation changing?

The Great Barrier Reef Marine Park catchment area is experiencing strong population growth. According to the Australian Bureau of Statistics, the median age of the people in each statistical region increased between three and five years in the past 10 years, and the median individual, family and household income has increased markedly in this time (ABS 2007). In 2005, 32 per cent of Queensland coastal residents said they had visited the Marine Park for recreation in the past 12 months (AEC Group 2005). By 2007, this had increased to 42 per cent (Young & Temperton 2007). Likewise, the patterns of recreational vessel registrations and population increases are very similar (see Figure 9).

Figure 9 Recreational vessel registrations and population over time



Traditionally fishing comprised a substantial proportion of the recreation but this has markedly reduced in recent years (39 per cent of coastal residents went fishing in the 12 months leading up to 2001, compared to only 15 per cent in 2007) (Higgs & McInnes 2003; Young & Temperton 2007). The decrease in participation rate in fishing, paired with the increased population, increased income and increase in boat registrations provides a clear picture that non-fishing boating is gaining popularity and is likely to feature strongly in the future recreational activity in the Marine Park. However, the new, relatively inexperienced fishers described earlier need to be recognised as a significant new cohort. More research is needed to clarify this issue.

At present, data is not available in terms of how individual financial investment on recreation in the Marine Park has changed. GBRMPA commissioned a series of studies by Access Economics to examine the economic contribution of visitors to the Marine Park. In 2007 Access Economics adjusted its calculations of investment on recreation in light of changes to Australian Bureau of Statistics analysis. Thus, figures from earlier reports are substantively different from those of 2007. In addition, their definition of “recreation” excludes short day trips by residents of the Marine Park region and therefore it is of limited use in this study. In a study of the spending habits of recreational fishers, Murphy (2002) estimated that fishers spend an average of \$115.44 per trip and have an average of 13 trips per year⁴. Better quality data on independent recreational visitor expenditure is needed.

⁴ Note, however, that this study had a poor response rate, low sample size and somewhat unorthodox survey content and thus the findings of this study should be interpreted with caution. The sample is likely to be skewed towards people who spend more, as participants were recruited through bait and tackle shops.

It is unfortunate that we do not have more specific data about how recreation is changing. Because we have limited recreational data historically and presently, we are restricted to drawing conclusions from secondary data. If we were to collect new primary data, it would provide baseline data from which we could make comparisons in the future⁵.

B. Management-themed questions

An important purpose of establishing the nature and frequency of independent recreational visitors' activity is to identify the impact of their behaviour on the Great Barrier Reef Marine Park. One of the most common approaches to managing impact is to establish social carrying capacity. In an early work, Watson (1988) introduced social carrying capacity as it relates to the Marine Park by noting that one cannot simply set limits on numbers of visitors at popular recreation settings. Watson argues that it is necessary to develop a program to establish social carrying capacity that must include research about independent recreational visitor experiences, norms and goals and their perceptions of social impacts; the establishment of clear management objectives for desired visitor experiences and recreational setting attributes; and standards by which to measure conditions over time.

Environmental and social impact assessment provide other approaches to determining the same information, with a different focus. The social carrying capacity approach might ask, "How many tourists and recreational visitors can an area sustain?" In contrast, the environmental and social impact assessment approach might ask instead "What are the environmental and social effects of having X people doing these activities in this combination?" (Slootweg, Vanclay & vanSchooten 2001; Queensland Government 2006; Taylor, Bryan & Goodrich, 1990; Broome & Valentine 1995).

Independent recreational visitor activity must be considered from both perspectives. It is clear that recreation requires segmentation and clarification of activities undertaken. In light of this, it is not possible to answer our management questions until we are clear what the social, economic and environmental impacts of each activity or each market segment are. However the questions that are relevant to GBRMPA management are important to identify. These are explored below.

What are the potential areas for tension with managing recreational visitor activity?

