

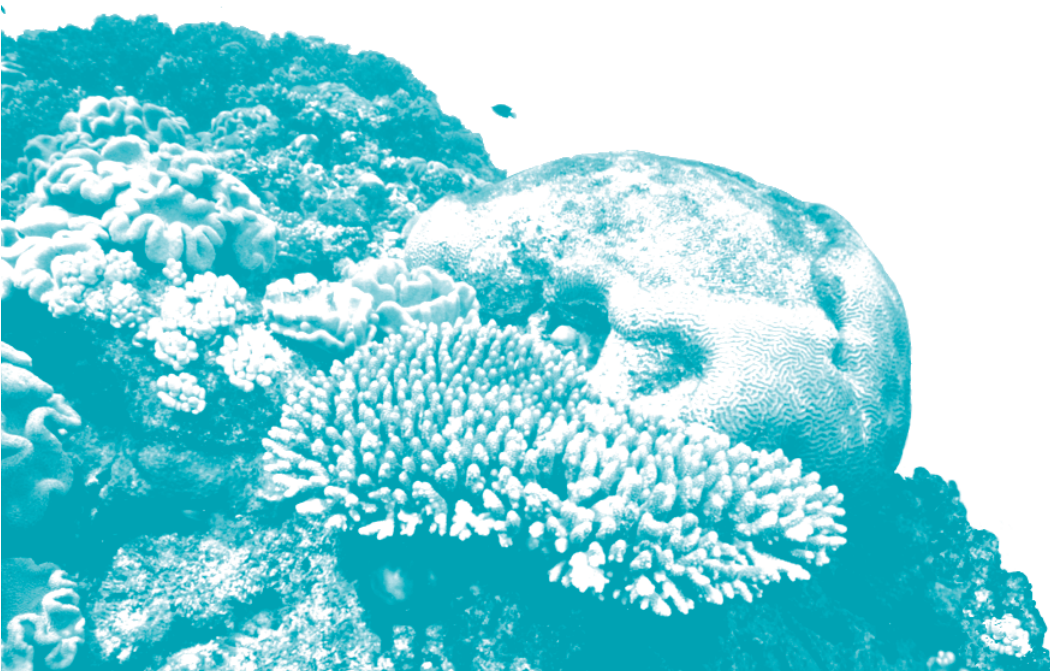


**GREAT BARRIER REEF**  
MARINE PARK AUTHORITY

RESEARCH PUBLICATION NO. 78

# **A Review of the Social, Motivational and Experiential Characteristics of Recreational Anglers from Queensland and the Great Barrier Reef Region**

Jayne Ormsby



*let's keep it great*

RESEARCH PUBLICATION NO. 78

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ISSN 1447-1035 (Online)

ISBN 1 876945 29 X (Online)

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[www.gbrmpa.gov.au](http://www.gbrmpa.gov.au)

**National Library of Australia Cataloguing-in-Publication data:**

Ormsby, Jayne, 1970- .

A review of the social, motivational and experiential characteristics of recreational anglers from Queensland and the Great Barrier Reef Region.

**Bibliography**

ISBN 1 876945 18 4 (Print)

ISBN 1 876945 29 X (Online)

1. Fishing - Queensland. I. Great Barrier Reef Marine Park Authority. II. Title. (Series : Research publication (Great Barrier Reef Marine Park Authority (Australia)) ; no.78).

799.109943



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## SUMMARY

Recreational fishing is a popular leisure time activity for many Queenslanders. With an increase in fishing effort along the Queensland coastline, fisheries managers are continuously faced with the challenge of conserving fish stocks and the environment that sustains them, whilst ensuring equitable resource allocations between sector groups. The Queensland Fisheries Management Authority and the Great Barrier Reef Marine Park Authority recognise that recreational anglers are an important sector of Queensland's fishing population. As part of the development of a Recreational Fishing Information System (RFISH), the Queensland Fisheries Management Authority and the Great Barrier Reef Marine Park Authority investigated the social, motivational and experiential aspects of recreational fishing by anglers from Queensland. Information gathered will provide a greater insight into the needs and preferences of recreational anglers whilst building a database from which effective decisions can be made.

A total of 2,061 surveys were completed by recreational anglers from Queensland, giving an overall response rate of 45.4%. This sample comprised of 1,180 anglers from South-east Queensland, 593 from the Great Barrier Reef region and 288 respondents from Western Queensland. The survey obtained information about respondents' motivations for participating in recreational fishing, levels of fishing experience, details of participant's last fishing trip, trip satisfactions and demographic characteristics.

The results from the socio-motivational component of the study are presented in three sections. The first section describes the experiential and demographic characteristics of recreational anglers from Queensland and more specifically the Great Barrier Reef region. The second section explores anglers' motivations for pursuing recreational fishing activities, and the third section presents details of anglers' last trip experiences from the Great Barrier Reef region.

Results from the investigation include the following key findings:

### *Experiential Characteristics of Anglers from Queensland and the Great Barrier Reef Region*

Eighty-five percent of recreational anglers from Queensland possessed at least ten years fishing experience. Eighty percent reported spending less than a quarter of their leisure time participating in fishing activities, and the majority of anglers regarded their fishing abilities as average. Overall, very similar levels of fishing skill and experience were reported by anglers from the South-east, Western and Great Barrier Reef regions of Queensland.

The majority of recreational anglers from the Great Barrier Reef region were male, aged between 30 – 49 years and had lived in their prospective areas for more than ten years. Most of these anglers had completed schooling to a secondary level, were wage earners and earned over \$41,000 per annum. Approximately 50% of those surveyed from the Great Barrier Reef region possessed at least thirty years fishing experience and rated their fishing skills as average. Seventy-eight percent spent less than a quarter of their leisure time fishing. Respondents who reported the most years of fishing experience were male, over fifty years of age, had retired or were pensioners, and completed schooling at a primary level. Male anglers spent more of their recreational time fishing and scored their fishing abilities at a higher level. Those who indicated more years of fishing experience and allocated the greatest amount of their leisure time to fishing also rated their fishing expertise highly. Results demonstrated no significant differences in

the levels of fishing experience, participation or skill between anglers from the four divisions of the Great Barrier Reef region.

#### *Motivations for Participating in Recreational Fishing*

For Queensland anglers the strongest motivations for pursuing fishing activities were 'for rest and relaxation', 'to be outdoors' and 'to enjoy nature'. Although 'catching fish to eat' was very important to 77% of respondents, almost 70% felt that 'a fishing trip could be successful even if no fish were caught' and 'were happy even if a fish wasn't caught on every trip, as long as they had the opportunity to catch a fish'. The high importance of these motivations were reflected by anglers from each of the three Queensland regions.

For anglers from the Great Barrier Reef region, non-catch motivations which related to 'psychological/physiological' and 'natural environment' experiences, were rated of more importance than catch related motives. Anglers with different levels of fishing experience and participation sought various types of motivations and experiences. More experienced anglers were mostly interested in the non-catch related benefits gained from participating in recreational fishing activities. Individuals who allocated a greater percentage of their leisure time to fishing and those with higher levels of fishing expertise were more motivated to catch fish, and fish for the skills and challenge involved, thus reflecting a greater resource dependency.

#### *Last Trip Experiences*

Sixty-six percent of recreational anglers from Queensland fished in saltwater during their last fishing trip. Sixty-two percent of anglers indicated that they were targeting a specific species on their last trip; with whiting, bream and flathead being the most popular species targeted.

Seventy percent of anglers surveyed from the Great Barrier Reef region also fished in saltwater on their last trip. Species mostly targeted were Mackerel, Crabs and Barramundi. Most saltwater trips were a single day outing, undertaken on a boat, accompanied by friends and family members. Saltwater anglers spent most of their time line fishing, crabbing and collecting bait.

Catching fish was not the main benefit received by anglers from Great Barrier Reef region on their last trip. Indicators of fishing trip satisfactions most frequently mentioned included personal and social benefits, natural environment experiences, conditions associated with the weather and catch related outcomes. Very few activities undertaken by other people or boats had a negative or detracting influence on anglers' and their experiences from the Great Barrier Reef region.

As a preliminary investigation these results provide management authorities with some essential information and social science techniques that can be used as a baseline for future management and decision-making.

## **1.0. INTRODUCTION**

For many Queenslanders recreational fishing is a popular leisure time activity. Surveys undertaken by Roy Morgan Research (1998) suggest that approximately 34% of Queenslanders fish at least once per year. As a result of more advanced fishing technology and a greater number of vessels on the water, fishing effort along the Queensland coastline has continued to increase (Kengington 1993). With an estimated 24,300 privately registered boats fishing the Great Barrier Reef region, it is not surprising that fishing practices represent the most extractive activity occurring within the Great Barrier Reef World Heritage Area (Wachenfeld, Oliver & Morrissey 1998). Managers of the fisheries are faced with the challenge of conserving targeted fish stocks while ensuring equitable resource allocations and sustained multiple use. It is clearly in the interests of conservation and fisheries agencies to identify and achieve an understanding of the social, economic and ecological implications of recreational anglers and their activities if the effects of fishing are to be managed successfully.

Management of fisheries within the Great Barrier Reef Marine Park is the responsibility of the Queensland Government through the Queensland Fisheries Management Authority (QFMA) and the Queensland Department of Primary Industries (DPI). The Great Barrier Reef Marine Park Authority (GBRMPA) also holds significant responsibilities for ensuring the conservation of fish stocks and the environment that sustains them. The GBRMPA achieves such goals through the provision of zoning, management plans, and regulations that relate specifically to the fisheries. Consultation between the QFMA and the GBRMPA is undertaken regularly to ensure that fisheries and Marine Park management and planning arrangements are complementary and compatible (Wachenfeld, Oliver & Morrissey 1998).

As managers of fisheries resources, the QFMA and the GBRMPA recognise that recreational anglers and their respective activities, play an important role in the maintenance and protection of fish stocks and species. As part of the construction of a Recreational Fishing Information System (RFISH), the QFMA have established a Recreational Fishing Logbook Program. As a component of this program, the QFMA and GBRMPA collected information on the socio-economic aspects of recreational fishing from Queenslanders. This information is aimed at providing managers with a greater insight into the needs and preferences of recreational anglers, whilst building a database from which effective decisions can be made. The results presented in this report are a preliminary insight into the socio-motivational aspects of recreational fishing by anglers from Queensland and more specifically the Great Barrier Reef region.

### **1.1. Literature Review**

A review of social and behavioural research on the recreational fishery in Queensland reveals there is a distinct lack of it. Despite the high popularity of fishing as a recreational activity in Australia, research into the topic has generally been of a biological emphasis. With a few notable exceptions, earlier research has been resource orientated with the focus being on the impact fishing has had on the fisheries resource. The motivational/behavioural question of why people go fishing has often been overlooked. There has been little appreciation of how social science data can be used in the allocation of fishery resources or how this information relates to biological understanding (Ditton 1980). Recently there has been emerging recognition that fisheries management involves managing people as well as fish (Fedler & Ditton 1994).

Consequently, considerably more attention is now being paid to anglers, their numbers, characteristics, attitudes, motivations, expenditures and harvest.

#### **1.1.1. *The Importance of Recreational Fishing Information for Management***

It is imperative that managers have the clearest possible understanding of recreational anglers, their motivations, experiences, tolerances and beliefs. Such information is very important for Marine Park management for several reasons.

To gain an understanding of why people go fishing is basic to explanations and predictions of recreational fishing behaviour. Nothing is more fundamental to fishers' behaviour than the factors that prompt it (Ingham 1986; Fedler & Ditton 1994).

Motivational and experiential factors vary with different conditions and between different types of fishing groups. As such, managers need to know about and have an understanding of such elements.

For practical reasons, through achieving a better understanding of the basic components of fishing motivation and how these relate to angler behaviour, managers can more easily anticipate fisher's responses to specific changes in management actions and ensure that experiences being provided meet angler needs (Driver 1977).

Anglers possess different levels of specialisation, prefer to fish in certain types of water and environments, target different species and so forth. Knowledge about these different profile characteristics will influence the types of management strategies implemented.

In summary, information from recreational anglers will assist managers to more effectively develop angler programs, provide enhanced fishing opportunities and experiences, whilst ensuring that consideration is given to ecological sustainability.

#### **1.1.2. *Motivations for Pursuing Fishing Activities***

What motivates people to fish has been the subject of conjecture for centuries. While many would believe that fishing is simply about catching a fish, a review of writings dating back as early as the 15th Century describes not only the catch-related benefits of fishing, but also the significance of unique personal rewards received from participation in this activity. Additionally, it is interesting to note that the theme of catching fish for consumption was nearly completely absent from these early contemplative works (e.g. Dame Juliana Berners 1496, Walton 1953 in Fedler & Ditton 1994). More recent scientific studies suggest that there are multidimensional aspects of fishing trip expectations and satisfactions that should be acknowledged (Holland & Ditton 1992; Driver & Cooksey 1980; Neuman & Hundloe 1986). To summarise, investigations have found fishing to be the result of a complex interaction of social, psychological and environmental factors; and it is this interaction which ultimately determines who participates in fishing and why (Ditton 1980).

Fishing motivations have been defined as the outcomes one desires from a fishing experience (Driver & Knopf 1976; Knopf, Driver & Basset 1973). Satisfaction on the other hand is determined by the differences between the outcomes one desires or thinks should be received (motivations) and the perceived fulfillment of those outcomes (Lawler 1973; Ditton & Fedler 1988). It is important to understand the reasons behind why people fish, because such motives have shown to be linked to the

expected outcomes or satisfactions derived from angling participation (Knopf 1983; Fedler 1984; Graefe & Fedler 1986).

Many earlier studies had assumed that the prime reason people fish was to catch fish, and that the size and/or quantity of fish caught was proportional to the amount of enjoyment received from a fishing trip (Fedler & Ditton 1994). In more recent research, findings highlight that while the desire to catch fish is one of the primary goals of anglers, non-catch related motivations associated with the experience are also very important. For many recreational anglers, the actual benefit derived from catching a fish may be relatively small in comparison to the total benefits of the recreational experience as a whole (Holland, Lal & Power 1992). In some studies non-catch motivations that have included 'to relax and unwind', 'to enjoy the company of others' and 'to be in a natural environment', have been rated of more importance than motives relating to the actual catching and harvesting of fish (Hendee & Bryan 1978; Fedler 1984). If people have numerous motives for fishing it follows that different anglers will seek to fulfill different packages of motives (Driver & Cooksey 1977; Graefe 1980). Motivational information is therefore important for fisheries management, as motives behind fishing ultimately provides an insight into why and what people want when using a marine environment.

### **1.1.3. Profiling Anglers**

It is a mistake to view the recreational fishing population as a homogenous group, for research has strongly suggested that anglers do not fit into neat, mutually exclusive categories (Graefe 1980). Clearly not all anglers possess the same attitudes, nor do they behave in the same way or receive the same satisfactions from a recreational experience. Developing an understanding of the variability among recreational anglers and their activities is currently an area requiring specific research attention by fisheries agencies. Because anglers are different it makes sense to generate summary profiles of fisher types because management policies should be tailored for particular fisheries in different regional locations.

One approach to understanding the diversity of recreational anglers is to develop conceptual typologies that seek to explain differences between individuals and groups of fishers. The concept of 'recreational specialisation' has potential for providing managers with a grounded understanding of group differences in the motivations, attitudes and behaviours of angler populations (Bryan 1977; Fedler & Ditton 1994; Ditton, Loomis & Choi 1992). Bryan (1977) defined specialisation as 'a continuum of behaviours' from the general to the specialised. At one end of the continuum are the least specialised anglers, who are naïve and hold a simplistic view of their activity, whilst at the other end of the continuum are the most specialised anglers who have made fishing a central life interest (Fedler & Ditton 1994). Bryan (1977) identified four types of anglers along the specialisation continuum, which he classified as: occasional, generalists, technique specialists and technique setting specialists.

Developing fisher typologies may be characterised in many ways, which reflect different preferences and behaviours. For example, Graefe (1980) suggested that assessing an angler's level of participation was useful for developing subgroups, and could be used as a surrogate measure for fishing specialisation. Several other methods of measuring an angler's level of specialisation include: frequencies of participation, level of fishing experience, setting preferences, technique preferences, choice of equipment, species targeted, importance of catch, social setting of activity and preference for resource management (Ditton et al. 1992). Identifying the various

segments of the recreational fishing population is critical in the formation of management and planning policies of Marine Park areas such as that of the Great Barrier Reef region.

## **1.2. Purpose of the Investigation**

The natural and social systems that relate to fishing environments are interdependent. The preservation of the Great Barrier Reef's fisheries is about managing people's uses, perceptions, values and expectations of this natural resource in ways which are ecologically sustainable. Recreational anglers are both essential partners and important sources of information with regards to environmental understanding and preservation of fishery resources. There is no detailed information that exists on the socio-motivational aspects of recreational anglers and their activities in Queensland. To meet this need the QFMA and the GBRMPA investigated and surveyed recreational anglers throughout regions of Queensland. This information will provide a baseline from which managers will be able to plan and better predict angler's behaviours towards regulations and adopt more successful strategies that encourage cooperation.

### **1.2.1. Aims and Objectives**

Information collected from the QFMA recreational fishing survey aims to enhance the understanding of the social, motivational and demographic profile of recreational anglers from the Great Barrier Reef region in order to assist with decision-making and future management of the fishery.

Objectives:

- To obtain a socio-demographic and fishing profile of recreational anglers using the Great Barrier Reef region
- To describe the nature and extent of recreational fishing activities (salt and freshwater) taking place in North Queensland
- To identify people's motivations and values for pursuing fishing activities whilst assessing the importance of fish catch and harvest to anglers from regions of Queensland
- To classify and understand the multi-dimensional aspects of fishing trip satisfaction
- Review and expand the Marine Park Authorities understanding of recreational anglers through comparisons with previous literature and studies of fishers in the Great Barrier Reef region and elsewhere
- Outline recommendations for future research and relevant implications for managers and planners of the Great Barrier Reef Marine Park

## 2.0. METHODOLOGY

### 2.1. The Survey

The Recreational Fishing Survey was developed through joint consultation between the Queensland Fisheries Management Authority and the Great Barrier Reef Marine Park Authority. The survey was designed to collect information as an extension of the Recreational Fishing Logbook Program. The purpose of the survey instrument was to gain an insight into the social, motivational and economic aspects of recreational fishing to people from regions of Queensland.

The survey was divided into four sections described as: Part 1) Fishing Experience and Motivations, Part 2) Details of Your Last Fishing Trip in Queensland, Part 3) Expenditure on Fishing and, Part 4) Demographic Information. In the survey respondents were asked to provide their Logbook ID so that responses to certain survey questions could be linked to previous information given in their Recreational Fishing Logbooks. Combinations of forced choice and open-ended questions were utilised within the survey format. Respondents were only identified by their Logbook ID, as such names and addresses remained anonymous. A copy of the Recreational Fishing Survey is presented in Appendix A.

### 2.2. The Sample

Subjects chosen to participate in the Recreational Fishing Survey were pre-selected from a list of anglers involved in the QFMA Recreational Logbook Program. The purpose of the Recreational Logbook Program is to collect information from recreational anglers on catch rates and the location of fishing activities throughout Queensland. A total of 4,539 surveys were mailed to recreational anglers from Queensland. Two thousand and sixty-one surveys were completed by anglers from the Logbook Program, giving a response rate of 45.4%. Neuman (1994) noted that a response rate of between 10 – 50% is common for mail surveys. For analysis purposes the sample was divided into three regions: South-east Queensland, the Great Barrier Reef region and Western Queensland. Statistical divisions included within these regions are found in Appendix B. Table 1 displays the response rates and the number of completed surveys from each of these three Queensland regions.

**Table 1.** Response rates for the Recreational Fishing Survey by Queensland Regions.

Queensland Region	Surveys Sent	Responses	Response Rate
South-east Queensland	2, 618	1, 180	45.07 %
Great Barrier Reef Region	1, 337	593	44.35 %
Western Queensland	584	288	49.31 %

### **2.3. Data Analysis**

QFMA and Australian Bureau of Statistics (ABS) staff classified, coded and entered survey data into a relational database using Microsoft Access. Queries were carried out in MS Access and then exported into Microsoft Excel. The objective was to describe the socio-motivational profile of recreational anglers who fish the Great Barrier Reef World Heritage area. Reference to this task provided guidance and determined those questions that required analysis. This socio-motivational data was extracted into SPSS (Statistical Package for Social Scientists) in order to undertake descriptive and statistical analyses. Several datafiles were created in SPSS, which separated respondents by region and the type of water fished in during their last trip.

For the purpose of this report, data was treated in two ways. Firstly data was summarised in order to provide a basic description of the sample and how they scored individual question items. Secondly, relationships were tested among different variables. In most cases differences were examined by Chi Squared and ANOVA tests.

To examine the motives for pursuing fishing (Motivation Scales), items were grouped into categories based on the extensive work of Fedler and Ditton (1994). Categories devised from the motivation scales sought to determine a smaller number of items that could be used to represent general motives for fishing. Motive categories and scores were calculated for each respondent and compared across factors such as socio-demographic characteristics and experiential profiles of anglers.

### **2.4. Limitations of the Investigation.**

The Recreational Fishing Survey was administered in part as a preliminary investigation into why people participate in fishing activities and the cost of recreational fishing. Several social science techniques were piloted in the survey, and as such there were some limitations and associated difficulties within the socio-motivational component of the study, which should be noted.

Firstly the poor response rates for questions appearing in the later sections of the survey lead to the assumption that the survey was too long and detailed for some respondents. It is suggested that the survey could have been simplified or divided into several smaller questionnaires aimed at targeting key issues of interest.

The socio-motivational sections of the survey could have been improved by standardising statements and incorporating consistent wording and response formats. Utilisation of pretested scales and questions from similar previous investigations would have ensured greater validity and reliability of data collected.

Although information was collected about an angler's last trip experiences, no questions asked respondents to provide details about their 'normal' or 'usual' type of fishing trip (e.g. type of water fished in, companions, location, species targeted). Normalising questions could have provided more useful information for managers and assisted with defining a more precise profile of recreational anglers and their levels of 'specialisation'.

Certain problems were also associated with the original QFMA database and quality of data contained within this. There was immense repetition in many of the datafiles, and when exported from Access into Microsoft Excel and SPSS, many filenames were lost



making it very confusing to distinguish what questions were which variables. Overall this process was very tedious and time consuming.

Preliminary descriptive analysis highlighted problems associated with the data in terms of incorrect coding and data entry. It was found that many variables had values without a corresponding coding classification. This was particularly evident in the coding of species targeted during an angler's last fishing trip. Values entered either had no corresponding species classification or species supposedly targeted in saltwater were actually freshwater species and visa versa. Because many people had worked on the data entry and coding of responses, it was difficult to rectify these errors. This could have been avoided through consistent checks during data entry.

Some three hundred surveys could not be linked to a Logbook ID, and as a result information regarding respondents' last trip, the destination visited and whether fishing had taken place in salt or fresh water could not be analysed. Valuable information from these respondents therefore had to be eliminated from the final dataset.