There are two main areas for potential tension between different types of recreational visitor: geographic proximity to each other, and differences between groups in terms of legislative restrictions.

⁵ An unpublished report by Norris, Moscardo and McCoy in 2003 is in the process of being published (as at September 2008). It provides information of reasonable quality about recreation. At the time of publishing this report, replication of the Norris et al. study was underway. It is anticipated that these two data sets collected five years apart will provide valuable data on changing patterns of recreation.

(1) Geographic proximity

There are tensions between different types of activity where these conflict with the motivations of the recreational visitors undertaking this activity. Sutton (2007) reported that 70 per cent of independent recreational fishers experienced constraints to their fishing including lack of time, crowding of fishing spots, unavailability of facilities and the costs of equipment and petrol. Fishers who placed high importance on relaxation and motivation cited work/family commitments, poor facilities and crowded fishing areas as barriers to being able to fish as often as they would like. As the number of registered recreational vessels increases, existing infrastructure is at times not able to support increased traffic. Anecdotal reports of incidents of 'ramp rage' are increasing.

Perceptions of crowding relate more to the nature of the interactions, the settings and recreational visitors' attributes and expectations than they do with user density (Watson 1988). Ormsby, Moscardo, Pearce and Foxlee (2004) measured visitor behaviour in, and satisfaction with, protected areas. These things are 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. Few studies have compared the relative contributions of crowding, visitor motives, perceptions of scenic quality and perceptions of the quality of service and infrastructure to outcomes (Ormsby et al. 2004). Management response to unacceptable or crowded conditions in recreation settings may include a range of things that still allow people to enjoy their activities (Watson, 1988). It should be noted that vessel length and other restrictions currently apply in some areas of the Marine Park.

Scherl, Valentine and Millard (2000) indicate in a study of campers on Lady Musgrave Island that campers valued tranquillity, peacefulness, a relaxed environment, family togetherness and a sense of escape. Day visitors, mainly managed recreational visitors (i.e. 'tourists'), saw their experiences in terms of mental stimulation and talked about their experiences as "activities". Scherl et al. reported that day visitors focused more broadly on the marine environment with less emphasis than campers on the terrestrial environment. Yachties shared values with both campers and daytrippers: like campers they valued tranquillity, peacefulness and relaxation but were more marine-orientated. Thus, while each of these activities can co-exist, there are problems when other activities such as jet skis and motorboats create noise disturbance that impact on enjoyment of other more quiet activities. Likewise, it is reasonable to assume that recreational boaties and fishers (both independent and managed recreational visitors) have expectations for enjoying their sport without interference by divers, swimmers and snorkellers (and vice versa).

(2) Legislative differences

Where different types of Marine Park users are subject to different rules, guidelines and restrictions there can be tension. Managed recreation (tourism) operators are restricted through permits and site bookings to go to some, but not all, areas of the Marine Park. In contrast, independent recreational boaters do not have similar restrictions and are allowed to travel more freely. While tour operators must pay licence fees to access the Marine Park, independent visitors can often access the same places for free or at low cost. Resolving this inconsistency would be of interest to operators and managers.

In a similar vein, commercial and recreational fishers are subject to different regulations with respect to how and where their activities must be undertaken in the Marine Park. There are several recurring arguments relating to this tension but no published evidence. Attitudes to zoning and other regulatory mechanisms are mixed and this is the subject of other research work.

How can we get to independent recreational visitors to inform, educate and engage them?

It is important to identify how to access independent recreational visitors in order to inform and educate, to manage behaviour and to engage them with policy change and decision making. Without accurate market segmentation we are unsure who is recreating, how they are doing this, and what is the best way to access these people. It is an important question that needs to be answered in future market research.

Monitoring behaviour is complex in an environment such as the Great Barrier Reef Marine Park because access to the Park is open to all, over a very large area. A range of activities are undertaken, for recreation, for commerce and for a range of other purposes, which makes identifying recreational visitors challenging. It is possible to achieve this, but in order to gather good quality data that can be useful for management of the Marine Park, it is necessary that long term, substantial investment be made.