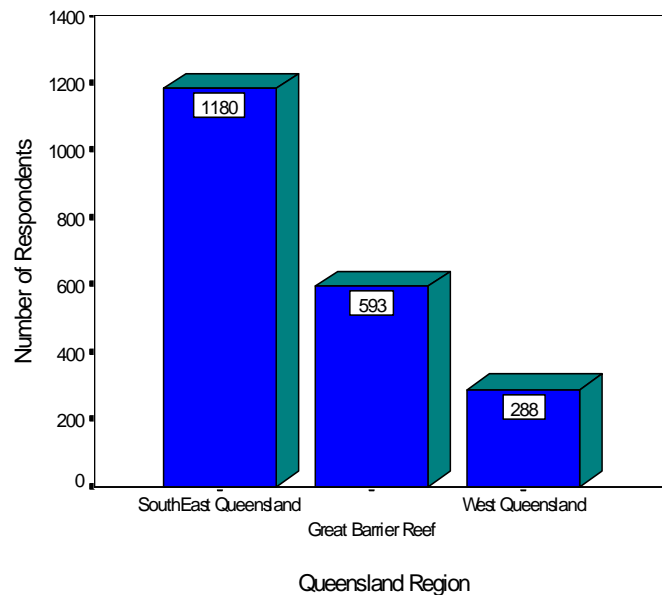
When the sample was divided into regions of Queensland, the Western district had a significantly lower number of respondents. Sample sizes also became comparatively smaller when respondents were de-aggregated into the four Great Barrier Reef sections. Therefore only general conclusions could be drawn from the analyses between recreational anglers from the different regions of Queensland and divisions of the Great Barrier Reef region. There was also a low representation of indigenous respondents, and female anglers (20%) in comparison to fishermen (80%). Consequently only limited comparative analyses could be undertaken.

Despite initial difficulties with the dataset and limitations with regards to the survey design, some very interesting and informative data was collected. Information provides an insight into the socio-motivational characteristics of recreational anglers from Queensland and the Great Barrier Reef region. These results are described and discussed in the following chapter.

### 3.0. RESULTS

#### 3.1. A Description of Recreational Anglers from Queensland

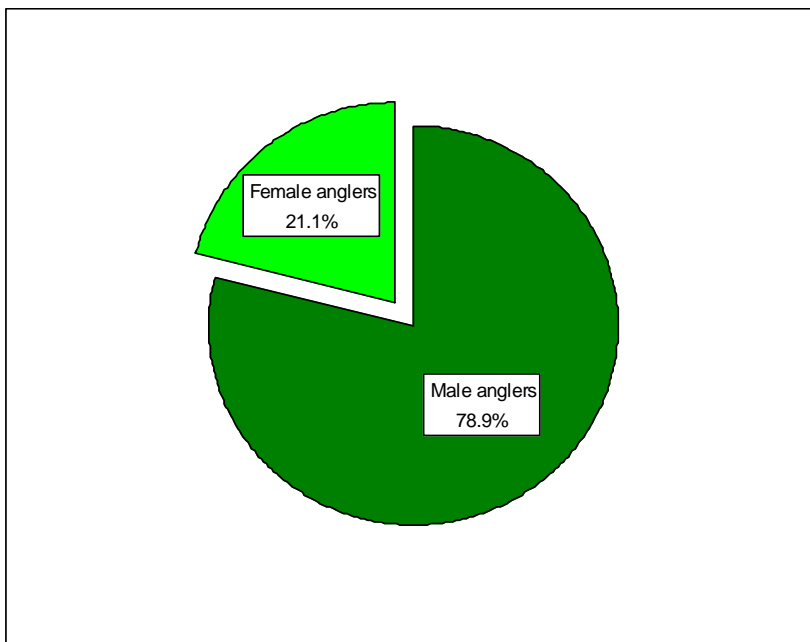
A total of 2,061 surveys were completed by recreational anglers from Queensland. Figure 1 shows that 56% of the sample comprised of respondents from South East Queensland (n= 1,180), 30% were from the Great Barrier Reef region (n=593) and 14% had returned surveys from Western Queensland (n=288).



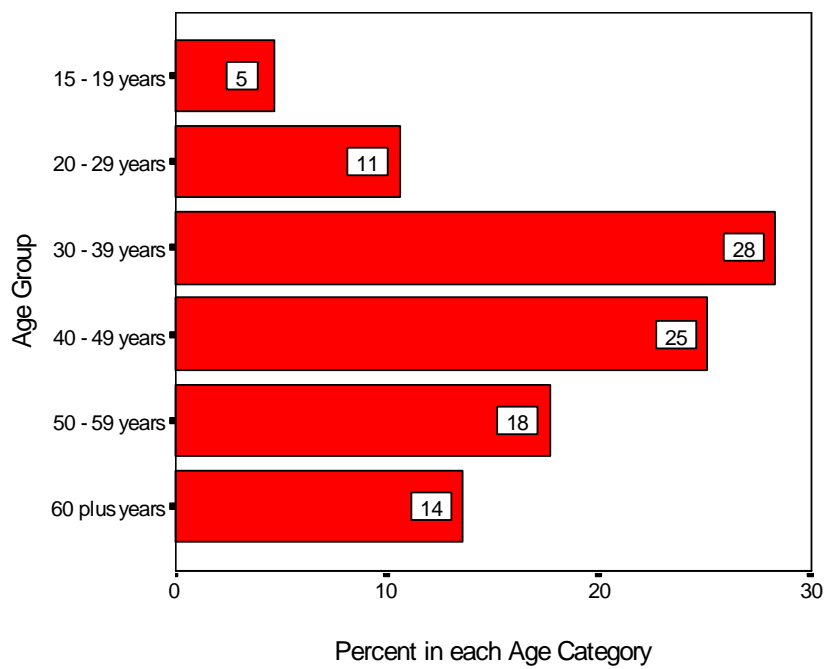
**Figure 1.** Respondents from the three regions of Queensland.

The demographic characteristics of the anglers who completed the survey are presented in Figures 2 through to 7. Of the sample 79% of Queensland respondents were male and 21% were female (see Figure 2). Anglers were over-represented in the middle age groups (30 – 39 years and 40 – 49 years), accounting for 53% of the sample and under-represented by those who indicated they were in the younger age groups (15 – 19 years and 20 – 29 years), who represented only 16% of the sample. Refer to Figure 3 for a display of the age categories of anglers from Queensland. Respondents were questioned about their highest level of education. Results presented in Figure 4 shows that 49% had completed a secondary level of schooling, 23% had attended tafe or technical college, 17% possessed a tertiary qualification, and 10% indicated they were educated at a primary level. As illustrated in Figure 5, approximately 7 out of 10 respondents were employed either as a wage or salary earner (53%) or classified themselves as being self-employed (17%). Pensioners and retirees comprised of 11% and 6% of the sample respectively.

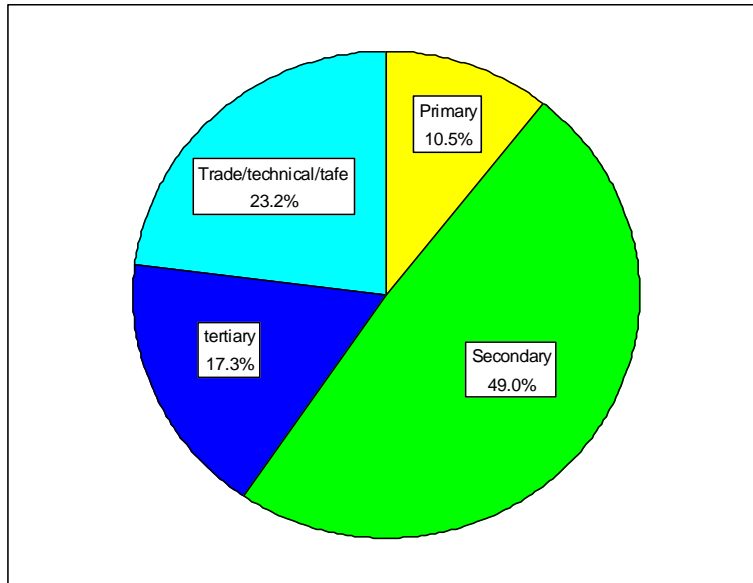
Of the sample only 8 people (0.4%) indicated that they of Aboriginal or Torres Strait Islander origin. The population percentage for Queensland is 2.8 percent.



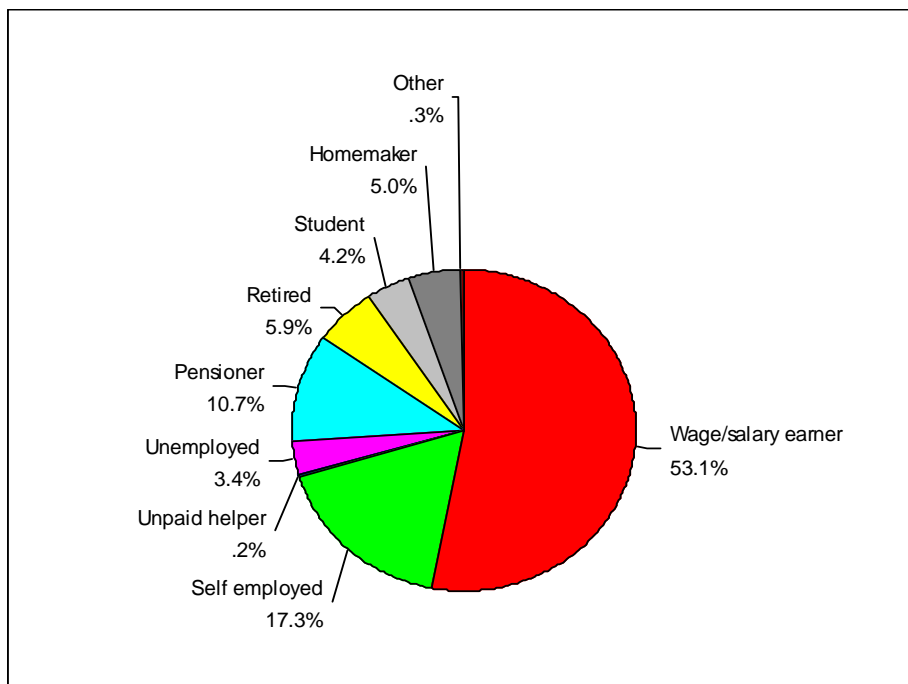
**Figure 2.** Gender of respondents from Queensland.



**Figure 3.** Percentage of respondents in each age category.

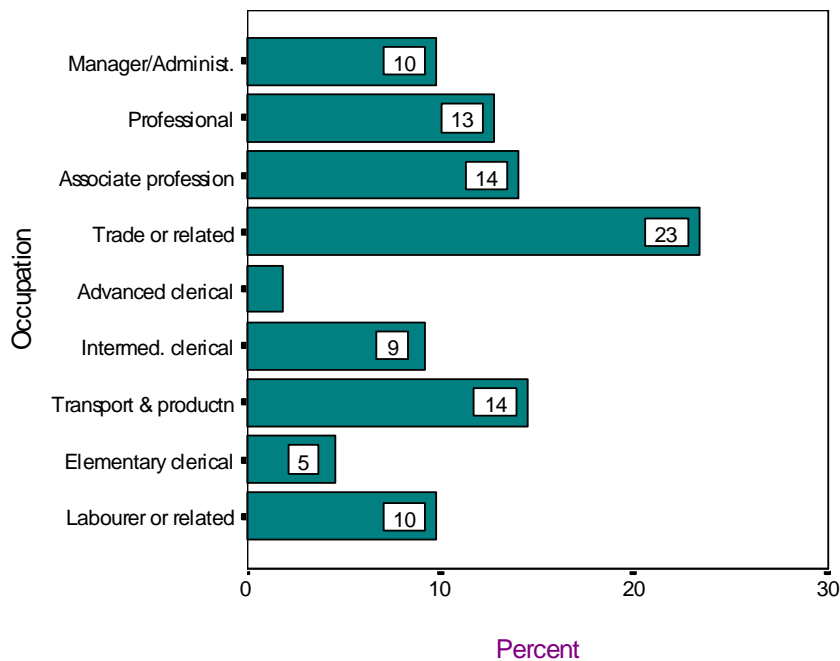


**Figure 4.** Highest level of education completed by Queensland recreational anglers.



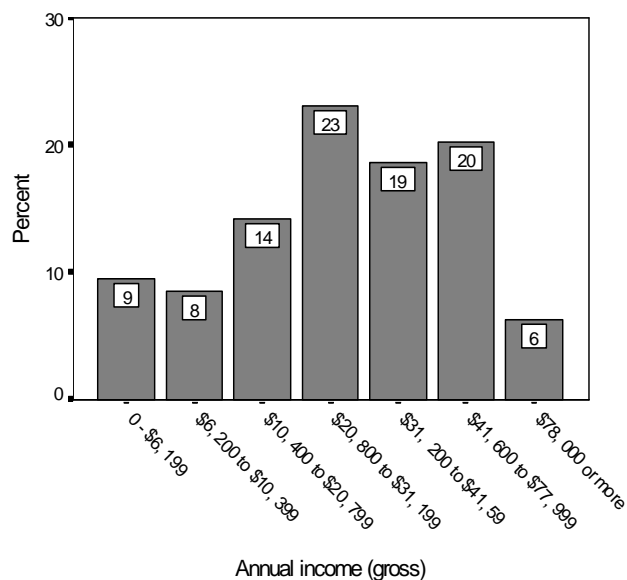
**Figure 5.** Labour force status of Queensland recreational anglers.

The occupational status of respondents is displayed in Figure 6. Tradespersons and related workers represented 23% of respondents. Associate professionals (14%), transport and production workers (14%) and professionals (13%) also over-represented the sample. There was a significant under-representation in two of the three clerical related categories with 2% and 5% being advanced clerical/service workers and elementary clerical/service workers, respectively.



**Figure 6.** The occupational status of Queensland respondents.

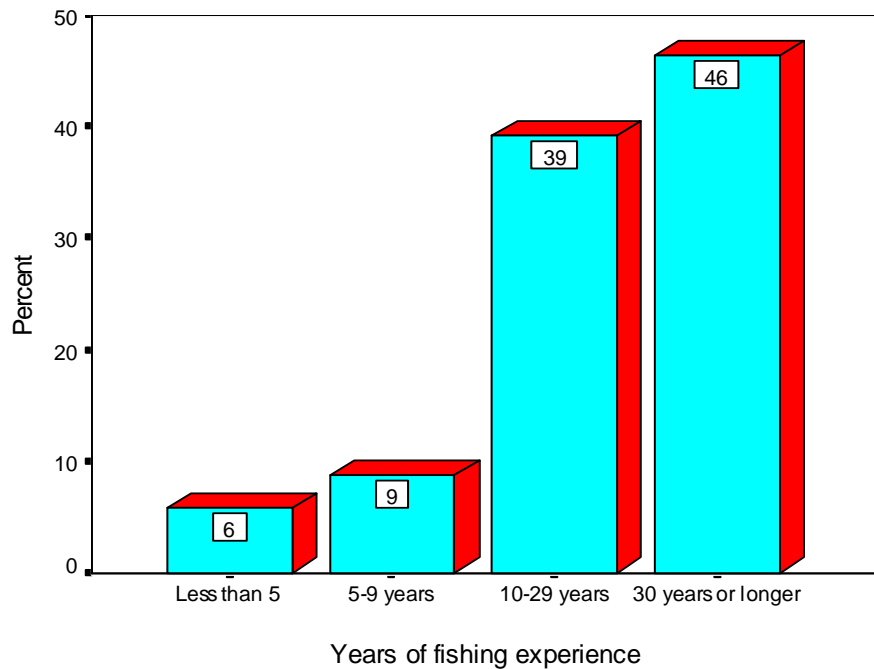
The annual income of survey respondents is presented in Figure 7. As shown 23% earned an annual gross income of \$20,800 to \$31,199, 20% fell within the income bracket of \$41,600 to \$77,999, and 19% indicated that they obtained an annual income of \$31,200 to \$41,599. This sample tended to have a significantly higher average income when compared to that of the Queensland population as a whole (Byron 1999).



**Figure 7.** Personal income levels for Queensland respondents.

### 3.2. An Experiential Profile of Recreational Anglers from Queensland

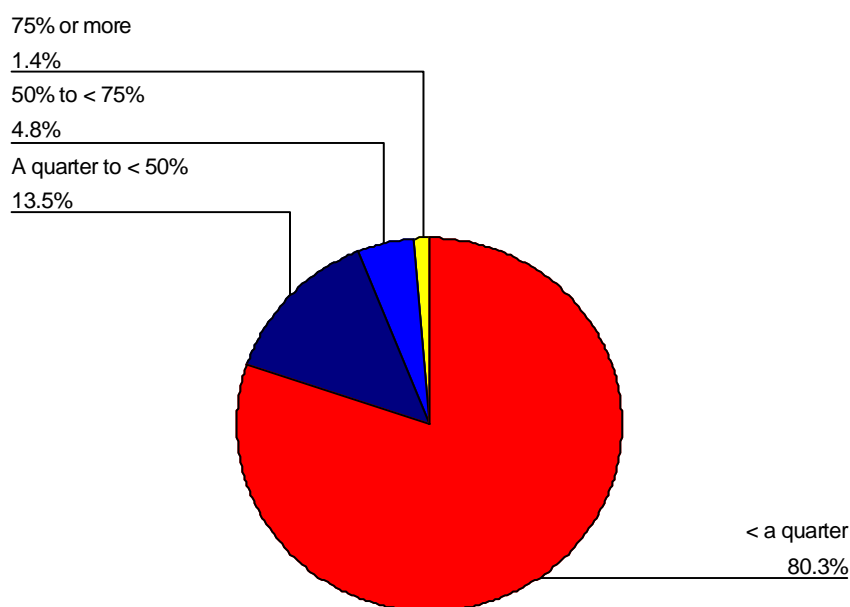
Recreational anglers from Queensland were asked to describe their years of fishing experience, amount of leisure time spent fishing, and to rate their fishing ability. These profile characteristics from 2,061 Queensland respondents are displayed in Figures 8, 9 and 10.



**Figure 8.** Years of fishing experience possessed by Queensland recreational anglers.

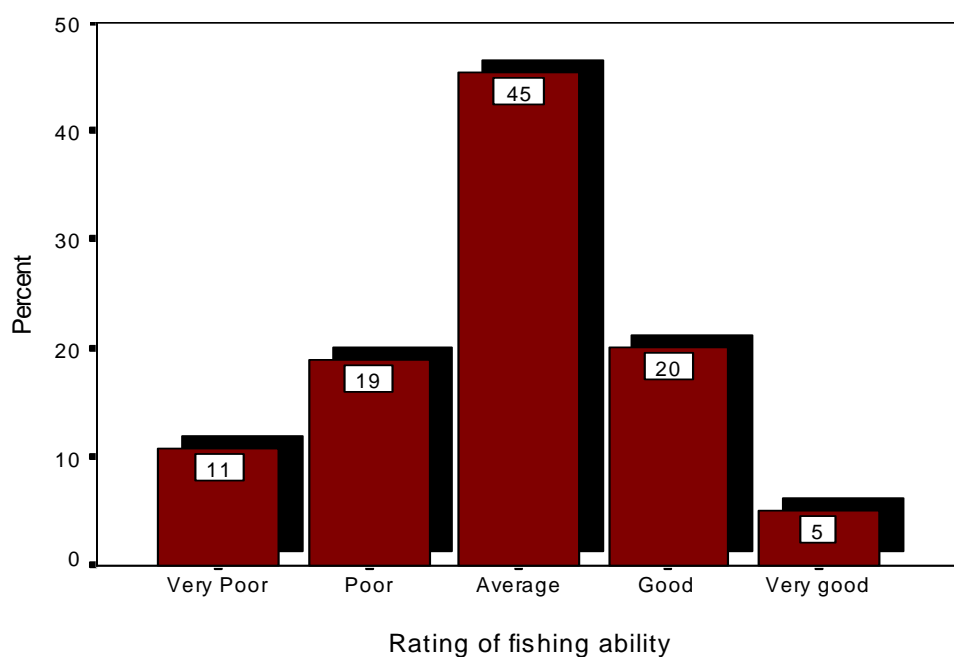
Figure 8 illustrates that 85% of recreational anglers from Queensland possessed at least ten years of fishing experience (10 – 29 years, 39% and 30 years or longer, 46%). Nine percent said they held between five to nine years of fishing experience, whilst 6% indicated they had participated in fishing activities for less than five years.

The majority of respondents from Queensland reported spending less than a quarter of their leisure time fishing (80.3%). Over 13 % said that they spent between a quarter to 50% of their recreational time fishing, whilst 4.8% and 1.4% reported allocating 50% to less than 75% and over 75% of their leisure time respectively, participating in fishing activities (see Figure 9).



**Figure 9.** Amount of leisure time spent recreational fishing by Queensland anglers.

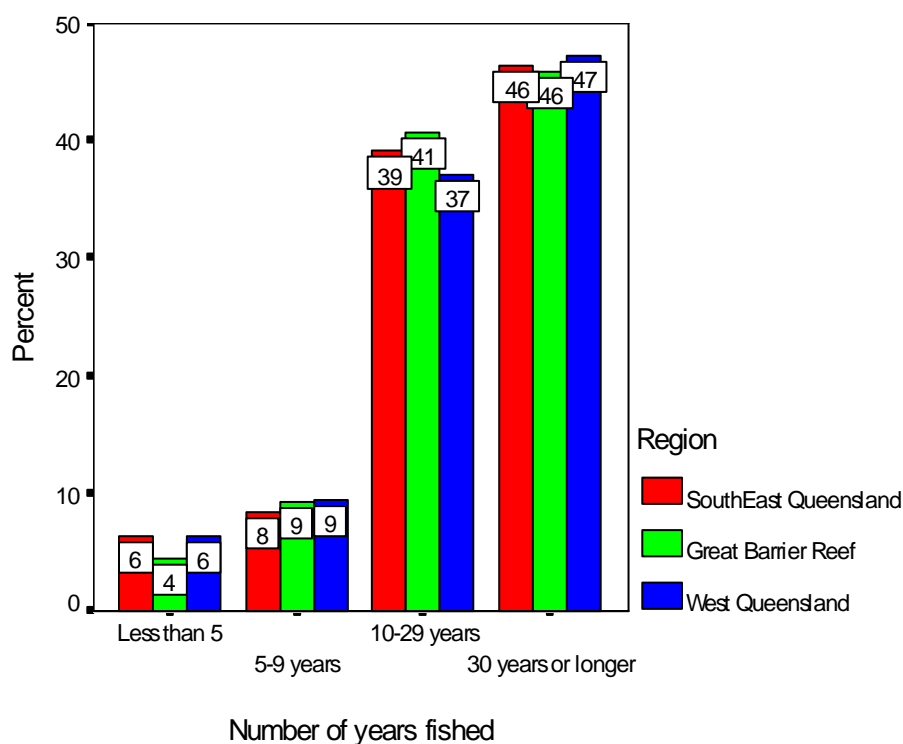
Recreational anglers from Queensland were asked to rate their ability at fishing on a scale from 1) = Very Poor to, 5) = Very Good. As viewed in Figure 10, 45% felt they were 'average' fishers, 30% rated their ability as being below average (Poor 19% and Very Poor 11%), and 25% thought that their expertise was above average (Good 20% and Very Good 5%).



**Figure 10.** Rating of fishing ability by recreational anglers from Queensland.

### 3.2.1. *An Experiential Profile of Recreational Anglers from Three Queensland Regions*

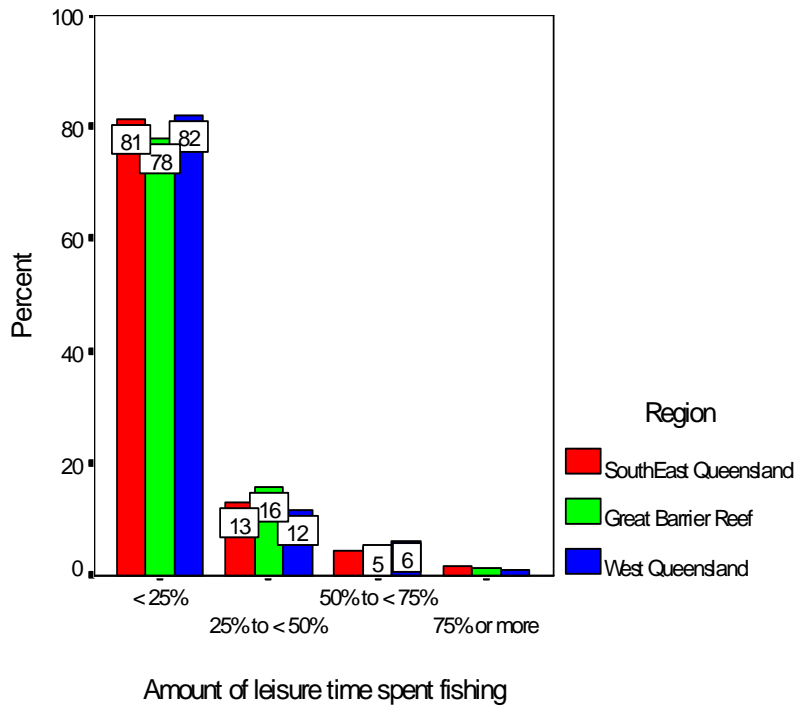
Analyses were undertaken to investigate whether the profile of recreational anglers, determined by years of fishing experience, level of participation in recreational fishing and rating of fishing ability, differed between respondents from three Queensland regions. Results found no significant differences between the profile characteristics of recreational anglers from South-east Queensland, Western Queensland or the Great Barrier Reef region. As displayed in Figure 11, a large proportion of respondents from each of the three regions had fished for at least 10 years. However, the largest and most experienced group from South-east Queensland, Western Queensland and the Great Barrier Reef region were anglers who reported having participated in recreational fishing for at least thirty years.



**Figure 11.** Years of fishing experience by anglers from Queensland Regions.

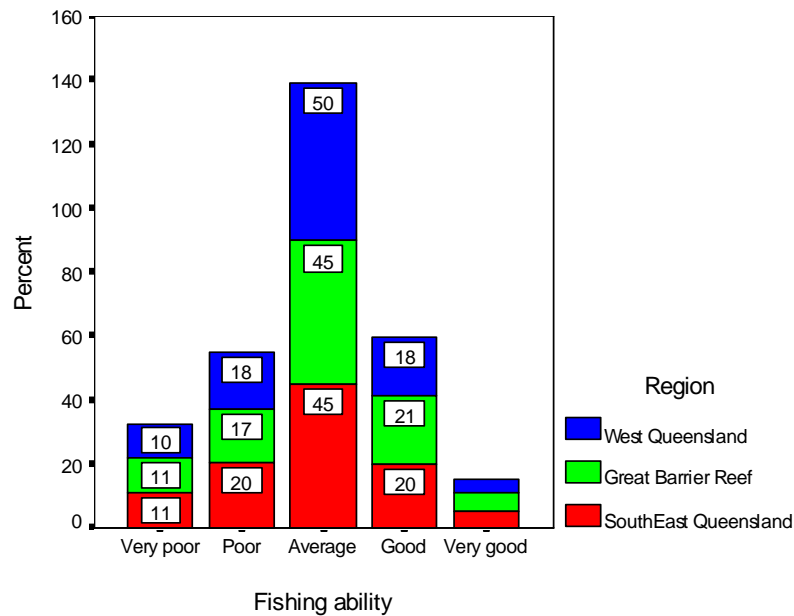
Levels of fishing participation were relatively stable across Queensland regions as illustrated in Figure 12. Only a very small proportion of anglers from each of the three Queensland regions indicated that over 75% of their leisure time was spent fishing. A significant majority of anglers from Great Barrier Reef, South-east and Western Regions of Queensland reported spending less than a quarter of their recreational time fishing.





**Figure 12.** Amount of leisure time spent fishing by anglers from three Queensland regions.

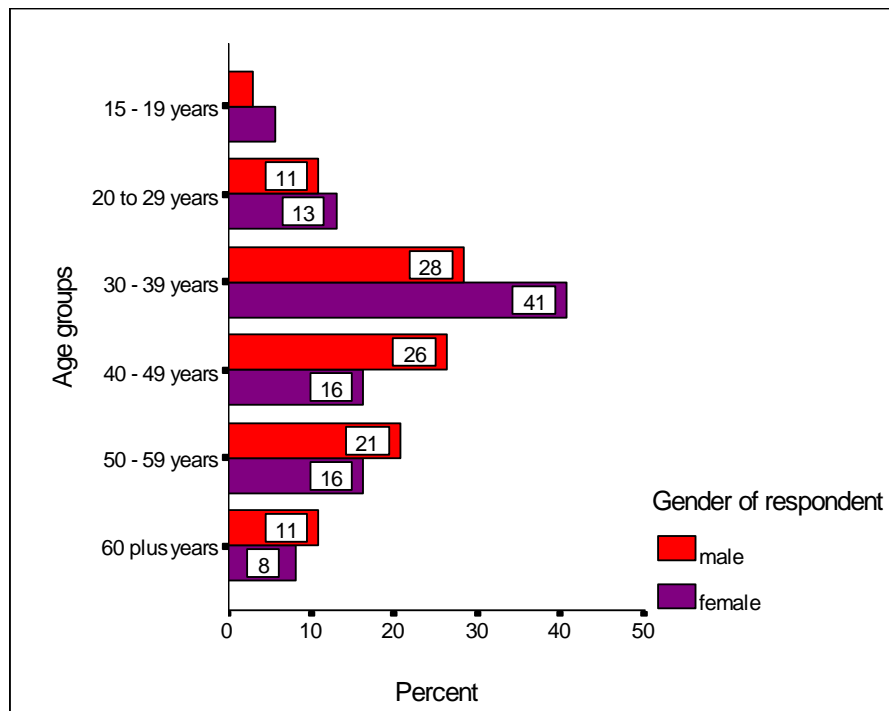
Analysis found no significant difference between the self-reported fishing ability of respondents across each of the three regions of Queensland. As reflected in Figure 13, a larger percentage of recreational anglers from each of the three Queensland regions graded their fishing skills as 'Average'.



**Figure 13.** Rating of fishing ability by anglers from three Queensland regions.

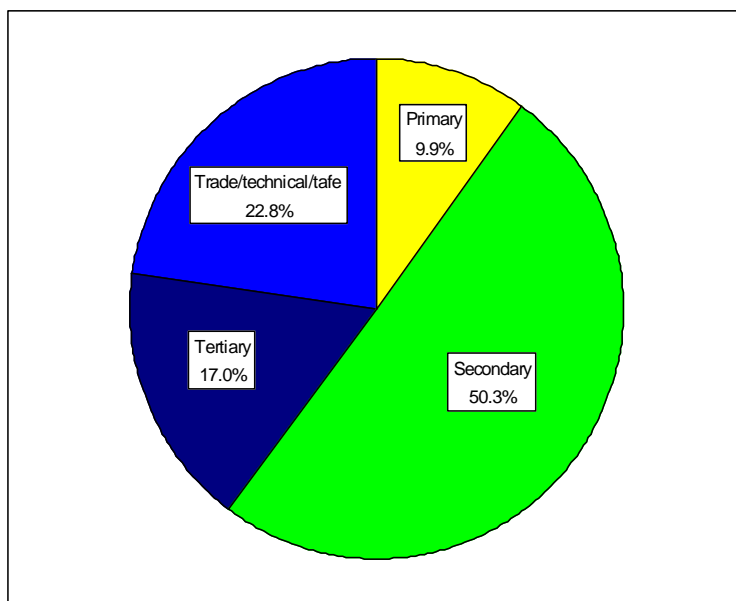
### 3.3. A Description of Recreational Anglers from the Great Barrier Reef Region

Data used for describing the socio-demographic and experiential profile of recreational anglers from the Great Barrier Reef Region of Queensland was obtained from 593 respondents. The majority of recreational anglers surveyed from the Great Barrier Reef region were male (79%); in comparison to 21% who were female. Most of these respondents were aged between 30 – 49 years (55%), whilst 30% of anglers reported being over the age of 50. Those younger than 30 years of age represented 15% of the recreational anglers surveyed. Figure 14 reflects very little difference in the percentage of male and female anglers in terms of participating age groups. There was however, a greater percentage of female anglers' aged between 30 – 39 years (41%) in comparison to male recreational anglers of the same age group (28%).



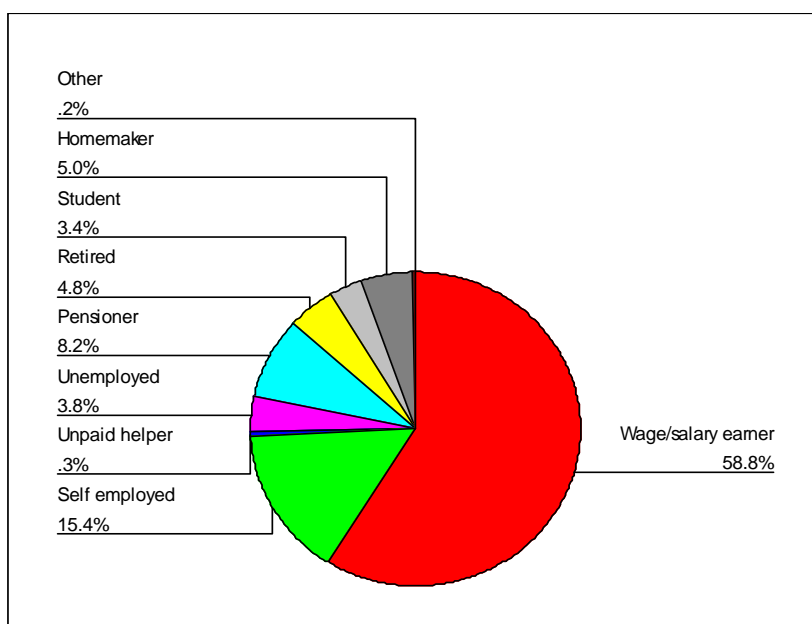
**Figure 14.** Age by gender of recreational anglers from the Great Barrier Reef region.

Figure 15 displays that 50% of recreational anglers from the Great Barrier Reef region had completed secondary school as their highest reported level of education, 23 % went to tafe or finished a trade, 17% achieved a tertiary degree, and 10% finished schooling at a primary level.



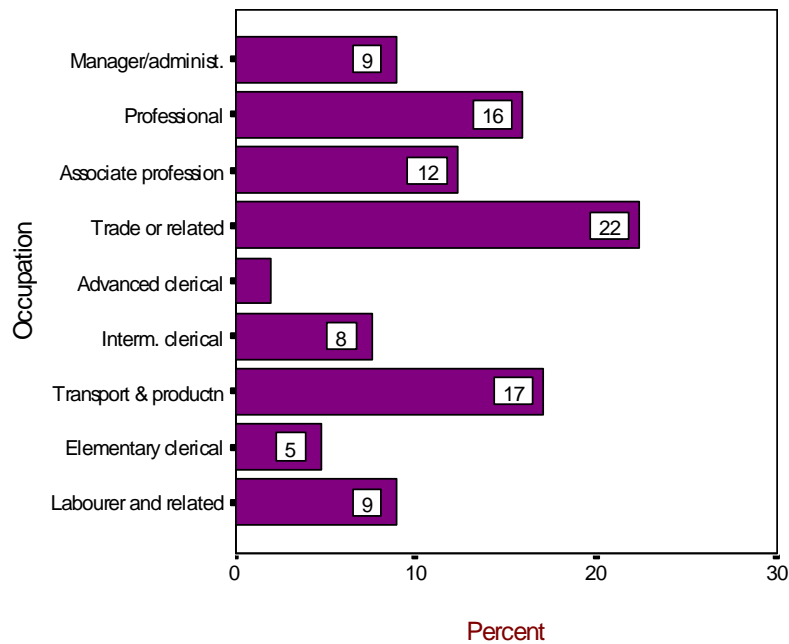
**Figure 15.** Highest level of education completed by anglers from the Great Barrier Reef region.

In terms of respondents' employment status, 59% reported that they were wage or salary earners, 15% said they possessed their own business, and 13 % were either pensioners or retired. The remaining 13% classified themselves as either being unemployed, a student, a homemaker or an unpaid helper (see Figure 16).



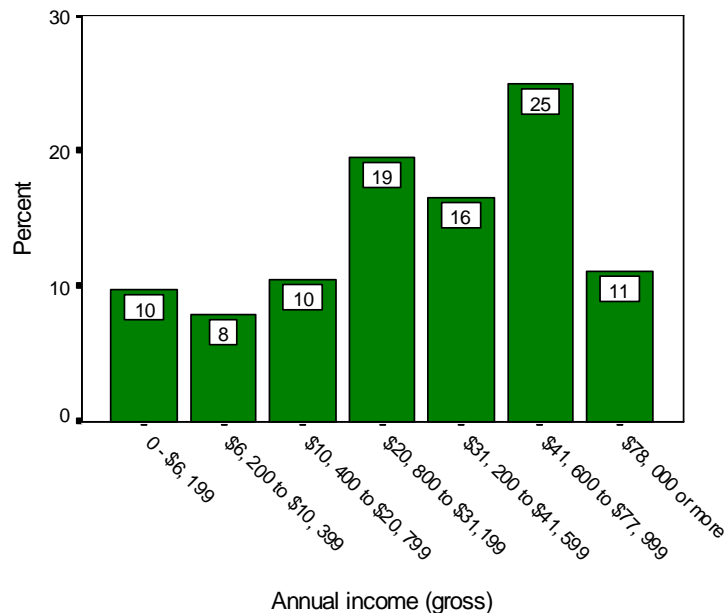
**Figure 16.** Labour force status of anglers from the Great Barrier Reef region.

Figure 17 displays the occupational status of Great Barrier Reef respondents. Twenty-two percent worked in a trade, 17% were transport or production workers, 16% held a professional position and 12% an associate professional position. Few respondents worked within any of the three clerical-related categories.



**Figure 17.** The occupational status of recreational anglers from the Great Barrier Reef region.

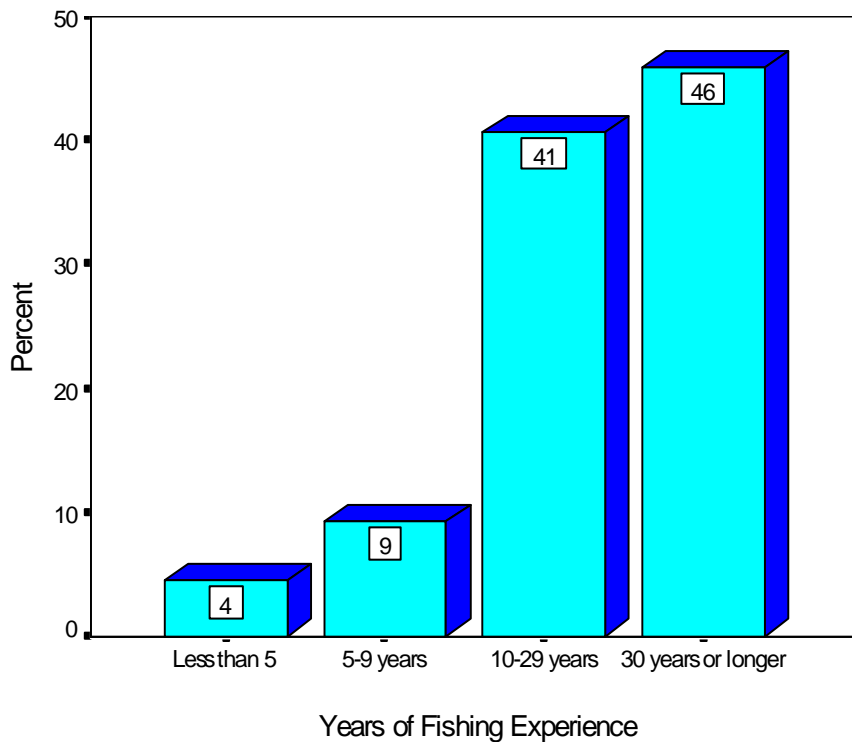
Approximately 36% of respondent's earnt over \$41,600 per annum and 35% reported having an annual income of between \$20,800 to < \$41,599. The annual gross incomes of these anglers from the Great Barrier Reef region were higher than the average incomes of respondents from the South-east and Western regions of Queensland.



**Figure 18.** Personal income levels for respondents from the Great Barrier Reef region.

### 3.4. An Experiential Profile of Recreational Anglers from the Great Barrier Reef Region

The majority of respondents from the Great Barrier Reef region had participated in recreational fishing activities for at least ten years (see Figure 19). Of the sample, 46% possessed thirty or more years of fishing experience, 41% had spent between 10 to 29 years as participants of recreational fishing, and 13% had fished for less than 10 years.



**Figure 19.** Years of fishing experience possessed by anglers from the Great Barrier Reef region.

Table 2 provides a comparison of the characteristics of anglers across the four categories of fishing experience. The distributions of angler's characteristics were analysed by use of the chi square test for differences in probabilities (Conover 1971). Results showed significant differences between groups with respect to gender, age, educational level, employment status and income. No significant association was found between fishing experience and respondents occupational status.

Results presented in Table 2 illustrate that anglers who reported having the most years of fishing experience were male and also tended to be older. Pensioners, retirees and unemployed respondents represented the group of recreational anglers who had participated in fishing for the most number of years. Findings also showed that homemakers and unpaid helpers possessed lower levels of fishing experience. With respect to educational level, anglers who reported the most years of fishing experience also completed schooling at the lowest level (primary school). A significant percentage of recreational anglers from both very high and low-income brackets claimed they had fished for at least thirty years.

**Table 2.** Characteristics of anglers from the Great Barrier Reef region by years of fishing experience.

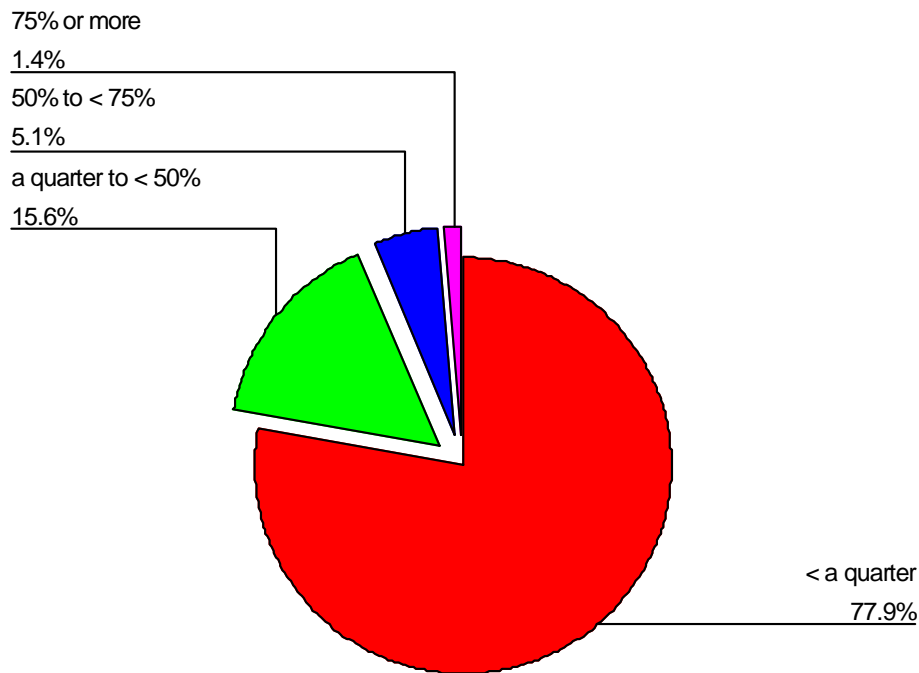
Angler Characteristics	Years of Fishing Experience				
	<i>Less than 5</i>	<i>5 – 9 years</i>	<i>10 – 29 years</i>	<i>30 years or longer</i>	<i>Total %</i>
<b>Gender ***</b>					
Male	3.3	7.6	40.4	48.7	100
Female	9.0	14.8	43.4	32.8	100
<b>Age ***</b>					
15 – 19 years	23.8	23.8	52.4	-	100
20 – 29 years	9.1	24.2	66.7	-	100
30 – 39 years	3.4	9.5	61.5	25.7	100
40 – 49 years	3.6	5.0	32.9	58.6	100
50 – 59 years	1.7	3.4	15.5	79.3	10
60 years & over	3.3	6.6	14.8	75.4	100
<b>Level of Education *</b>					
Primary	1.8	8.8	22.8	66.7	100
Secondary	4.5	10.3	43.1	42.1	100
Trade/Tafe/Technical	3.1	3.8	45.8	47.3	100
Tertiary	6.1	11.2	40.8	41.8	100
<b>Employment Status ***</b>					
Wage/Salary earner	4.1	8.8	47.2	39.9	100
Self employed	4.4	4.4	32.2	58.9	100
Homemakers/ Unpaid helpers	3.1	25.0	50.0	21.9	100
Pensioner/retired/ unemployed	2.0	7.1	19.4	71.4	100
<b>Income **</b>					
\$0 to \$20, 799	6.7	12.7	34.7	46.0	100
\$20, 800 to \$41, 599	3.7	10.5	49.2	36.6	100
\$41, 600 or more	3.1	4.2	38.7	53.9	100

\*\*\* *Chi Square value significant at 0.001 level*

\*\* *Chi Square value significant at 0.01 level*

\* *Chi Square value significant at 0.05 level*

To measure an anglers level of participation in recreational fishing, respondents were asked to report how much of their leisure time is spent fishing. Figure 20 illustrates the percentage of leisure time Great Barrier Reef respondents allocated to recreational fishing. Almost 78% of the anglers surveyed reported spending less than a quarter of their leisure time fishing. Some 16% said that up to 50% of their recreational time was allocated to fishing, 5% indicated between 50% to 75%, whilst 1.4% of these Great Barrier Reef anglers reported that 75% or more of their leisure time was spent fishing.