Performance indicators to monitor the behaviour, attitudes and motivations of recreational visitors are critical elements that must be developed. Moscardo & Ormsby (2004) prepared principles for the development of performance indicators for the Marine Park and argued that they should include:

- Measures of actual patterns of use
- Information from monitoring that is easily available to managers
- Having standard measures of key variables
- Stakeholder support for any monitoring system.

Gap analysis

The most useful definition of recreation for management purposes is one that can be used to learn more about the subgroup of people who access the Marine Park independently for enjoyment and leisure. Based on the literature review in section one of this paper, the definition of recreation that we have used for this paper is provided below once again.

Recreation is an independent visit for fun to the Marine Park.

Market segmentation

The influx of people to the Queensland coast, particularly to areas adjacent to the Great Barrier Reef Marine Park, means that more people will be taking recreational visits to the Reef. We recognise that this cohort of Marine Park users is not well understood and there is limited data available about them. We need to understand what motivates people to move to the Queensland coast, and how this increased population will impact on levels of recreational activity, water quality and Marine Park biodiversity. Also, independent recreational visitors are actually a series of sub-groups or clusters of individuals, based on what they do, where, when and why. Identifying user groups and their beliefs and attitudes will help to inform who the target audience is and where information campaigns should be directed.

GAP

At present, knowledge of the motivations, expectations and attitudes of people who undertake independent recreational visits is so limited that a market segmentation study is high priority in order to create a framework for further information-gathering about this cohort.

GAP

The relationship between social and economic factors and independent recreational visitors' actions towards the Marine Park needs to be explored. In particular, the changes in recreational activity and the likely impact of this on the Marine Park need to be examined.

It is this most critical of information that will drive GBRMPA decision making about how best to engage with independent recreational visitors to ensure maximum enjoyment of the Marine Park with minimal negative, or maximum positive, impact on it. Some options that may point the way forward include those described in the next section.

Given the dearth of information relating to independent recreation, at this stage it is not possible to make generalisations about regional differences in recreation within the Marine Park. The literature on fishing provides evidence to suggest there is geographic variability and if so, this may be important to know. Thus, this is a secondary gap that

needs to be addressed. An easy way of commencing this process would be to map geographically the registrations of different recreational vessel sizes and types, ideally over time, and to overlay population changes against this data. The information would provide a first indication of possible differences in usage of, for example, marinas, moorings and boat ramps. This exercise would draw on existing data sources.

GAP

There is a clear gap in our knowledge of geographic spread of non-boat-related activity (such as shell collecting and geocaching).

GAP

We do not have much information about how far independent recreational visitors travel to access the Reef.

People's sources of information about the Marine Park (including the weather forecasts for this area) rely on television, newspapers and, for boat owners most recently, website and radio. Weather information provides important data for independent recreational visitors' decisions about where and when to go to the Marine Park. Some information from the Capricorn Reef area is available on *when* people go recreational fishing: this occurs most often in autumn, with spring and winter well represented and with fewest trips in summer.

GAP

There is a gap in our knowledge of when people go to the Marine Park.

Demographic information

The best sources of information about independent recreational visits relate to recreational fishing. There are some interesting trends in recreational fishing, where there were relatively fewer people taking up the sport in the 1990s and early 2000s. Recently, however, there has been an increase in new fishers with little experience and who are relatively young. While the median age of fishers is still 30 to 49 years, the demography of recreational fishers is changing.

GAP

Obtaining further information about the education levels and employment types of fishers at the present time will enable comparisons with data from 1999 to learn more about the changing demography of recreational fishers.

Recreational vessel use

While the stated purposes or motivations for fishing have not changed, the size of boats that are bought to go fishing have. There has been a noticeable decline in registration of the smallest vessels (up to three metres) but an increase in boats of *every other size* including the very largest (over 25 metres).