**Figure 20.** Leisure time allocated to recreational fishing by anglers from the Great Barrier Reef.

A comparison of respondent's socio-demographic characteristics within the four levels of fishing participation is presented in Table 3. Results reflect that males tended to spend more of their leisure time fishing in comparison to their female counterparts. With respect to educational level, the most occasional anglers reported having the most formal education, whereas those who allocated a higher percentage of their leisure time to fishing represented a greater proportion of respondents with little formal schooling. No significant differences were found between participation in fishing and age, employment status, occupation or income levels of respondents from the Great Barrier Reef region. Further analysis showed no association between years of fishing experience and an angler's level of participation in recreational fishing.

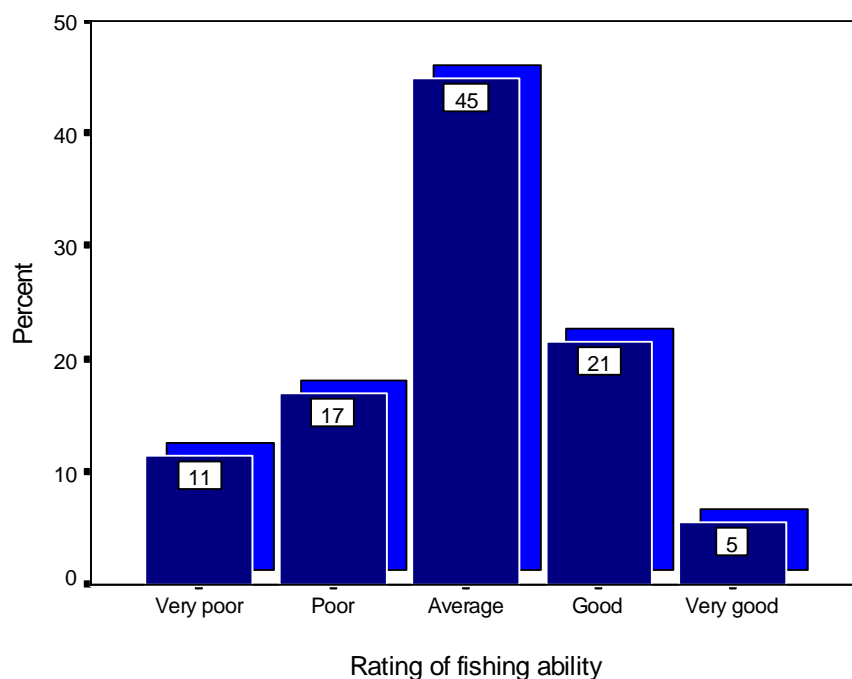
**Table 3.** Characteristics of anglers from the Great Barrier Reef region by amount of leisure time spent fishing.

Angler Characteristics	Amount of leisure time spent fishing				
	<i>Less than 25%</i>	<i>25% - &lt;50%</i>	<i>50% - &lt;75%</i>	<i>75% - 100%</i>	<i>Total %</i>
<b><i>Gender*</i></b>					
Male	75.1	17.5	6.1	1.3	100
Female	87.5	9.2	1.7	1.7	100
<b><i>Level of Education*</i></b>					
Primary	74.1	18.5	3.7	3.7	100
Secondary	72.7	20.4	5.5	1.4	100
Trade/Tafe/technical	82.4	9.9	6.1	1.5	100
Tertiary	88.7	8.2	3	-	100

\* *Chi Square value significant at 0.05 level*

As an indication of how good anglers from the Great Barrier Reef region were at recreational fishing, respondents were asked to rate their fishing ability on a five-point scale that ranged from 'Very Good' to 'Very Poor'. Figure 21 displays a relatively even distribution of self-reported skill by respondents. When anglers were asked how they rated their fishing ability, 45% scored themselves as 'Average', 21% as 'Good', and 5% rated their fishing expertise as 'Very Good'. Seventeen percent, followed by 11% graded their fishing abilities as 'Poor' and 'Very Poor' respectively.





**Figure 21.** Rating of fishing ability by anglers from the Great Barrier Reef region.

Table 4 displays different levels of fishing ability by the socio-demographic characteristics of anglers from the Great Barrier Reef region. Significant results were discovered in terms of respondents' gender, occupational status and annual income across ratings of fishing ability. Male anglers were more likely to grade their expertise at fishing as 'Good' or 'Very Good'. Clerical, sales and service workers followed by managers and professionals were groups who tended to rate their fishing abilities at lower levels. People who were involved in occupations that related to transportation, labouring or a trade reflected those anglers with the highest levels of self-reported skill. Anglers from a higher income bracket (> \$41,600) represented those who were more likely to rate their fishing skills at a higher level (i.e. 'Good'). There were no significant differences between age, educational level or employment status with respects to respondents' ratings of their fishing abilities.

**Table 4.** Rating of fishing ability by characteristics of anglers from the Great Barrier Reef region.

Angler Characteristics	Rating of Fishing Ability					
	<i>Very Poor</i>	<i>Poor</i>	<i>Average</i>	<i>Good</i>	<i>Very Good</i>	<i>Total %</i>
<b><i>Gender</i> ***</b>						
Male	7.4	15.3	46.2	25.5	5.7	100
Female	26.4	23.1	40.5	5.8	4.1	100
<b><i>Occupational Status</i> *</b>						
Manager/Professional	12.9	15.2	50.0	16.7	5.3	100
Trade or related	2.5	11.3	53.8	28.8	3.8	100
Clerical/service/sales	10.2	30.6	40.8	16.3	2.0	100
Transport/production/labourer	9.7	21.5	34.4	28.0	6.5	100
<b><i>Income</i> **</b>						
\$0 to \$20, 799	16.1	13.4	49.0	15.4	6.0	100
\$20, 800 to \$41, 599	6.3	23.2	45.3	19.5	5.8	100
\$41, 600 or more	13.1	14.1	41.4	26.7	4.7	100

\* Chi Square value significant at 0.05 level

\*\* Chi Square value significant at 0.01 level

\*\*\* Chi Square value significant at 0.001 level

In order to gain a fuller understanding of the experiential profile of anglers from the Great Barrier Reef region, it was important to investigate whether fishing skill was dependent upon a respondent's fishing experience. Results displayed in Table 5 reflect a significant relationship between the level of fishing experience (number of years fished) and ratings of fishing skill by anglers. Analyses suggest that anglers who possessed fewer years of fishing experience also scored their ability at fishing at much lower levels ('Poor' and 'Very Poor').

**Table 5.** Years of fishing experience by fishing ability of Great Barrier Reef respondents.

Rating of Fishing Ability ***	Years of Fishing Experience			
	<i>Less than 5</i>	<i>5 – 9 Years</i>	<i>10 – 29 years</i>	<i>&gt; 30 years</i>
Poor (Poor & Very Poor)	69.2	50.0	25.6	22.3
Average	19.2	37.0	50.8	43.5
Good (Good & Very Good)	11.5	13.0	23.5	34.2
	100%	100%	100%	100%

\*\*\* *Chi Square relationship significant at 0.001 level*

A significant relationship was found between respondents' level of fishing ability and the amount of leisure time spent fishing. Results displayed in Table 6 demonstrate that anglers who allocated the greatest amount of their recreational time participating in fishing activities also rated their fishing skills at a higher level.

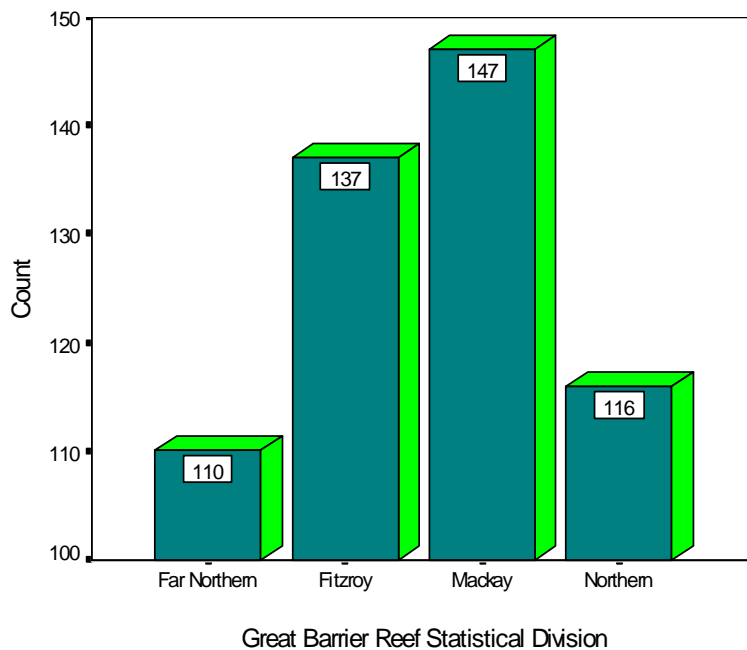
**Table 6.** Fishing ability of Great Barrier Reef respondents by amount of leisure time spent fishing.

Rating of Fishing Ability ***	Amount of leisure time spent fishing			
	<i>Less than 25%</i>	<i>25% - &lt;50%</i>	<i>50% - &lt;75%</i>	<i>75% - 100%</i>
Poor (Poor & Very Poor)	34.9	5.6	0	0
Average	45.5	46.7	30.0	37.5
Good (Good & Very Good)	19.6	47.8	70.0	62.5
Total	100%	100%	100%	100%

\*\*\* *Chi Square relationship significant at 0.001 level*

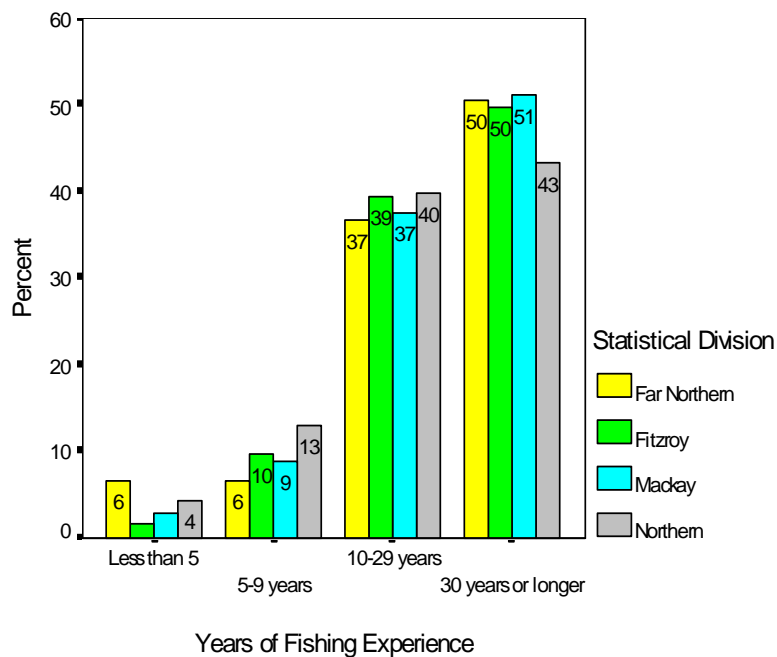
### **3.4.1. Profile Characteristics of Recreational Anglers from Statistical Divisions of the Great Barrier Reef Region**

Figure 22 shows the number of respondents surveyed from each of the four Great Barrier Reef statistical divisions. Twenty-two percent of respondents were anglers from Far North Queensland (n=110), 23% were surveyed from the Northern division (n=116), whilst 27% and 29% represented respondents from the Fitzroy (n=137) and Mackay (n=147) sections of the Great Barrier Reef region.



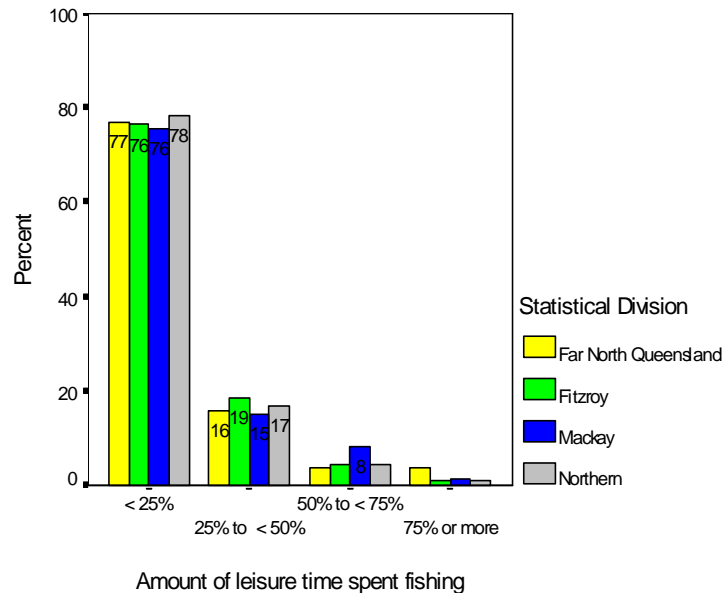
**Figure 22.** Anglers surveyed from the four statistical divisions of the Great Barrier Reef region.

Figures 23, 24 and 25 displays the experiential characteristics of anglers from the Far Northern, Northern, Fitzroy and Mackay sections of the Great Barrier Reef region. Anglers from each of the four statistical divisions reported very similar levels of fishing experience (see Figure 23). The majority of anglers from each of the four sections claimed they had participated in fishing for at least ten years, with approximately 50% of respondents from the Far Northern, Fitzroy and Mackay sections reporting they had fished for over thirty years.



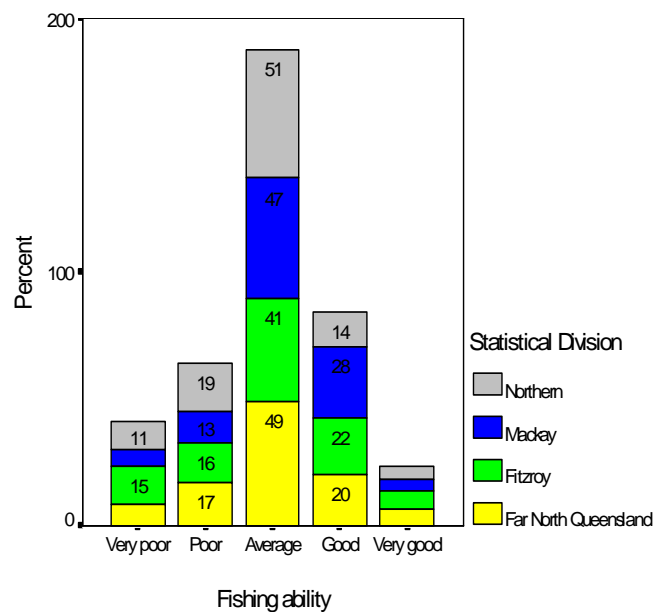
**Figure 23.** Fishing experience of anglers from statistical divisions of the Great Barrier Reef region.

There was very little difference between anglers from each of the four Great Barrier Reef divisions with regards to the amount of leisure time they spent pursuing fishing activities. Over 76% of respondents from each of the divisions reported that less than 75% of their recreational time was spent participating in fishing (see Figure 24).



**Figure 24.** Amount of leisure time spent fishing by anglers from divisions of the Great Barrier Reef.

Ratings of fishing ability by anglers from each of the Great Barrier Reef statistical divisions are displayed in Figure 25. Analyses found no significant difference in the fishing abilities of respondents from the four statistical divisions. However, a slightly higher percentage of people from the Mackay section scored their fishing ability as 'good' when compared to the self reported ratings of skill by respondents from the Far Northern, Northern and Fitzroy divisions.



**Figure 25.** Rating of fishing ability by anglers from statistical divisions of the Great Barrier Reef.

### 3.4.2. *A Discussion of Profile Characteristics of Anglers from the Great Barrier Reef Region*

This study sought to obtain an experiential profile of anglers from the Great Barrier Reef region by assessing their years of fishing experience, level of participation (avidity), and fishing ability. Findings showed that the majority of recreational anglers were male, aged between 30 – 49 years that had lived in their prospective areas for more than ten years. Most had completed schooling to a secondary level, were wage earners, with 36% of this sample earning over \$41,600 per annum. Forty-six percent of people surveyed possessed a minimum of thirty years fishing experience. Anglers who tended to have the most fishing experience were older, male, had retired or were pensioners, and completed schooling at a primary level. Seventy-eight percent of respondents from the Great Barrier Reef region spent less than a quarter of their leisure time fishing. Males allocated more of their recreational time to fishing and rated their fishing skills at a higher level. Those working in a trade or laboring position and anglers who earned over \$41,600 rated their fishing expertise higher than anglers from most other income and occupational groups. Similar levels of experience and participation were reported by anglers from the Far Northern, Mackay, Fitzroy and Northern sections of the Great Barrier Reef region.

Research undertaken by Graefe (1980) which assessed the relationship between level of fishing participation and angler characteristics, reflected similar findings to those discovered in the current investigation. Graefe's (1980) work showed that the more avid angler was over represented in both the higher and lower income brackets, tended to be older, more experienced at fishing, and had little formal schooling. Patterns seen relative to these variables in the results of the current investigation, may be a reflection of the presence of a segment of retired individuals in the highest level of the participation category. Additional findings by Graefe (1980) showed that those who fished most often were characterised by greater involvement with equipment, reflected higher levels of self-reported skill and participated in a wider variety of fishing

settings. Similarly, those Great Barrier Reef anglers who allocated most of their leisure time to fishing also reported higher ratings of fishing ability.

In this investigation an angler's level of participation was assessed by the amount of leisure time they spent fishing. Level of fishing participation is useful managerially because essentially it represents an important indicator of fishing effort. Several previous studies have shown that a small minority of anglers account for most of the fishing trips undertaken over a year (Romsa & Girling 1976; O'Leary & Pate 1979; Ditton 1980). Similar results were reflected in the present findings whereby those who spent most of their time recreational fishing also represented the smallest percentage of anglers from the Great Barrier Reef region. It is suggested that even though the more avid angler (those who spent the majority of their leisure time fishing) may represent only a small proportion of the overall recreational fishing population in the Great Barrier Reef region, their commitment means that they are probably more successful on the trips they do take. Consequently, the fishing activities of this smaller group may account for a more disproportionate share of the fish caught.

By further testing levels of angler participation it is possible to begin to assess the notion that a small minority of anglers account for most of the fishing days (effort) and most of the catch. In order to test this assumption, research should specifically inquire about an angler's frequency of fishing trips (per year or quarter), the length of these trips and details of catch. Earlier studies have made the mistake of acquiring data in average or summary form, making it impossible for decision-makers to understand the variation in participation levels and relate this to relevant subgroups of anglers (Ditton 1980). If future research can illustrate how anglers at varying levels of participation possess different motivations and seek different types of experiences, the implications for management decisions may be great.

Profile information about anglers and their variability can assist management authorities with the implementation of more successful strategies and regulations for the fishery. Information can help with assessing how different groups will be affected by various regulations. As an example, if authorities implemented a regulation aimed at achieving a particular yield by introducing size and bag limits, the experience of the more enthusiastic angler (those who fish more often and are likely to achieve higher catch rates) would likely be effected more so than the more numerous group of anglers who go fishing less often, and who may not be as skilled at catching a fish. Managers therefore must be careful about how their decisions will affect different groups of anglers, their activities and experiences.

Anglers can be further classified into different groups or types by understanding their various preferences, behaviours, environments and experiences. The next chapter will look at how recreational anglers from Queensland and the Great Barrier Reef region differed in terms of their fishing motivations and experiences sought.

### **3.5. Motivations for Participating in Recreational Fishing by Anglers from Queensland**

To gain an understanding of the diversity of reasons for why people fish, the motivations for pursuing fishing activities by 2,061 recreational anglers from Queensland was investigated. The items used in Motivation Scale were single item indicators developed from the earlier work of Knopf, Driver and Bassett (1973), Driver and Knopf (1976), Driver and Cooksey (1977) and sportsfishing literature. Motivations

were measured on a five point scale ranging from: 1) Not at all Important, to 5) Very Important. Table 7 describes the importance of various reasons for fishing according to the responses of recreational anglers from Queensland.

**Table 7.** Motivations for pursuing fishing activities by Queensland recreational anglers.

Motives for fishing (values given are percentages)	Not at all Important	Slightly Important	Moderately Important	Important	Very Important	Mean <sup>s</sup>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
To obtain fish/crabs for eating	15.5	13.6	25.8	19.9	25.2	3.26
To escape routine	10.8	9.7	23.8	24.9	30.8	3.55
To enjoy nature	3.7	6.0	22.3	30.4	37.6	3.92
To test fishing equipment	52.4	23.3	16.8	4.3	3.3	1.83
To be with friends	14.5	12.4	28.1	24.1	20.9	3.24
To be with family	12.3	7.9	21.6	23.8	34.4	3.60
For rest and relaxation	2.3	3.3	13.4	28.8	52.1	4.25
For the challenge	18.2	13.7	28.0	21.5	18.7	3.09
To be outdoors	5.5	4.9	19.1	30.2	40.3	3.95
To improve my skills	28.1	21.0	29.0	12.0	9.8	2.54
For the pleasure of catching fish/crabs	6.7	6.5	23.4	28.1	35.3	3.79
To learn about nature	20.9	18.9	32.8	16.5	10.9	2.77
To be close to the water	11.6	12.5	26.4	22.9	26.7	3.41
To get away from people	24.5	14.5	22.5	16.0	22.6	2.98

(n = 2, 061)

<sup>s</sup> Mean is based on a five point scale where: 1 = Not at all Important; 2 = Slightly Important; 3 = Moderately Important; 4 = Important; 5 = Very Important.



For Queensland respondents, the strongest motive for pursuing fishing activities was 'for rest and relaxation' (mean 4.25<sup>s</sup>), followed by 'to be outdoors' (mean 3.95<sup>s</sup>) and 'to enjoy nature' (mean 3.92<sup>s</sup>). 'For the pleasure of catching fish' (mean 3.79<sup>s</sup>) was also ranked highly as an important motivation to fish. Of least importance to Queensland anglers was 'to test fishing equipment' (mean 1.83<sup>s</sup>) and 'to improve skills' (mean 2.52<sup>s</sup>).

Attitude statements from a scale developed by Graefe (1980) were used to understand respondents' orientations towards catching fish (otherwise termed 'resource dependency'). Specifically, motive items measured angler's preference for size, number and type of fish caught. Respondents were asked to indicate the extent to which they agreed with each attitude statement on a five-point Likert type scale ranging from 1) Strongly Disagree to 5) Strongly Agree. Results are displayed in Table 8.

**Table 8.** Importance of various reasons for catching fish by recreational anglers of Queensland.

Motives for Catching Fish (Values given are percentages)	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean <sup>s</sup>
	1	2	3	4	5	
A fishing trip can be successful even if no fish are caught	5.3	6.8	21.0	26.4	40.4	3.90
I usually eat the fish caught	4.8	5.3	13.3	18.8	57.8	4.20
I would rather catch one or two big fish than ten smaller fish	7.4	8.2	26.3	19.8	38.4	3.74
It doesn't matter to me what type of fish I catch	9.4	11.3	26.8	22.4	30.2	3.53
The more fish or crabs caught, the better the fishing trip	24.5	20.2	29.7	14.0	11.5	2.68
I'm just as happy if I don't keep the fish/crabs I catch	11.9	15.3	28.4	20.0	24.4	3.30
It doesn't matter if I don't catch fish every trip, so long as the opportunity exists to catch fish	3.1	5.0	18.8	25.5	47.6	4.09
I like to fish where there are several kinds of fish to catch	5.0	6.5	24.2	30.5	33.9	3.82
I want to keep all the fish/crabs that I catch	51.1	21.5	18.0	5.0	4.5	1.90
I catch fish/crabs for sport and pleasure rather than for food	18.5	15.4	34.2	15.3	16.8	2.97
I usually give away the fish/crabs I catch	38.8	23.6	28.9	5.7	3.1	2.11
I like to fish where I know I have a chance of catching a trophy fish	49.5	18.4	17.9	7.1	7.1	2.04
I like to release most of the fish caught	16.4	22.2	37.4	11.4	12.5	2.81

(n=2,060)

<sup>s</sup> Mean is calculated by: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree

Overall, recreational anglers from Queensland most strongly supported the statements: 'I usually eat the fish I catch' (mean 4.20<sup>s</sup>); 'it doesn't matter to me if I don't catch fish every trip as long as I have the opportunity to catch fish' (mean 4.09<sup>s</sup>) and; 'a fishing trip can be successful even if no fish are caught' (mean 3.90<sup>s</sup>). Motives to 'keep all the fish I catch' (mean 1.90<sup>s</sup>) and 'to fish where I have the chance of catching a trophy fish' (mean 2.04<sup>s</sup>) received the lowest levels of agreement from Queensland anglers.

### **3.5.1. *Motivational Orientations for Fishing by Anglers from Three Queensland Regions***

The importance of various motives for fishing by respondents from South-east, West and the Great Barrier Reef regions of Queensland are displayed in Table 9. A comparison of item means suggest there were many similarities in the motivational orientations of anglers from different regions of Queensland. Anglers from each of the three regions rated 'for rest and relaxation', 'to be outdoors' and 'to enjoy nature' as the strongest motivations for pursuing recreational fishing activities. For the 'pleasure of catching fish' was also reported to be a very significant reason to fish according to respondents from all three Queensland regions. Of least importance to recreational anglers from all regions of Queensland were 'to test fishing equipment' and 'to improve skills'.

In order to determine whether the region lived in by an angler from Queensland influenced their motives for pursuing fishing activities, several one-way analyses of variance were undertaken. Significant differences were discovered between regions for five of the motivational items (see Table 9). Analyses found that anglers from Western Queensland scored 'to be outdoors' of higher importance compared to respondents from the South-east and Great Barrier Reef regions. 'To be with friends' and 'to be with family' whilst fishing, was also rated of stronger importance by anglers from Western Queensland. 'To obtain fish/crabs for eating' was significantly more important to anglers from the Great Barrier Reef region; and 'to be close to the water' was rated of higher importance to South East Queenslanders when compared to the motives of anglers from other Queensland regions.

**Table 9.** Mean scores for fishing motivations by respondents from three Queensland regions.

<i><b>Motivations for fishing</b></i>	<b>Queensland Regions</b>			
	<i><b>Western Queensland<sup>§</sup></b></i>	<i><b>South-east Queensland<sup>§</sup></b></i>	<i><b>Great Barrier Reef Region<sup>§</sup></b></i>	<i><b>Queensland Grand mean<sup>§</sup></b></i>
For rest and relaxation	4.33	4.19	4.26	4.25
To escape routine	3.56	3.58	3.53	3.55
To enjoy nature	3.91	3.86	3.95	3.92
To be outdoors*	4.06	3.85	3.97	3.95
To learn about nature	2.85	2.76	2.76	2.77
To be close to the water ***	3.15	3.32	3.51	3.41
To be with friends*	3.43	3.27	3.19	3.24
To be with family *	3.80	3.51	3.60	3.60
To get away from other people	3.08	2.94	2.97	2.98
Pleasure of catching fish	3.87	3.81	3.76	3.79
To obtain fish for eating *	3.23	3.38	3.20	3.26
To improve skills	2.63	2.55	2.52	2.54
To test fishing equipment	1.96	1.83	1.79	1.83
For the challenge	3.20	3.10	3.05	3.09

<sup>§</sup> Mean is based on a five point scale where: 1 = Not at all Important; 2 = Slightly Important; 3 = Moderately Important; 4 = Important; 5 = Very Important

\* F test value significant at 0.05

\*\*\* F test value significant at 0.001

Table 10 presents mean scores for catch motivations by recreational anglers from South-east Queensland, Western Queensland and the Great Barrier Reef region. A grand mean for this sample of Queensland recreational anglers is also displayed. Comparing catch motives as an indication of respondents' resource dependency, across the three regions of Queensland revealed many similarities. The three statements 'I usually eat the fish I catch', 'it doesn't matter to me if I don't catch fish every trip as long as I have the opportunity to catch fish', and 'a fishing trip can be successful even if no fish are caught' received the highest levels of support by respondents from all three Queensland regions. Comparatively anglers from South-east, West and the Great Barrier Reef regions most strongly disagreed with the items 'I want to keep all the fish I catch' and 'I like to fish where I have the chance of catching a trophy fish'. 'I usually give away the fish I catch' also received low levels of agreement by anglers from the three Queensland regions.

Comparisons using one-way analysis of variance found some subtle motivational differences for catching fish between respondents from the three regions of Queensland. In comparison to recreational anglers from Western Queensland and the Great Barrier Reef region, South-east Queenslanders reported stronger agreement for the statement 'I would rather catch one or two big fish rather than ten smaller fish'. 'I'm just as happy if I don't keep all the fish I catch' received stronger disagreement from Great Barrier Reef anglers, whereas 'fishing where there are several kinds of fish to catch' and 'eating the fish caught' were items more strongly supported by anglers from this Queensland region.

**Table 10.** Mean scores for catch motivations by recreational anglers from three Queensland regions.

Catch Motives	Queensland Regions			
	<i>Western Queensland<sup>§</sup></i>	<i>South-east Queensland<sup>§</sup></i>	<i>Great Barrier Reef<sup>§</sup></i>	<i>Queensland Grand Mean<sup>§</sup></i>
A fishing trip can be successful even if no fish are caught	3.95	3.95	3.86	3.90
Doesn't matter to me what type of fish I catch	3.54	3.46	3.56	3.53
I'm just as happy if I don't keep all the fish I catch *	3.43	3.18	3.32	3.30
It doesn't matter to me if I don't catch fish every trip as long as I have the opportunity to catch fish	4.20	4.13	4.05	4.09
I catch fish for sport & pleasure rather than for food	3.06	2.92	2.97	2.97
I usually give away the fish I catch	2.11	2.10	2.11	2.11
I like to fish where I have the chance of catching a trophy fish	2.09	1.99	2.05	2.04
I like to release most fish I catch	2.84	2.77	2.83	2.81
I usually eat the fish I catch*	4.11	4.30	4.16	4.20
The more fish I catch the better the fishing trip	2.62	2.76	2.66	2.68
I like to fish where there are several kinds of fish to catch*	3.69	3.92	3.80	3.82
I want to keep all the fish I catch	1.93	1.94	1.88	1.90
I would rather catch one or two big fish rather than ten smaller **	3.64	3.62	3.82	3.74

<sup>§</sup> Mean is calculated by 1 = Strongly Disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly Agree.

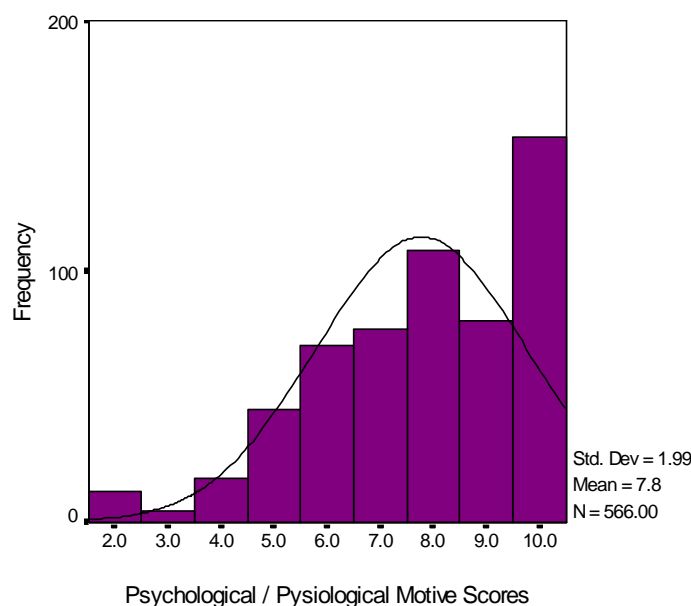
\* F test value significant at 0.05

\*\* F test value significant at 0.01

### 3.6. Motivations for Pursuing Fishing by Anglers from the Great Barrier Reef Region

Table 11 describes the importance of various motives for fishing by recreational anglers from the Great Barrier Reef region. For analysis purposes motives for pursuing fishing have been grouped into categories based on work by Fedler and Ditton (1994). These five motivational categories include: 1) General Psychological and Physiological Motives, 2) Natural Environment Motives, 3) Social Motives, 4) Fishery Resource Motives, and 5) Skill Motives. Categories devised from the motivational scale sought to determine a smaller number of items that could be used to represent general motives for fishing. These five motive categories and the items classified under each are displayed in Table 11. A total score for each of the five motivational categories was calculated for every Great Barrier Reef respondent by summing scores for the relevant items associated with each. A mean score for each of the five motive categories are also presented in Table 11.

The motivational category classified as ‘Psychological and Physiological’ comprised of the motive items ‘rest and relaxation’ and ‘escaping routine’. Psychological and Physiological motive scores ranged from 2.0 to 10.0 and are displayed in Figure 26. High scores reflect strong Physiological/Psychological motivations; lower scores indicate weaker motives for fishing based on this category. As viewed in Figure 26, the majority of respondents scored towards the higher end of the Physiological/Psychological Motive Scale (mean 7.8), thus reflecting strong motivations for fishing based upon Psychological and Physiological outcomes.



**Figure 26.** Psychological/Physiological motive scores for pursuing fishing as a recreational activity.

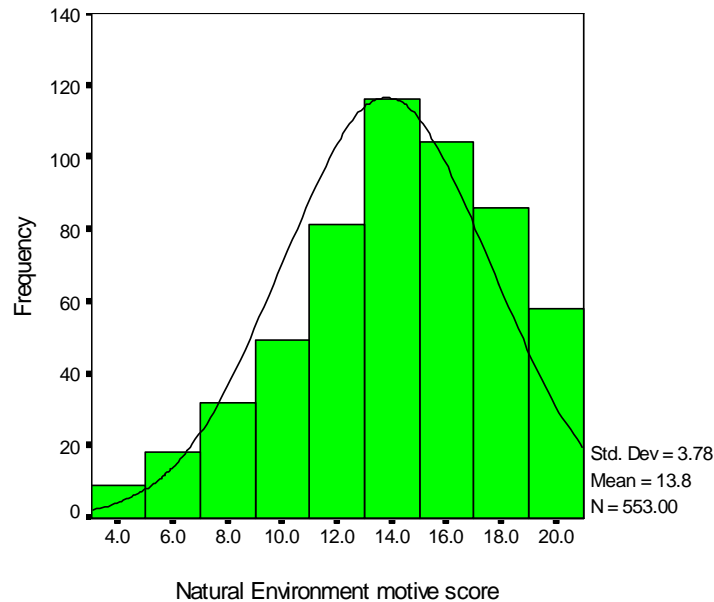
**Table 11.** Motives for pursuing recreational fishing activities by anglers from the Great Barrier Reef region.

Reasons for Fishing	Motivational category					
	<i>Not at all important</i>	<i>Slightly Important</i>	<i>Moderately Important</i>	<i>Important</i>	<i>Very Important</i>	<i>Mean<sup>s</sup></i>
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
<i>Psychological and Physiological</i>						
For rest and relaxation	3.3	4.0	13.0	30.1	49.7	4.19
To escape routine	11.6	9.3	20.9	25.5	32.7	3.58
<i>Natural Environment</i>						
To enjoy nature	4.2	6.3	24.1	29.9	35.4	3.86
To be outdoors	6.3	6.2	21.5	27.8	38.2	3.85
To learn about nature	21.5	18.2	33.4	16.2	10.6	2.76
To be close to the water	13.7	11.7	26.4	25.2	23.0	3.32
<i>Social</i>						
To be with friends	14.9	11.7	27.3	24.1	22.0	3.27
To be with family	14.8	7.8	21.9	23.1	32.4	3.51
To get away from other people	23.9	17.0	23.1	13.6	22.4	2.94
<i>Fishery Resource</i>						
Pleasure of catching fish	6.3	5.8	24.1	28.3	35.5	3.81
To obtain fish for eating	10.4	13.7	28.8	21.4	25.7	3.38
<i>Skills</i>						
To improve skills	27.6	21.0	29.3	13.1	9.0	2.55
To test fishing equipment	52.0	22.9	17.3	5.2	2.5	1.83
For the challenge	16.7	14.9	27.2	23.8	17.4	3.10

<sup>s</sup> Mean is based on a five point scale where: 1 = Not at all Important; 2 = Slightly Important; 3 = Moderately Important; 4 = Important; 5 = Very Important

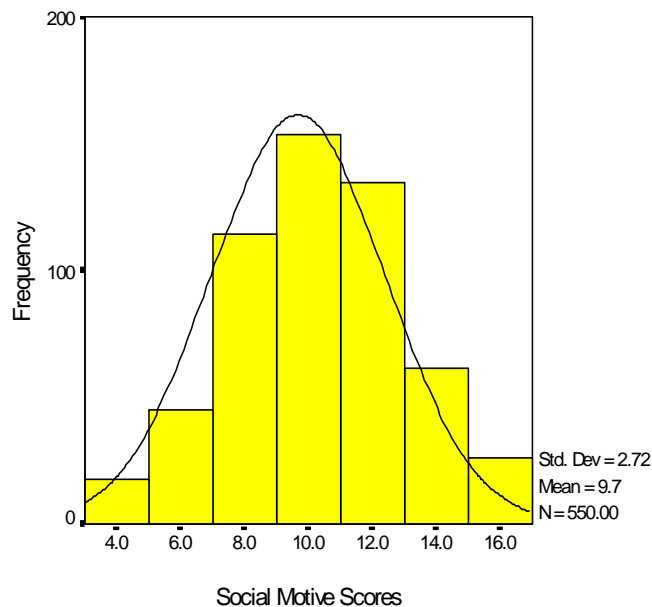


The second motive category, interpreted as 'Natural Environment', represents reasons for fishing which include the items: 'to enjoy nature', 'to be outdoors', 'to learn about nature' and 'to be close to the water'. As illustrated in Figure 27, scores ranged from 4.0 to 20.0, with a mean value of 13.8. Respondents therefore considered natural environment motives to be an important factor in pursuing fishing as a recreational activity.



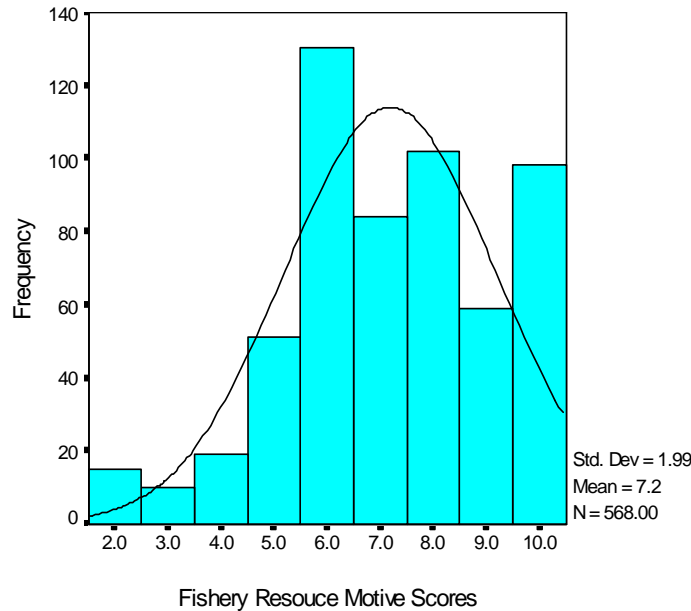
**Figure 27.** Natural environment motive scores for pursuing recreational fishing activities.

Motivations to be with friends and family, and get away from other people comprised the 'Social' motive category. Social motive category scores ranged from 3.0 to 15.0 (mean 9.7), which indicates that social motivations were of moderate importance to anglers (see Figure 28).



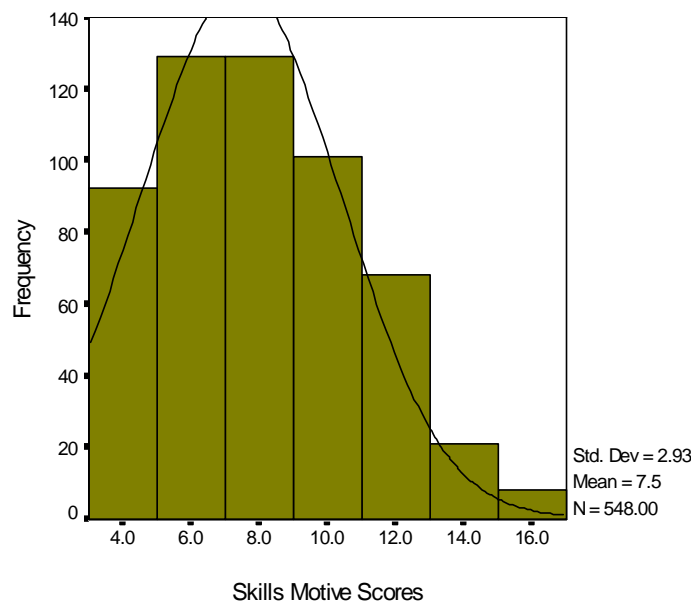
**Figure 28.** Social motive scores for pursuing recreational fishing.

The dispersion of scores for the motive category 'Fishery Resource' is displayed in Figure 29. Scores ranged from 2.0 to 10.0 (mean 7.19), which indicates that anglers from the Great Barrier Reef region are motivated to go fishing for 'the pleasure of catching fish' and 'to obtain fish for eating'.



**Figure 29.** Fishery resource motive scores for pursuing recreational fishing.

Figure 30 displays scores obtained for the motive category classified as 'Skill'. Scores ranged from 3.0 to 15.0 with a mean category score of 7.48. As viewed, respondents' scores were grouped towards the lower end of the scale, thus reflecting the relatively low importance of 'improving skills', 'testing equipment' and 'challenge' as reasons to go fishing for Great Barrier Reef anglers.



**Figure 30.** Skill motive scores for pursuing recreational fishing activities.

As displayed in Table 11, anglers from the Great Barrier Reef region rated Psychological and Physiological motivations such as 'rest and relaxation' (mean 4.19<sup>s</sup>) and 'to escape daily routines' (mean 3.58<sup>s</sup>) as very important reasons for pursuing fishing activities. 'Rest and relaxation' was regarded as the strongest motive by anglers for undertaking recreational fishing as a leisure pursuit. Motives which related to experiencing the Natural Environment i.e. 'to enjoy nature' (mean 3.86<sup>s</sup>) and 'to be outdoors' (mean 3.85<sup>s</sup>) were also viewed as being of very high value. These fishing motives received the second and third highest ratings from Great Barrier Reef respondents. However, 'To learn about nature' (mean 2.76<sup>s</sup>) was not perceived as an important reason for going fishing according to the responses of these recreational anglers. Social motives which included 'to be with friends' and 'to be with family' (mean 3.27<sup>s</sup> and mean 3.51<sup>s</sup> respectively) were cited as being of importance to anglers, yet 'to get away from other people' (mean 2.94<sup>s</sup>) was not rated highly as a motive for fishing. The Fishery Resource statement 'for the pleasure of catching fish' (mean 3.81) was scored highly as a reason for pursuing fishing activities, so too was the item 'to obtain fish for eating' (mean 3.38). The fifth motivational category classified as 'Skill', received the lowest ratings of importance by anglers for the two items 'to test fishing equipment' (mean 1.83) and 'to improve skills' (mean 2.55<sup>s</sup>).

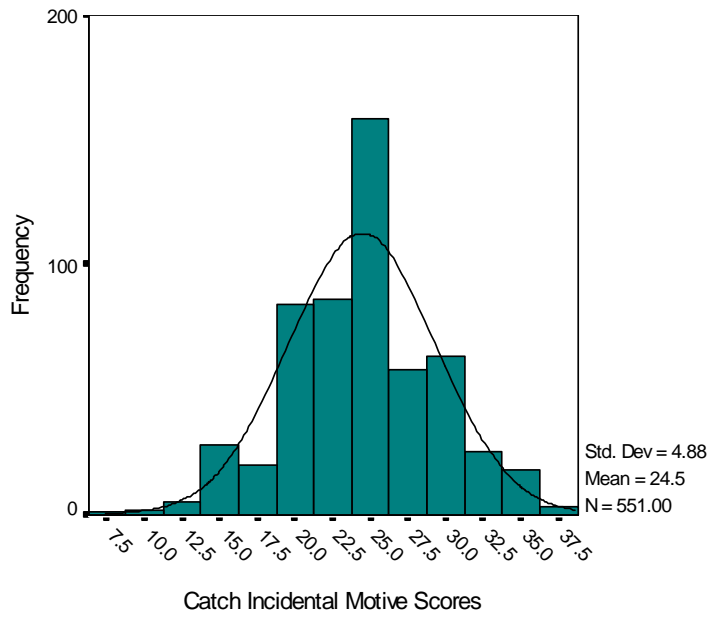
Mean values displayed in Table 12 provide an insight into the catch related motives that were of greatest value to recreational anglers from the Great Barrier Reef region. 'I usually eat the fish I catch' (mean 4.30<sup>s</sup>), was the motive that received the strongest levels of agreement from respondents. Conversely, little support was given for the statement 'I usually give away the fish I catch' (mean 2.10<sup>s</sup>). Results also reflected strong agreement with the beliefs: 'it doesn't matter to me if I don't catch fish on every trip, as long as I have the opportunity to catch fish' (mean 4.13<sup>s</sup>) and 'a fishing trip can be successful even if no fish are caught' (mean 3.95<sup>s</sup>). Many anglers also agreed that they 'like to fish where there are several kinds of fish to catch' (mean 3.92<sup>s</sup>). Fishing Dominant motives which included 'I want to keep all the fish I catch' (mean 1.94<sup>s</sup>) and 'the more fish I catch the better the fishing trip' (mean 2.76<sup>s</sup>), were items that anglers from the Great Barrier Reef region were most likely to strongly disagree with.