GAP

In light of the increases in recreational vessel size, is use of boats changing? For example, are recreational vessels being used exclusively to fish, or does recreational vessel use incorporate a range of activity?

Along the same lines, the impact of recreation and in particular, fishing and boating, on marine biodiversity is not well understood.

Infrastructure information

Evidence from the literature review shows that non-fishing boating is gaining popularity. We are aware that particular recreational activities (such as snorkelling) are not geographically compatible with other activities (such as jet skiing) and these can create tensions between different cohorts of recreational visitors.

Issues arise also when infrastructure within the Marine Park (such as moorings) and outside the Marine Park (e.g. boat ramps) does not meet the needs of independent recreational visitors. Platten et al. (2007) estimated that on weekends with weather conditions ideal for fishing, boat ramp use exceeds their capacity by between 30 and 50 per cent.

Conflicts between tourism, recreation and traditional use of the Marine Park are not well understood either. These need to be explored more fully to identify the extent to which these are a problem, and how they can best be managed.

GAP

There is a clear need to identify and anticipate the changing needs of independent recreational visitors and to provide suitable infrastructure.

Stage 2: Proposed projects

The literature review and gap analysis provided in this paper support and address the goals described for Stage 1 of the “Recreation Project”. In the previous section, a series of gaps in our knowledge of recreation and recreational visitors were identified. The projects proposed below are designed to provide information that can be used to address these gaps in an integrated and systematic way. These projects directly extend beyond the Stage 1 project and relate to the draft Stage 2 goal 1: to develop a strategy to collect required information on recreation arising out of Stage 1 findings. The projects proposed are:

- A geographic study of place-based recreational activity.
- Market segmentation: what are the different groups of independent recreational visitors? Is there a logical series of dimensions on which these segments are defined? (e.g. attitudes, types of activity, demography, geography, sources of information, etc.). This would involve:
 - Close reading of the literature defined in this paper and beyond to identify possible dimensions
 - A series of focus groups to test these dimensions
 - A survey of attitudes, actions, social, economic and demographic factors of locally resident visitors to the Marine Park catchment including expenditure behaviour.
- An environmental impact assessment of recreational activity in the Marine Park. This would involve:
 - Establishing the extent of different types of recreational activities being undertaken in the Marine Park (possibly specific regions can be done separately) including overall numbers, peak daily numbers, group size, length of stay, size of fish catch.
 - Developing a list of possible actions that these recreational visitor groups might do that would affect the environment (e.g. putting sewage into the Marine Park; littering; damaging coral with anchors) and the potential impact of each of these actions.
 - Undertake an observational study with each recreation type, to examine the extent to which these recreational visitors are performing each of these behaviours
 - Extrapolate the proportions to the Marine Park as a whole to estimate the potential impact of each of these activities individually and collectively on the Marine Park
 - Identify the potential for conflicts in use of the Marine Park.

Three specific but smaller research questions:

- Identify the likely breadth of recreational activities through an analysis of the sales patterns of recreational equipment in the leading generalist stores (e.g. KMART and Super AMART).⁶
- What are the similarities and differences between resident and non-resident recreational yacht activity by residents and non-residents in terms of their attitudes, information and knowledge, impacts on the Reef). How do we get in touch with these different segments?
- What is the demography of boat owners, how is this changing and what do they think? What do they do?

After the first goal of Stage 2 has been achieved by undertaking the projects described above, it would be possible to address the remaining three Stage 2 goals described in the Project Aims section of this paper. They could be achieved by commissioning work to develop parameters and measures for independent recreational activity (goal 2) and to trial data collection to support the measures (goal 3). Finally, regular monitoring systems and processes could then be put in place to ensure that high quality information about independent recreational visitors is available to support management decisions.

⁶ It should be recognised that the growth in large generalist stores (including BCF and Anaconda) has some adverse impact on small bait and tackle shops and, where this happens, it is possible that this may influence smaller shop owners' perceptions of recreational use in the Marine Park.

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