To further analyse respondents resource dependency (motivations for catching fish) items were classified under two categories: 1) Catch Incidental, and 2) Catch Dominant, and a mean category score for each respondent calculated. The range of scores for anglers from the Great Barrier Reef region are presented in Figure 31 and Figure 32. Scores for the Catch Incidental category ranged from 8.0 to 38.0, with a mean value of 24.46 (see Figure 31). Figure 32 represents Catch Dominant scores that varied from a minimum of 8.0 to a maximum score of 25.0; a total mean value of 16.54 was obtained. Both scales reflect relatively even distributions in terms of levels of agreement for the two catch motive categories. See Table 12 for a list of items classified under each of these resource dependency categories.

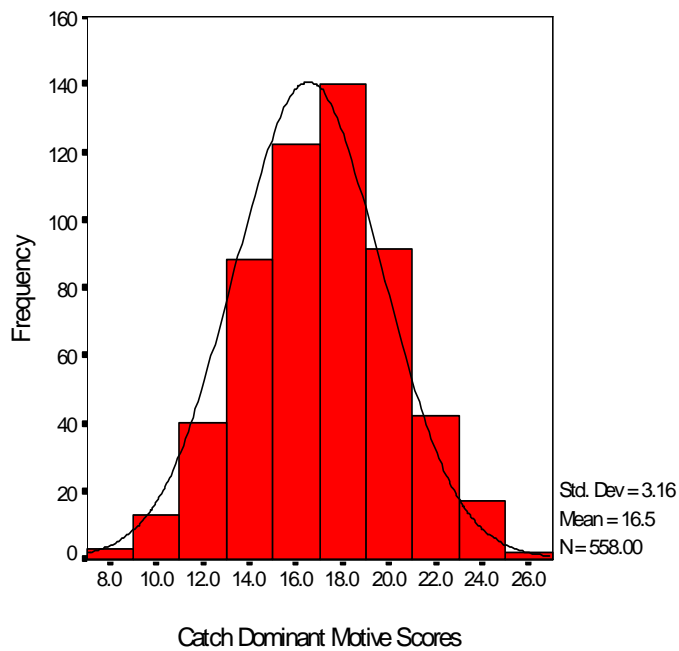
**Table 12.** Motives for catching fish by anglers from the Great Barrier Reef region.

Resource Dependency	Motivational category					
	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Mean <sup>s</sup>
	1	2	3	4	5	
Fishing Incidental						
A fishing trip can be successful even if no fish are caught	4.1	5.1	22.8	27.6	40.3	3.95
Doesn't matter to me what type of fish I catch	9.8	12.7	27.4	21.8	28.3	3.46
I'm just as happy if I don't keep all the fish I catch	12.6	16.8	31.8	17.8	21.0	3.18
It doesn't matter to me if I don't catch fish every trip as long as I have the opportunity to catch fish	2.2	4.5	19.8	25.4	48.1	4.13
I catch fish for sport & pleasure rather than for food	19.5	15.8	33.4	16.0	15.3	2.92
I usually give away the fish I catch	38.6	23.0	31.0	5.2	2.3	2.10
I like to fish where I have the chance of catching a trophy fish	50.5	20.7	15.0	6.5	7.2	1.99
I like to release most fish I catch	16.7	23.3	37.0	12.6	10.4	2.77
Fishing Dominant						
I usually eat the fish I catch	2.7	3.9	14.2	18.7	60.4	4.30
The more fish I catch the better the fishing trip	21.9	19.1	32.2	15.4	11.5	2.76
I like to fish where there are several kinds of fish to catch	4.5	4.0	22.9	31.9	36.6	3.92
I want to keep all the fish I catch	48.7	22.9	18.5	5.8	4.2	1.94
I would rather catch one or two big fish rather than ten smaller	8.3	10.0	27.2	20.2	34.3	3.62

<sup>§</sup> Mean is calculated by 1 = Strongly Disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly Agree.



**Figure 31.** Catch Incidental motives for fishing by anglers from the Great Barrier Reef region.



**Figure 32.** Catch dominant motives for fishing by anglers from the Great Barrier Reef region.

### 3.6.1. Motivations for Fishing by Anglers from Four Divisions of the Great Barrier Reef Region

Analysis was undertaken to assess whether significant differences occurred between motives for fishing by anglers from four statistical divisions of the Great Barrier Reef Region. Results discovered no significant differences, suggesting that motives to fish were similar by respondents throughout the divisions of the Great Barrier Reef region (see Table 13). The four most important motivations for fishing by respondents from the Far Northern, Fitzroy, Mackay and Northern Sections included: 'for rest and relaxation', 'for the pleasure of catching fish', 'to enjoy nature' and 'to be outdoors'. Of least importance to anglers from the four statistical divisions were the motives 'to improve skills' and 'to test equipment'.

**Table 13.** Fishing motivations of anglers from statistical divisions of the Great Barrier Reef region.

Motivations for Fishing by Category	Great Barrier Reef Statistical Regions			
	<i>Far Northern</i> <sup>§</sup>	<i>Fitzroy</i> <sup>§</sup>	<i>Mackay</i> <sup>§</sup>	<i>Northern</i> <sup>§</sup>
<b><i>Psychological and Physiological</i></b>				
For rest and relaxation	4.31	4.27	4.17	4.04
To escape routine	3.81	3.62	3.45	3.61
<b><i>Natural Environment</i></b>				
To enjoy nature	4.03	3.88	3.87	3.70
To be outdoors	4.01	3.72	3.89	3.71
To learn about nature	2.79	2.69	2.91	2.57
To be close to the water	3.22	3.32	3.50	3.12
<b><i>Social</i></b>				
To be with friends	3.30	3.19	3.27	3.34
To be with family	3.53	3.43	3.61	3.45
To get away from other people	2.75	2.90	2.96	3.03
<b><i>Fishery Resource</i></b>				
Pleasure of catching fish	3.77	3.96	3.90	3.59
To obtain fish for eating	3.51	3.41	3.40	3.13
<b><i>Skills</i></b>				
To improve skills	2.51	2.46	2.62	2.55
To test fishing equipment	1.89	1.73	1.93	1.85
For the challenge	3.19	3.11	3.24	2.94

<sup>§</sup> Mean is based on a five point scale where: 1 = Not at all Important; 2 = Slightly Important; 3 = Moderately Important; 4 = Important; 5 = Very Important

Catch motivations for respondents from the four Great Barrier Reef divisions may be viewed in Table 14. 'I usually eat the fish I catch', 'it doesn't matter if I don't catch a fish as long as I have the opportunity to catch fish' and 'a fishing trip can be successful if no fish are caught', were the statements which received the strongest support from recreational anglers. Comparatively there was consistent disagreement from anglers representing each of the four statistical divisions of the Great Barrier Reef region with regards to the statements 'I want to keep all the fish I catch' and 'I usually give away the fish I catch'. No significant motives to fish were found between respondents from the four divisions.

**Table 14.** Catch motivations by statistical divisions of the Great Barrier Reef region.

Resource Dependency	Great Barrier Reef Statistical Divisions			
	<i>Far Northern</i> <sup>§</sup>	<i>Fitzroy</i> <sup>§</sup>	<i>Mackay</i> <sup>§</sup>	<i>Northern</i> <sup>§</sup>
<b><i>Catch Incidental</i></b>				
A fishing trip can be successful even if no fish are caught	4.00	3.96	3.95	3.92
Doesn't matter to me what type of fish I catch	3.33	3.61	3.48	3.46
I'm just as happy if I don't keep all the fish I catch	3.18	3.16	3.19	3.17
It doesn't matter to me if I don't catch fish every trip as long as I have the opportunity to catch fish	4.17	4.06	4.24	4.02
I catch fish for sport & pleasure rather than for food	2.69	2.96	3.03	3.01
I usually give away the fish I catch	2.04	2.05	2.12	2.08
I like to fish where I have the chance of catching a trophy fish	1.86	1.88	2.18	1.99
I like to release most fish I catch	2.78	2.64	2.73	2.89
<b><i>Catch Dominant</i></b>				
I usually eat the fish I catch	4.31	4.31	4.44	4.12
The more fish I catch the better the fishing trip	2.68	2.87	2.74	2.77
I like to fish where there are several kinds of fish to catch	3.99	3.83	4.07	3.87
I want to keep all the fish I catch	1.79	2.10	1.88	2.03
I would rather catch one or two big fish rather than ten smaller	3.70	3.51	3.65	3.67

<sup>§</sup> Mean = (1 = Strongly Disagree; 2 = Disagree; 3 = Neither Agree nor Disagree; 4 = Agree; 5 = Strongly Agree)

### 3.6.2. Motivations for Fishing based upon Experiential Characteristics of Anglers from the Great Barrier Reef Region

One of the objectives of this study was to investigate whether an angler's previous fishing experience has an effect upon their motivations for pursuing fishing activities. As a means of assessing whether motivational differences exist amongst recreational anglers from the Great Barrier Reef region, analyses were undertaken based upon an angler's: years of fishing experience, level of participation in fishing, and fishing ability. Results are displayed in Tables 15, 16 and 17.

Table 15 summarises differences in the importance of various motives for fishing across years of fishing experience. Chi-square analysis was used to test whether the distributions of respondents within each level of fishing experience were significantly different from each other. Results of the chi-square tests and the percentage of anglers who rated each reason as 'Important' or 'Very Important' are included in Table 15.

**Table 15.** Motives for fishing by years of fishing experience of anglers from the Great Barrier Reef region.

Motives for Fishing	Years of Fishing Experience				Chi Square Value (% Important and Very important)
	Less than 5	5 – 9 years	10 – 29 years	30 years +	
Obtain fish for eating	29.2	35.3	47.6	50.4	19.85 (N.S)
To escape routine	56.5	57.7	60.2	56.6	21.86 *
To enjoy nature	56.6	58.0	65.5	67.3	15.55 (N.S)
Test fishing equipment	9.1	10.0	8.2	6.8	18.83 (N.S)
To be with friends	33.4	52.0	48.1	44.4	10.11 (N.S)
To be with family	45.4	68.6	57.1	52.5	16.21 (N.S)
For rest and relaxation	58.3	75.5	79.0	83.4	33.87 ***
For the challenge	40.9	38.0	43.8	39.6	17.44 (N.S)
To be outdoors	72.8	56.9	68.1	65.7	23.50 *
To improve my skills	27.2	19.6	23.4	21.0	13.85 (N.S)
Pleasure of catching fish	45.5	56.0	62.7	67.8	13.94 (N.S)
To learn about nature	27.2	22.0	22.6	31.8	20.46 (N.S)
To be close to the water	40.9	47.1	43.6	53.3	27.89 **
To get away from people	31.8	30.7	36.6	37.0	20.23 (N.S)

\* Significant at 0.05 level

\*\* Significant at 0.01 level

\*\*\* Significant at 0.001 level



Significant differences were obtained for four of the fishing motive items. 'To be close to the water' and 'for rest and relaxation' were rated higher in importance by anglers who possessed the most years of fishing experience (30 years or longer). Although significant differences were found across levels of fishing experience for the items 'to be outdoors' and 'to escape routine', percentage differences in the ratings of importance for these motives were not large (see Table 15).

Table 16 presents Great Barrier Reef anglers' ratings of importance for various fishing motives by levels of fishing participation. Differences between participation levels were significantly relative to three of the motive items which described 'for the challenge', 'to improve skills' and 'to test fishing equipment'. The importance of these aspects of fishing varied, however respondents who allocated between 75% to 100% of their leisure time to fishing, attached greater importance to each of these fishing motives. Results showed that respondents who spent the least amount of their recreational time fishing rated 'for the pleasure of catching fish' of lower importance in comparison to anglers who more regularly participated in fishing activities.

**Table 16.** Motives for fishing by level of fishing participation by anglers from the Great Barrier Reef region.

Motives for Fishing	Amount of Leisure Time spent fishing				<i>Chi Square Value (% of Important and Very Important)</i>
	<i>Less than 25%</i>	<i>25% to &lt;50%</i>	<i>50% to &lt;75%</i>	<i>75% to 100%</i>	
Obtain fish for eating	45.3	54.0	50.0	62.3	14.85 (N.S)
To escape routine	56.1	63.5	73.3	62.5	15.30 (N.S)
To enjoy nature	62.4	74.7	70.0	98.0	13.25 (N.S)
Test fishing equipment	5.9	15.3	10.3	28.6	38.27 ***
To be with friends	45.4	50.0	50.0	28.6	14.54 (N.S)
To be with family	54.8	59.1	60.0	37.5	10.42 (N.S)
For rest and relaxation	77.2	87.0	90.0	100	15.89 (N.S)
For the challenge	39.0	46.5	53.4	75.0	21.61 *
To be outdoors	64.8	65.9	76.6	87.5	10.74 (N.S)
To improve my skills	18.6	36.0	26.6	50.0	30.18 **
Pleasure of catching fish	60.6	75.0	80.0	75.0	22.47 *
To learn about nature	24.5	35.3	33.3	50.0	19.27 (N.S)
To be close to the water	44.7	59.3	63.3	32.5	20.51 (N.S)
To get away from people	33.7	63.1	46.7	62.5	17.44 (N.S)

\* *Significant at 0.05 level*

\*\* *Significant at 0.01 level*

\*\*\* *Significant at 0.001 level*

Of the fourteen items utilised to assess motives for fishing, ten were found to have significant differences based upon the fishing ability of respondents (see Table 17). A general pattern evident in the data reflects that motivations for fishing tended to be rated of more importance by those recreational anglers who reported a high level of fishing expertise. Results imply therefore, that anglers possessing varying levels of fishing skill do pursue fishing for different reasons.

**Table 17.** Motives for fishing by fishing ability of anglers from the Great Barrier Reef region.

Motives for Fishing	Rating of Fishing Ability					<i>Chi Square Value (% of Important and Very Important)</i>
	<i>Very Poor</i>	<i>Poor</i>	<i>Average</i>	<i>Good</i>	<i>Very Good</i>	
Obtain fish for eating	39.0	31.6	48.8	54.8	61.3	55.57 ***
To escape routine	50.8	52.2	59.8	62.6	61.3	25.03 (N.S)
To enjoy nature	55.7	64.5	63.4	71.8	74.2	16.52 (N.S)
Test fishing equipment	1.6	1.1	7.2	15.7	13.4	62.87 ***
To be with friends	48.4	39.8	43.5	52.4	56.6	25.17 (N.S)
To be with family	58.4	62.8	53.2	56.6	43.3	14.82 (N.S)
For rest and relaxation	66.7	75.3	81.5	81.6	84.4	30.34 *
For the challenge	18.0	26.6	41.7	57.4	61.3	83.16 ***
To be outdoors	49.2	70.2	65.2	69.7	80.0	34.06 **
To improve my skills	11.3	18.9	19.3	33.1	34.4	49.53 ***
Pleasure of catching fish	37.1	47.3	65.1	81.4	87.1	139.04 ***
To learn about nature	21.4	13.3	26.4	38.8	33.3	35.63 **
To be close to the water	34.4	40.9	44.9	67.2	50.0	65.30 ***
To get away from people	21.8	34.1	35.3	44.3	46.9	35.91 **

\* *Significant at 0.05 level*

\*\* *Significant at 0.01 level*

\*\*\* *Significant at 0.001 level*

Analyses were undertaken to assess whether anglers, distinguished by their years of fishing experience, differed in terms of their motivations for catching fish. Results presented in Table 18 reflect one significant difference in the motivation for catching fish based upon years of fishing experience by anglers from the Great Barrier Reef region. 'I usually eat the fish I catch' increased in importance as a motive for fishing by anglers who possessed more years of fishing experience. There were general levels of agreement for the other twelve catch motivations independent of fishing experience.

**Table 18.** Catch motives based upon years of fishing experience by anglers from the Great Barrier Reef region.

Catch Motives	Years of Fishing Experience				<i>Chi Square Value (% of agree and strongly agree)</i>
	<i>Less than 5 years</i>	<i>5 – 9 years</i>	<i>10 – 29 years</i>	<i>30 + years</i>	
Trip can be successful even if no fish are caught	83.3	70.4	64.4	69.4	17.42 (N.S)
I usually eat the fish caught	64.0	75.4	77.0	83.2	26.67 **
I'd rather catch one or two big fish than ten smaller ones	50.0	61.6	53.8	54.2	13.58 (N.S)
It doesn't matter to me what type of fish I catch	52.0	45.3	50.2	50.8	3.16 (N.S)
The more fish caught the better the fishing trip	8.4	24.5	28.2	28.0	13.27 (N.S)
I'm just as happy if I don't keep the fish I catch	54.2	42.3	38.8	36.6	9.10 (N.S)
It doesn't matter if I don't catch fish every trip, as long as the opportunity exists to catch fish	83.3	75.5	72.1	73.5	13.06 (N.S)
I like to fish where there are several kinds of fish to catch	69.6	55.8	66.5	72.9	18.55 (N.S)
I want to keep all the fish that I catch	8.6	7.7	11.9	8.8	10.23 (N.S)
I catch fish for sport and pleasure rather than for food	26.0	28.9	28.9	34.3	10.18 (N.S)
I usually give away the fish I catch	4.5	3.9	9.9	6.2	6.56 (N.S)
I like to fish where I know I have the chance of catching a trophy fish	4.5	14.4	16.7	11.6	17.82 (N.S)
I like to release most of the fish caught	30.4	28.3	23.3	21.1	19.15 (N.S)

\*\* Significant at 0.01 level

Results discovered two items with relative differences between levels of fishing participation and motives for catching fish (Table 19). Those respondents who spent most of their leisure time fishing (75% to 100%) attached lower importance to fishing where 'there are several kinds of fish to catch'. This group of anglers also represented those who reported stronger agreement with regards to the statement 'I like to fish where I know I have the chance of catching a trophy fish'.

**Table 19.** Catch motives based upon level of fishing participation by anglers from the Great Barrier Reef region.

Catch Motives	Amount of leisure time spent fishing				
	<i>Less than 25 %</i>	<i>25 % to &lt; 50 %</i>	<i>50% to &lt;75%</i>	<i>75% to 100%</i>	<i>Chi Square value (% of Important and Very Important)</i>
Trip can be successful even if no fish are caught	65.5	77.8	70.0	75.0	11.61 (N.S)
I usually eat the fish caught	78.9	79.8	80.0	75.0	4.26 (N.S)
I'd rather catch one or two big fish than ten smaller ones	53.6	64.8	43.3	50.0	17.46 (N.S)
It doesn't matter to me what type of fish I catch	48.9	57.5	46.7	50.0	13.88 (N.S)
The more fish caught the better the fishing trip	27.1	26.1	46.6	25.0	8.63 (N.S)
I'm just as happy if I don't keep the fish I catch	35.7	46.6	50.0	62.5	13.00 (N.S)
It doesn't matter if I don't catch fish every trip, as long as the opportunity exists to catch fish	71.6	84.1	66.7	87.5	12.95 (N.S)
I like to fish where there are several kinds of fish to catch	65.3	86.2	70.0	50.0	22.20 *
I want to keep all the fish that I catch	10.0	10.2	10.0	0	16.14 (N.S)
I catch fish for sport and pleasure rather than for food	31.4	34.8	13.3	50.0	15.62 (N.S)
I usually give away the fish I catch	6.4	11.7	6.6	25.0	16.92 (N.S)
I like to fish where I know I have the chance of catching a trophy fish	11.1	25.6	13.3	37.5	34.47 **
I like to release most of the fish caught	22.0	31.0	26.6	25.0	10.26 (N.S)

\* Significant at 0.05 level

\*\* Significant at 0.01 level

Five catch motives varied significantly across ratings of fishing ability by Great Barrier Reef recreational anglers (Table 20). Significant differences were found for the statements: 'the more fish caught the better the fishing trip', 'I like to fish where there are several kinds of fish to catch', 'I want to keep all the fish that I catch', 'I catch fish for sport and pleasure rather than for food' and 'I like to fish where I know I have the chance of catching a trophy fish'. Levels of agreement with regards to these motives for catching fish became stronger with increased ratings of fishing skill by respondents.

**Table 20.** Motives for catching fish based upon the fishing ability of anglers from the Great Barrier Reef region.

Catch Motives	Rating of Fishing Ability					
	<i>Very Poor</i>	<i>Poor</i>	<i>Average</i>	<i>Good</i>	<i>Very Good</i>	<i>Chi Square Value (% of agree and strongly agree)</i>
Trip can be successful even if no fish are caught	70.8	70.4	65.8	68.2	71.0	16.11 (N.S)
I usually eat the fish caught	76.6	72.8	80.5	82.4	78.2	20.64 (N.S)
I'd rather catch one or two big fish than ten smaller ones	53.9	50.0	55.2	56.5	53.2	11.22 (N.S)
It doesn't matter to me what type of fish I catch	50.8	47.9	52.9	46.8	47.4	15.28 (N.S)
The more fish caught the better the fishing trip	26.6	14.7	28.1	29.3	48.4	28.62 *
I'm just as happy if I don't keep the fish I catch	30.2	41.0	38.0	41.2	43.4	19.86 (N.S)
It doesn't matter if I don't catch fish every trip, as long as the opportunity exists to catch fish	64.1	76.8	73.2	76.6	71.9	22.11 (N.S)
I like to fish where there are several kinds of fish to catch	51.6	51.6	74.8	74.1	80.6	46.56 **
I want to keep all the fish that I catch	9.5	1.1	12.7	8.8	20.0	30.41*
I catch fish for sport and pleasure rather than for food	16.2	30.1	30.6	39.2	41.4	32.04 *
I usually give away the fish I catch	6.4	1.1	8.8	10.5	6.6	20.27 (N.S)
I like to fish where I know I have the chance of catching a trophy fish	3.2	6.4	9.8	28.7	33.3	54.22 **
I like to release most of the Fish caught	21.9	22.4	23.4	23.6	20.0	13.28 (N.S)

\* Significant at 0.05 level

\*\* Significant at 0.001 level

### 3.6.3. *Motivational Differences for Fishing based upon the Demographic Characteristics of Anglers from the Great Barrier Reef Region*

In order to investigate whether there were motivational differences for fishing based upon the socio-demographic characteristics of anglers from the Great Barrier Reef region, several one-way analyses of variance were undertaken on each of the five fishing motive categories. Summaries of these results are presented in Tables 21 to 25. No significant differences were found in motivations for fishing based upon the annual income of recreational anglers from the Great Barrier Reef region.

Table 21 illustrates that male anglers were significantly more likely to go fishing to improve their 'Skills'. To experience the 'Natural Environment' and achieve 'Psychological/Physiological' benefits were less important as motives to go fishing according to the responses of anglers from the youngest (15-19 yrs) and oldest (>60 yrs) age categories. In comparison to the motive scores of older anglers, improving 'Skills' and to fish for 'Social' reasons were rated of stronger importance by younger anglers (< 30 yrs).

**Table 21.** Motives for fishing by gender of anglers from the Great Barrier Reef region.

Gender of Respondent	Skill Motive Score	
	<i>g</i>	<i>SD</i>
Male	7.81	2.87
Female	6.08	2.74

F-Value = 32.69

Significant at <0.001

**Table 22.** Motives for fishing by age groups of anglers from the Great Barrier Reef region.

Motive Categories	Mean – Age groups of Fishers						
	15–19yrs	20–29 yrs	30–39 yrs	40–49 yrs	50–59 yrs	>60 yrs	F Significance
Psychological and Physiological	6.95	7.64	8.10	7.71	8.04	6.76	5.08 (<0.001)
Natural Environment	12.90	13.76	14.09	13.39	14.50	12.61	2.43 (<0.05)
Social	10.05	9.84	10.16	9.37	9.54	8.59	3.16 (<0.01)
Fishery Resource	6.70	7.17	7.12	7.04	7.52	7.34	1.14 (N.S)
Skill	8.60	8.47	7.58	6.73	7.59	6.89	4.36 (<0.001)

Anglers with a tertiary level of education were less motivated to go fishing to improve their 'Skills' (see Table 23). Results presented in Table 24 suggest that anglers who were self employed or owned their own business rated 'Psychological/Physiological' and 'Social' motives for fishing of higher importance compared with anglers from other groups. Those who were either retired, on a pension or unemployed reported the lowest scores for these two motive categories.

**Table 23.** Motives for fishing by level of education of anglers from the Great Barrier Reef region.

Level of Education	Skill Motive Score	
	<i>g</i>	<i>SD</i>
Primary	7.52	3.16
Secondary	7.63	3.05
Tertiary	6.64	2.60
Trade/technical/Tafe	7.61	2.76

**Table 24.** Motives for fishing by the employment status of anglers from the Great Barrier Reef region.

Motive Category	Mean – Employment Status				<i>F-Significance</i>
	<i>Wage or salary</i>	<i>Self employed</i>	<i>Homemaker/unpaid helper</i>	<i>Unemployed/Retired/Pensioner</i>	
Psychological/Physiological	7.84	8.27	7.70	7.03	6.31 (<0.001)
Natural Environment	13.97	13.72	13.36	13.35	0.84 (N.S)
Social	9.79	9.96	9.86	8.93	2.82 (<0.05)
Fishery Resource	7.10	7.33	6.78	7.54	2.04 (N.S)
Skill	7.52	7.40	7.52	7.30	0.16 (N.S)

The motive category classified as 'Fishery Resource' received the highest ratings of importance by anglers who worked in a trade followed by those who were in the transportation/production or labouring business. Transportation/production workers and labourers attached the greatest amount of importance to the category 'Skill', as a motive for pursuing fishing activities (see Table 25).

**Table 25.** Motives for fishing by the occupational status of anglers from the Great Barrier Reef region.

<b>Motive Category</b>	<b>Mean – Occupational Status</b>				
	<b><i>Manager/ Professional/ Administrator</i></b>	<b><i>Trade or related</i></b>	<b><i>Clerical/ Sales or Service</i></b>	<b><i>Transportation/ Production/Labour</i></b>	<b><i>F Significance</i></b>
Psychological/ Physiological	7.96	7.78	7.77	7.92	0.19 (N.S)
Natural environment	13.49	14.43	14.57	13.98	1.65 (N.S)
Social	9.70	9.70	10.06	9.94	0.35 (N.S)
Fishery Resource	6.91	7.47	6.66	7.41	2.90 (<0.05)
Skill	7.13	7.66	6.93	8.18	2.88 (<0.05)



An assessment of resource dependency ('Fish Incidental' and 'Fish Dominant' motive categories) based upon the socio-demographic characteristics of anglers from the Great Barrier Reef region were analysed. No significant differences were discovered in the catch motivations of anglers based upon their age, annual income or employment status. However 'Catch Dominant' motives for fishing was dependent upon the gender and educational level of respondents. Results found that males and those who completed a primary school level of education represented anglers who rated 'Catch Dominant' motives for fishing of greater importance (see Table 26 and Table 27, respectively).

**Table 26.** Motives for catching fish by gender of anglers from the Great Barrier Reef region.

Resource Dependency Motive Categories	Mean – Gender		
	<i>Male</i>	<i>Female</i>	<i>F Significance</i>
Catch Incidental	24.55	24.13	0.66 (N.S)
Catch Dominant	16.71	15.81	7.48 (<0.01)

**Table 27.** Motives for catching fish by educational level of anglers.

Resource Dependency Motive Categories	Mean – Educational Level				
	<i>Primary</i>	<i>Secondary</i>	<i>Trade/Tafe</i>	<i>Tertiary</i>	<i>F Significance</i>
Catch Incidental	24.49	24.71	23.73	24.40	0.94 (N.S)
Catch Dominant	17.69	16.56	16.19	16.22	2.95 (<0.05)

Table 28 reflects that managers, professionals and administrators reported 'Catch Incidental' motives for fishing of lower importance when compared to the scores of anglers from other occupational categories.

**Table 28.** Catch motivations by occupational status of anglers from the Great Barrier Reef region.

Resource Dependency Motive Category	Mean – Occupational Status				
	<i>Manager/ Professional/ Administrator</i>	<i>Trade or related</i>	<i>Clerical/ Sales or Service</i>	<i>Transportation/ production/ labour</i>	<i>F Significance</i>
Catch Incidental	23.64	24.19	25.46	25.59	3.93 (<0.01)
Catch Dominant	16.68	16.88	15.79	16.50	1.34 (N.S)

### **3.6.4. A Discussion of Motivations for Fishing by Anglers from the Great Barrier Reef Region**

#### **3.6.4.1. A Discussion of Great Barrier Reef Anglers Motives for Fishing in Comparison to Previous Research**

A primary objective of this investigation was to discover the motivations behind the pursuit of fishing by people from the Great Barrier Reef region. While the desire to catch fish was almost certainly a primary motive of these recreational anglers, findings showed that non-catch motivations associated with the 'experience' clearly held great value also. Consequently, results strongly suggested that catching fish was not the main goal of fishing by anglers surveyed. Findings based on Fedler and Ditton's (1994) five motive categories, reflected that 'Psychological and Physiological' followed by 'Natural Environment' motives were of more importance than 'Fishery Resource' motives for participating in fishing activities. 'Rest and relaxation', 'enjoying nature', and 'being outdoors' were the strongest motivations for pursuing fishing according to recreational anglers surveyed from the Great Barrier Reef region.

Based from interviews with thousands of anglers, numerous studies in America have discovered the significance of non-catch motivations in the pursuit of fishing activities (Holland & Ditton 1992). Dimensions rated of most importance to anglers from previous investigations have included: 'enjoying nature' (Knopf et al. 1973; Buchanan 1985; Steinback & O'Neil 1994; Fedler & Ditton 1994; Johnson & Orback 1986), 'relaxation' (Spaulding 1976; Driver & Cooksey 1980; Dovers 1994), and 'escape from daily routines' (Graefe 1980; Johnson & Orback; 1986; Dovers 1994). These non-catch motivations have achieved higher mean scores or percentages of anglers rating them as important, than have motives relating to the actual catching, harvest or consumption of fish (Hendee & Bryan 1978; Fedler 1984).

Various researchers in the Australian context have also reported the importance of non-catch motivations for fishing (Blamey & Hundloe 1993; PA Management Consultants 1984; Gartside 1986). P.A. Management Consultants (1984) found in a national Australian household study that 'to relax and unwind', 'to be outdoors' and 'to enjoy the company of others' were the main reasons people reported for engaging in recreational fishing activities. Anglers from Pumicestone Passage in Southern Queensland rated 'rest and relaxation' as their primary motive for fishing, whilst catching fish was shown to be a secondary motive (WBM Oceanics Australia 1994). In an investigation by Jennings (1996) to 'relax in the outdoors', 'enjoy the environment' and 'get away from everyday life and work' were the most important factors for Shoalwater Bay users in Southern Queensland. Gartside (1986) also reported the importance of similar motivations that included gaining a sense of 'escapism' from daily life and work, and obtaining 'enjoyment from the environment'. In light of these previous findings, the results from the current investigation suggest that recreational anglers from the Great Barrier Reef region possess similar fishing motivations to other Australian anglers and those surveyed from abroad in previous studies.

While most anglers strongly agreed that they usually eat the fish they catch, fishing as a source of food was not a significant motivation for anglers. These results support findings from an earlier investigation of anglers from Pumicestone Passage in Queensland whereby only 7% of those surveyed indicated that they fished primarily to 'obtain food' (WBM Oceanics Australia 1994). In a Queensland study undertaken by Neumann and Hundloe (1986) only a small percentage of anglers considered obtaining food as their main reason for fishing. This trend has also been reflected in American

research where majorities of anglers were seeking satisfactions unrelated to the catching or eating of fish (Bryan 1974).

The current investigation has revealed not only the range of motives for why individuals participate in recreational fishing, but has shown that a fishing trip can be successful even if no fish are caught. For recreational anglers from the Great Barrier Reef region one of the most important aspects in the pursuit of fishing was not to catch fish every trip, but to have the 'opportunity' to catch a fish. These findings generally concur with previous studies that have also reported the low importance of catching and keeping all the fish caught (Fedler & Ditton 1994; Neumann & Hundloe 1986). The catching of fish is undoubtedly a primary motive of many anglers, however general non-catch motives (e.g. fish incidental motives, psychological/physiological motives and natural environment motives) are frequently being cited as major reasons for people's participation in fishing activities. It is not surprising that angler motivations have not been well received by fisheries biologists or managers in the past (Fedler & Ditton 1994).

The big question remains "How important is fish in the pursuit of recreational fishing?". WBM Oceanics Australia (1994) have implied that if catch rates decline, effort will continue to be applied to fish stocks because people will continue fishing just for the enjoyment and fun of it. In response to this however, Radonski (1984) has pointed out that people may tell you they will continue to fish, but actually may reduce their fishing participation when they no longer have the opportunity to go fishing and keep something. An important finding from this research is that recreational anglers from the Great Barrier Reef region do not appear to be focused on the catch related aspects of fishing i.e. catching lots of fish, catching a trophy fish and so forth. However, if the opportunity to catch a fish is taken away from this group, their participation in recreational fishing as a leisure pursuit is likely to decline.

#### 3.6.4.2. A Discussion of Motivations based on the Experiential and Demographic Characteristics of Anglers from the Great Barrier Reef Region.

Different participants in fishing seek different benefits from their experiences (Bryan 1976), and therefore are motivated for different reasons. Through assessing experiential profile characteristics in conjunction with the motivations of anglers from the Great Barrier Reef region, some interesting and potentially useful findings have been discovered. Results reflected that experienced anglers (those with the most years of fishing experience) were mostly interested in non-catch related benefits obtained from participating in recreational fishing activities. However, it was the catch related aspects of the fishing experience that made anglers with higher levels of participation and fishing ability, more distinctive from other groups of recreational anglers. Individuals who allocated a higher percentage of their leisure time to fishing and those with greater fishing abilities were more concerned with actually catching fish, and fishing for the challenge and skills involved. In other words, these anglers possessed a higher resource dependency. Similar findings from previous research have also shown that different types of motives and experiences were sought by anglers at varying levels of participation and specialisation (Graefe 1980; Ditton, Loomis & Choi 1992).

Although it was not possible to classify recreational anglers from the Great Barrier Reef region into specialisation groups, results from the current investigation follow similar trends to findings by Ditton, Loomis and Choi (1992). This earlier research indicated that high specialisation anglers possessed a greater resource dependency when

compared to anglers from lower specialisation groups. The former group considered catching big, distinctive, trophy fish to be an important part of their fishing experience in contrast to the later group of anglers who were disinterested in the 'rare' event aspects of fishing. Unruh (1979; 1980) argued however, that it is the least specialised angler who is likely to be aware of, and seek only the most superficial and apparent elements of the fishing experience i.e. 'catching fish'. For the more specialised angler the act of catching fish is of lower importance. This type of angler would view non-activity specific elements of the experience (i.e. psychological and social benefits) to be equally important to that of catching a fish, if not more so. Further research into profiling anglers and crosstabulating this information with socio-motivational variables will assist with providing fisheries agencies with a more grounded understanding of group differences.

### 3.7. Type of Water Fished in by Anglers on their Last Trip

#### 3.7.1. Water Fished in by Queensland Recreational Anglers on their Last Trip

The QFMA survey asked respondents to provide details about their last fishing trip. One of these questions referred to the type of water anglers had fished in on their last trip. Of the 1, 249 respondents from Queensland who recorded the type of water they fished in 53% had fished inshore in saltwater, 17% reported fishing in fresh water and 14.5% said they fished inshore in both salt and fresh water (see Table 29).

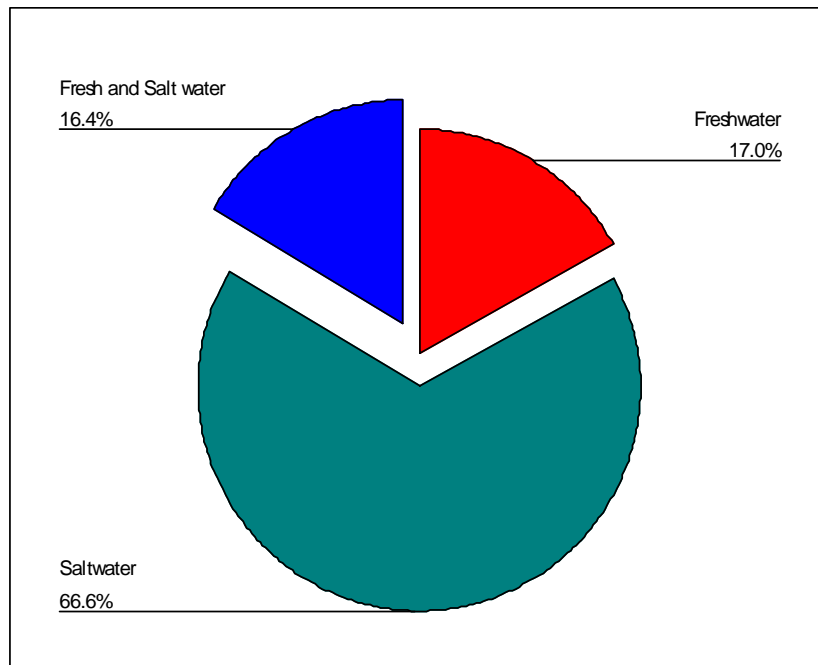
**Table 29.** Types of water fished in by Queensland recreational anglers on their last trip.

Type of Water Fished In	Frequency (n)	Valid Percent (%)
Fresh	212	17.0
Salt	38	3.0
Fresh and Salt	23	1.8
Salt Inshore	666	53.3
Salt Offshore	125	10.0
Salt Inshore and Offshore	3	0.2
Fresh and Salt Inshore	181	14.5
Fresh and Salt Offshore	1	0.1
Total	1 249	100%

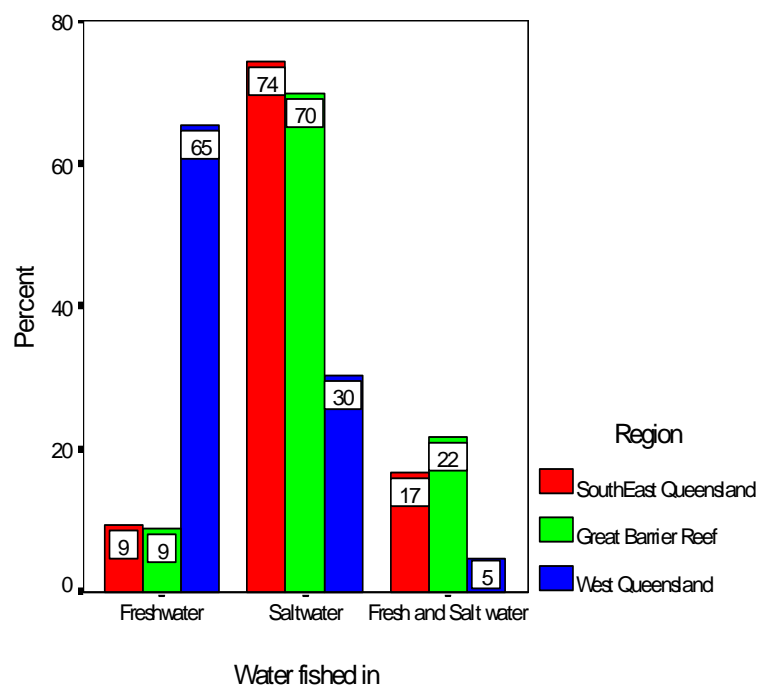
To further categorise the type of water fished in by Queensland anglers, respondents were regrouped into saltwater, freshwater and both fresh and saltwater. Results in Figure 33 illustrates that 66.6% of Queensland anglers fished in saltwater on their last trip, 17% went fishing in freshwater and 16.4% reported fishing in both salt and fresh water.

Figure 34 displays the types of water fished in by anglers from South-east, Western and the Great Barrier Reef regions of Queensland on their last trip. Significant differences

were found in the types of water fished in by anglers from these three Queensland regions. Sixty-five percent of anglers from Western Queensland fished in fresh water, as opposed to 9.3% and 8.8% of anglers from the South-east and Great Barrier Reef regions respectively. A lower percentage of Western Queensland respondents (30%) fished in salt water, in comparison to anglers from the South-east (74.1%) and the Great Barrier Reef (69.7%) regions of Queensland.



**Figure 33.** Type of water fished in by Queensland recreational anglers on their last trip.



**Figure 34.** Type of water fished in by anglers from Queensland regions on their last trip

### **3.7.2. Type of Water Fished in by Anglers from the Great Barrier Reef Region on their Last Trip**

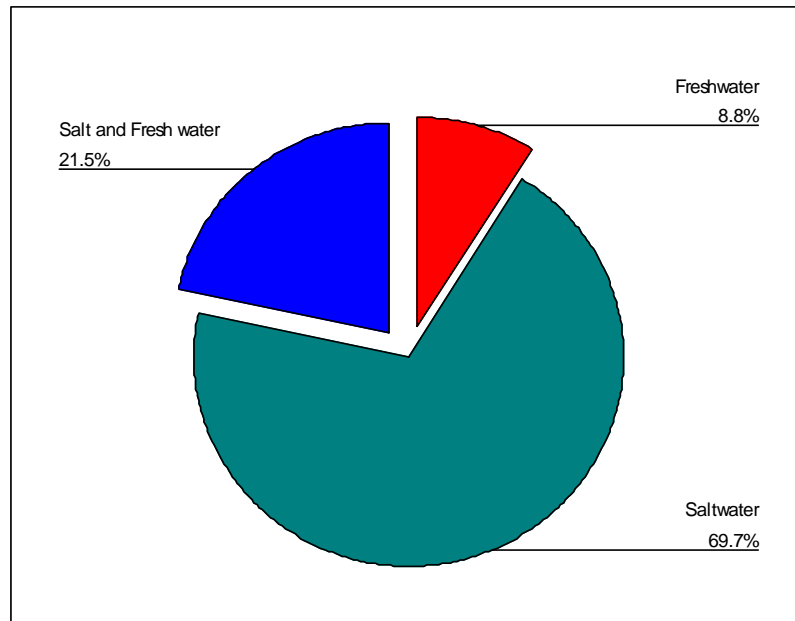
Table 30 provides information from 376 Great Barrier Reef respondents regarding the type of water fished in during their last trip. The majority of anglers fished inshore in saltwater (48.7%), 17.6% fished offshore in saltwater, and 14.3% fished inshore in both fresh and salt water during their last fishing trip. Almost 9% of the sample from the Great Barrier Reef region had gone fishing in a freshwater location.

**Table 30.** Types of water fished in by anglers from the Great Barrier Reef region.

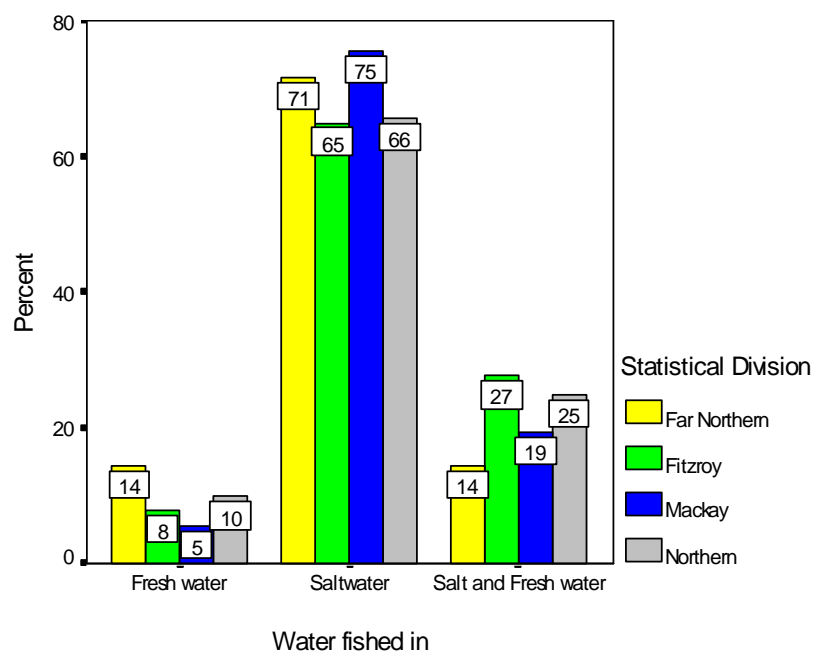
Type of Water Fished In	Frequency (n)	Valid Percent (%)
Fresh	33	8.8
Salt	12	3.2
Fresh and Salt	8	2.1
Salt Inshore	183	48.7
Salt Offshore	66	17.6
Salt Inshore and Offshore	1	0.3
Fresh and Salt Inshore	73	14.3
Total	376	100%

The type of water fished in by anglers from the Great Barrier Reef region was regrouped into three categories: saltwater, freshwater and both fresh and salt water. Figure 35 reflects that the majority of anglers from the Great Barrier Reef region fished in saltwater on their last trip (69.7%), 21.5% indicated they fished in both salt and freshwater and 8.8% reported fishing in freshwater.

Figure 36 displays the type of water fished in by anglers from the four divisions of the Great Barrier Reef region. Results produced no significant differences in the types of water fished in by anglers from the Fitzroy, Mackay, Northern or Far Northern divisions. Results illustrate that the majority of respondents from all four divisions fished in saltwater.



**Figure 35.** Type of water fished in by anglers from the Great Barrier Reef region on their last trip.



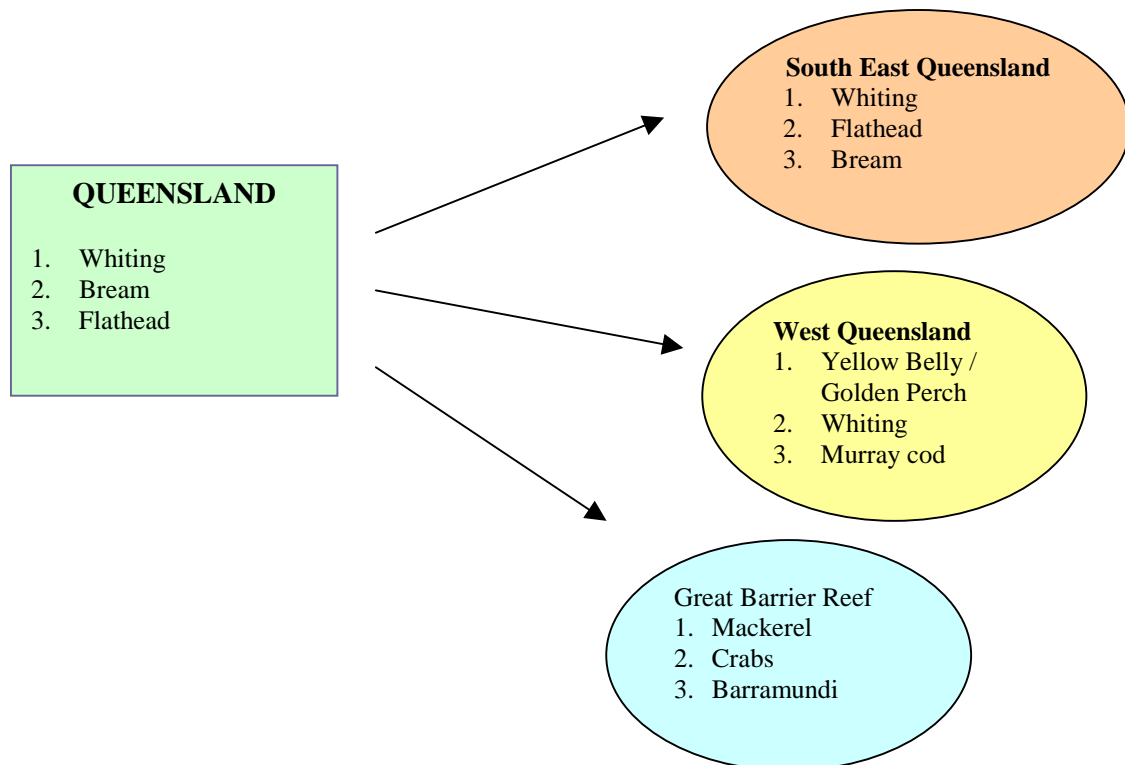
**Figure 36.** Water Fished in by Anglers from the Four Sections of the Great Barrier Reef region.

### 3.8. Species Targeted by Anglers on their Last Trip

#### 3.8.1. Types of Fish Targeted by Recreational Anglers from Queensland

Anglers from Queensland were asked whether they targeted a particular species of fish on their last trip. Of the 1,672 respondents, 62% indicated they were targeting a specific type of fish, whilst 38% reported that they were not focused on catching any species in particular. Table 31 presents the types of fish that were targeted by Queensland anglers on their last trip. As illustrated the most popular fish included: Whiting, Bream and Flathead.

The three most targeted species by anglers from the South-east, Western and Great Barrier Reef regions of Queensland are presented in Figure 37. Whiting, Flathead and Bream were the most targeted species by anglers from South-east Queensland. Western Queensland anglers tended to fish for Yellow belly/Golden perch, Whiting and Murray cod; whilst Mackerel, Crabs and Barramundi represented the most popular types of catch targeted by Great Barrier Reef regional anglers.



**Figure 37.** Most targeted species by regional anglers of Queensland on their last trip.



**Table 31.** Types of fish targeted by Queensland recreational anglers on their last trip.

<b>Fish Type</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Whiting	167	14.87
Bream	124	11.04
Flathead	112	9.97
Mackerel (Spotted/Doggie/Spanish)	69	6.14
Crabs (Mud)	61	5.43
Tailor	54	4.80
Yellow bellied/Golden Perch	51	4.54
Barramundi	41	3.65
Australian Bass	34	3.03
Crabs (Sand)	27	2.40
Murray Cod/Mary River	25	2.23
Mangrove Jack	24	2.14
Pearl/Silver Perch	23	2.05
Snapper/Squire	21	1.87
Jew Fish	20	1.78
Crabs (General)	20	1.78
Javelin/Grunter	19	1.69
Sweetlip (Red Throat Emperor)	18	1.60
Winter Whiting	16	1.42
Dart/Swallowtail	15	1.34
Trout/Coral Trout	15	1.34
Cod	15	1.34
Trevalley/Turrum	13	1.16
Reef Fish (Subtropical)	12	1.07
Red Emperor	9	0.80
Summer Whiting	9	0.80
Sooty Grunter/Black Bream	9	0.80
Cobia/Kingfish	8	0.71
Salmon	8	0.71
Red claw/Yabbies	7	0.62
Catfish	7	0.62
Reef Fish (Coral Reef/Tropical)	6	0.53
Small/Large Mouth Nannygai	6	0.53

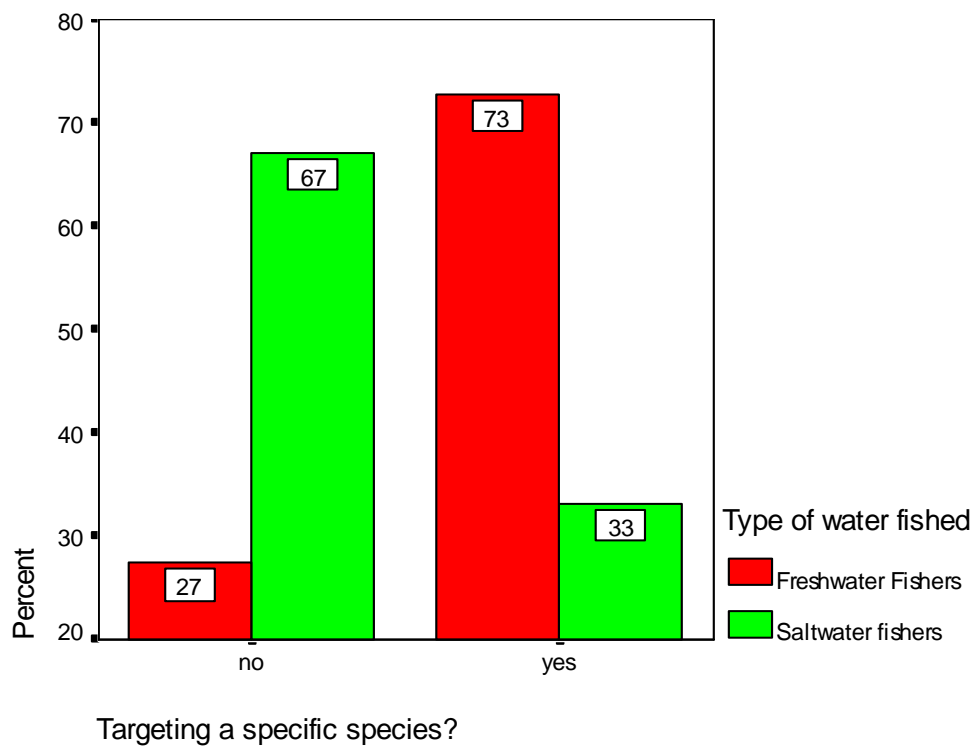
**Table 31 (con't).** Types of fish targeted by Queensland recreational anglers on their last trip.

Fish and Crabs (General)	4	0.35
Freshwater Perch	4	0.35
Fingermark	4	0.35
Estuary Fish	4	0.35
Prawns	3	0.26
Mulloway	3	0.26
Gar	3	0.26
Squid	3	0.26
Mullet	2	0.18
Red throat/Grassy Bream	2	0.18
Queenfish	2	0.18
Sleepy cod/Murray cod	1	0.09
Other fish	19	1.69
Total	1, 123	100%

**3.8.2. Species Targeted by Recreational Anglers from the Great Barrier Reef Region**

Recreational anglers from the Great Barrier Reef region were asked whether they targeted a specific species of fish on their last trip. Sixty-four percent of respondents indicated that they did not target any particular species of fish, whilst 36% answered in the affirmative. The types of fish mostly targeted by Great Barrier Reef anglers included Mackerel, Crabs and Barramundi. Species targeted on respondent's last trip are displayed in Table 32.

Respondents from the Great Barrier Reef region were categorised into salt and fresh water anglers and asked whether they targeted a specific species on their last trip. A higher percentage of freshwater anglers (73%) in comparison to saltwater anglers (33%) reported targeting a specific species (see Figure 38). Saltwater anglers mostly targeted mackerel, trout (Coral Trout), Crabs, Barramundi and Sweetlip (Red Throat Emperor) on their last trip. Freshwater anglers were most likely to target Barramundi, Sooty Grunter/Black Bream and Red Claw/Yabbies. Types of fish targeted by saltwater and freshwater anglers from the Great Barrier Reef region on their last trip are displayed in Table 33.



**Figure 38.** Comparison of salt and freshwater anglers and whether a specific species was targeted.

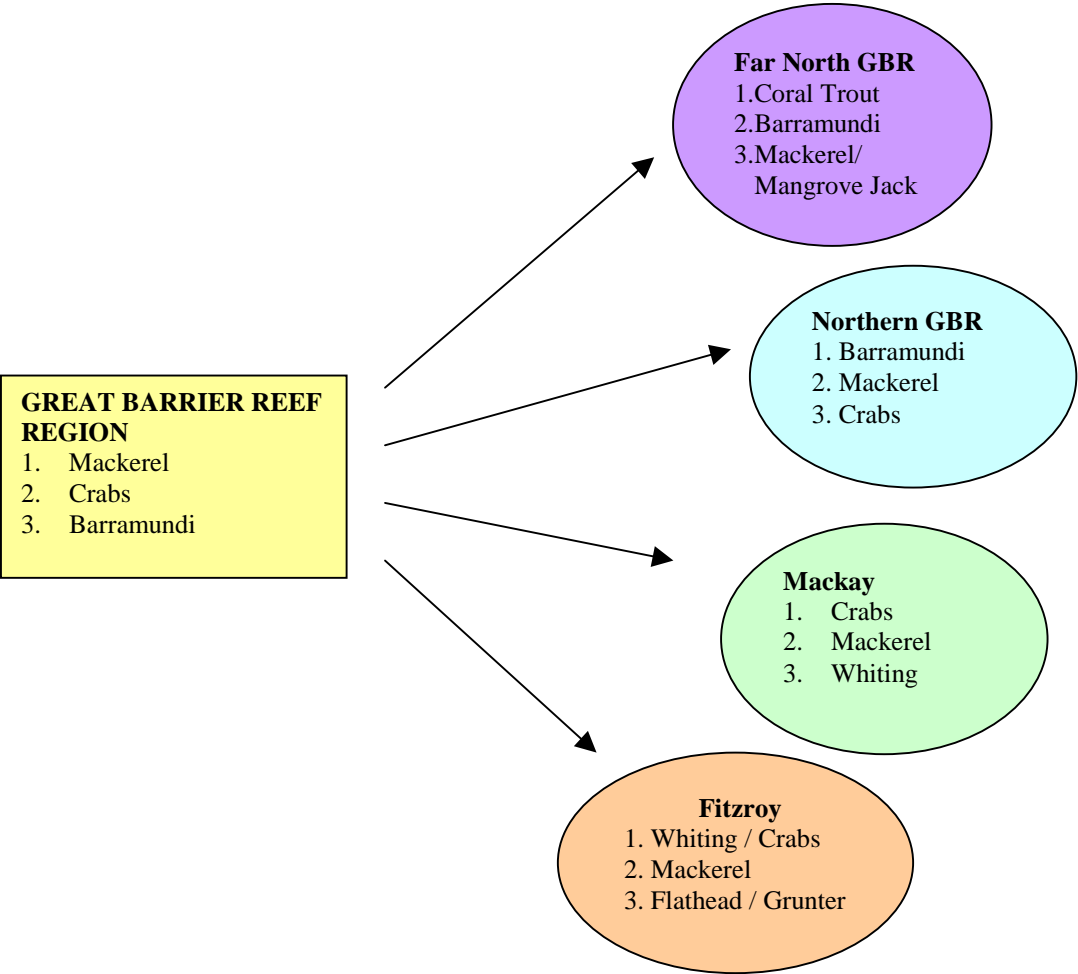
**Table 32.** Types of fish targeted by anglers from the Great Barrier Reef region on their last trip.

<b>Fish Type</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Mackerel (Spotted/Doggie/Spanish)	37	12.94
Crabs (Mud & Sand)	35	12.24
Barramundi	35	12.24
Whiting	21	7.34
Trout/Coral Trout	20	6.99
Javelin/Grunter	16	5.60
Bream	13	4.55
Mangrove Jack	13	4.55
Flathead	12	4.20
Sweetlip (Red Throat Emperor)	12	4.20
Sooty Grunter/Black Bream	6	2.01
Red Claw/Yabbies	6	2.01
Jew Fish	6	2.01
Salmon	5	1.75
Reef Fish (Coral Reef/Tropical)	5	1.75
Trevalley/Turrun	5	1.75
Fingermark	4	1.40
Cod	4	1.40
Yellow Bellied/Golden Perch	4	1.40
Small/Large Mouth Nannygai	4	1.40
Tailor	3	1.05
Estuary Fish Species	3	1.05
Sleepy Cod/Murray Cod	3	1.05
Other Fish	2	0.70
Snapper/Squire	2	0.70
Nannagai/Scarlet Seaperch	2	0.70
Prawns	2	0.70
Blue Tusk	2	0.70
Cobia	1	0.35
Squid	1	0.35
Mullet	1	0.35
Red throat/Grassy Bream	1	0.35
Total	286	100%

**Table 33.** Fish targeted by saltwater and freshwater anglers from the Great Barrier Reef region.

Fish Type	Saltwater		Freshwater	
	<i>Frequency (n)</i>	<i>Percent (%)</i>	<i>Frequency (n)</i>	<i>Percent (%)</i>
Mackerel (Spotted/Doggie/Spanish)	27	19.44		
Trout/Coral Trout	16	11.51		
Crabs (Mud & Sand)	15	10.79	1	3.03
Barramundi	13	9.35	11	33.33
Sweetlip (Red Throat Emperor)	13	9.35		
Mangrove Jack	8	5.76	1	3.03
Javelin/Grunter	6	4.32		
Whiting	5	3.60		
Small/Large Mouth Nannagai	4	2.88		
Bream	4	2.88	1	3.03
Cod	3	2.16		
Flathead	3	2.16		
Snapper/Squire	2	1.44		
Nannagai/Scarlet Seaperch	2	1.44		
Prawns	2	1.44		
Jew Fish	2	1.44	2	6.06
Salmon	2	1.44		
Reef Fish (Coral Reef/Tropical)	2	1.44		
Trevalley/Turrum	2	1.44		
Fingermark	2	1.44	1	3.03
Tailor	2	1.44	1	3.03
Blue Tusk	1	0.71		
Squid	1	0.71		
Estuary Fish Species	1	0.71		
Other Fish	1	0.71		
Sooty Grunter/Black Bream			5	15.16
Red claw/Yabbies			5	15.16
Yellow Bellied/Golden Perch			3	9.08
Sleepy Cod			2	6.06
Total	139	100%	33	100%

The most popular species targeted by anglers from the Far Northern, Northern, Mackay and Fitzroy divisions of the Great Barrier Reef region are displayed in Figure 39. Barramundi, Mackerel, Crabs, and Whiting appeared to be the most popular species targeted by anglers from the four Great Barrier Reef divisions on their last fishing trip.



**Figure 39.** Species mostly targeted by anglers from divisions of the Great Barrier Reef region.

### **3.8.3. *A Discussion of Salt and Fresh Water Anglers and Species Targeted***

A large proportion of recreational anglers from Queensland fished in saltwater during their last trip. Of anglers surveyed from the Great Barrier Reef region, two-thirds also fished predominately in saltwater. Due to limited sample sizes and a lack of information regarding the type of water an angler would normally fish in, profiles of salt and freshwater anglers were not developed. A review of previous research has demonstrated the variegation of angler populations based upon the type of water fished in. According to the findings of Bryan (1976), Arther (1978), Fedler & Ditton (1994), fresh and saltwater anglers are largely distinct groups possessing significantly different motivations, demographic characteristics and expenditures. It is unfortunate that very little research has been undertaken in Australia that has assessed such diversities between salt and freshwater anglers.

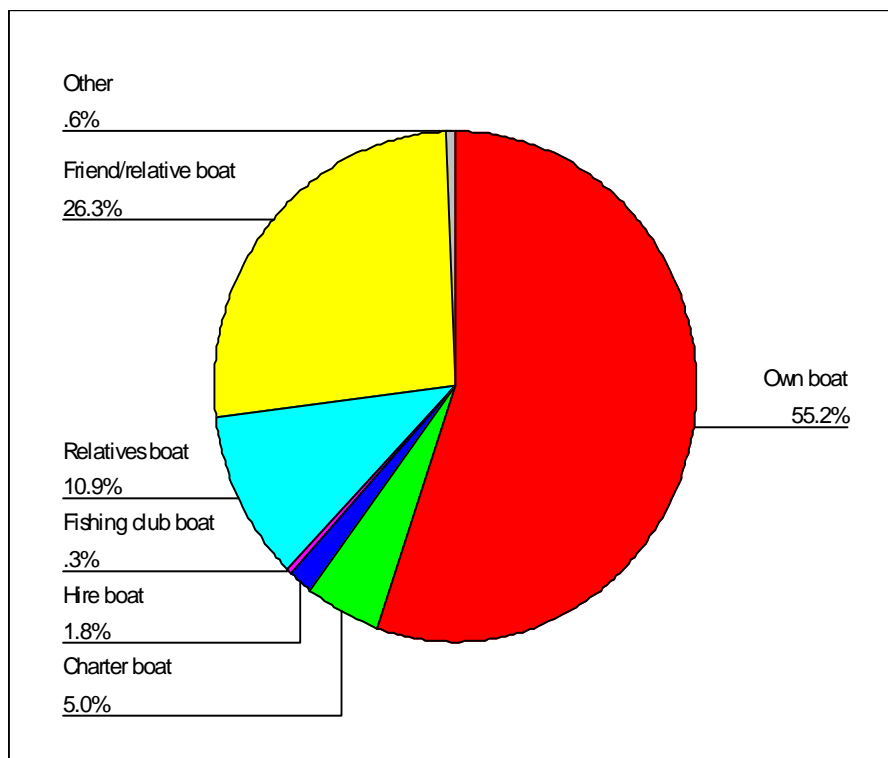
The species most targeted by anglers from the Great Barrier Reef region during their last trip were Mackerel, Crabs and Barramundi. Species sought and mode of fishing have in previous studies, been significant indicators of the great diversity that exists between individual anglers. Earlier findings have shown that when anglers are grouped either by fishing mode or species sought the importance of catch related motivations vary significantly (Fedler & Ditton 1994). Information detailing what species is targeted and caught, and the social values held towards certain fish types, is valuable for management as it effects the strategies and regulations that should be implemented. Additionally, information about species sought and fishing mode may also be used to represent 'market segments' or types of anglers that seek unique experiences. For management authorities recognising these segments and ensuring their experiential preferences are met will assist in the maintenance, growth and support of that segment (Fedler & Ditton 1994). With these outcomes in mind, there is certainly justification for furthering research to demonstrate the diversity of angler populations in Queensland on the basis of water fished in, species targeted and fishing mode.

### 3.9. Details of the Last Fishing Trip undertaken by Anglers from the Great Barrier Reef Region

#### 3.9.1. Length of Last Fishing Trip, Platform Used and Fishing Trip Companions

Respondents were asked to provide details about the length of their last fishing trip. Eighty-five percent reported that their last trip was a 'single outing', whilst the remaining 15% indicated that the trip was part of a longer journey. For those who indicated that it was part of a longer outing, the median number of days spent on a fishing trip was three. Refer to Appendix C for a distribution of days spent on the last fishing trip by anglers from the Great Barrier Reef region.

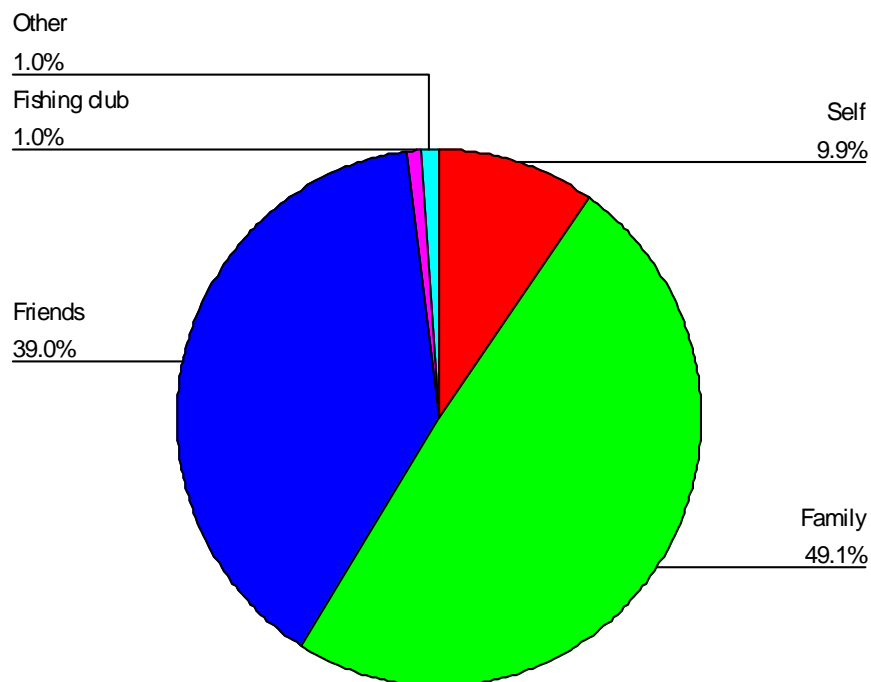
Anglers from the Great Barrier Reef region were questioned about the fishing platform used on their last fishing trip. Of 495 respondents, 68% reported that they had fished from a boat. Figure 40 illustrates that 55.2% of these anglers used their own boat, 26.3% fished from a vessel owned by friends or relatives, and 10.9% said that the boat belonged to a relative. There were no differences in the usage of boats as a fishing platform between anglers who fished in freshwater, as opposed to those who fished in saltwater, on their last trip.



**Figure 40.** Ownership of the boat used on the last fishing trip by anglers from the Great Barrier Reef region.



The majority of anglers from the Great Barrier Reef region travelled on their last fishing trip with family members (49%), and friends (39%). Only 10% went fishing alone, and very few (5 people) said they fished with a club (see Figure 41). Forty-seven of the 497 respondents from the Great Barrier Reef region said they took their dogs along as their fishing companions. Friends and family members accompanied almost 90% of both salt and fresh water anglers on their last trip. Males accompanied approximately 90% of respondents, 38% said that a female had travelled with them on their last trip, children aged between 5 to 14 years were with 23% of anglers on their trip, and 8.6% reported they had a small child under the age of five with them. Refer to Appendix D for a summary of trip companions and the number of people who fished on anglers' last trip.



**Figure 41.** Fishing companions of anglers from the Great Barrier Reef region on their last trip.

### 3.9.2. A Discussion of Fishing Trip Companions and Gender of Anglers

Social motives deal with the desire to interact with other people (Fedler & Ditton 1994). Findings from this study suggest that while boaters wanted to get away from other people and escape from normal routine, they preferred to go fishing with friends and family members. Family and friends were reported as the two main categories of passengers who accompanied anglers from the Great Barrier Reef region on their last fishing trip. Collecting information about the profile of fishing trip companions is important in understanding both motivations behind fishing and the satisfactions gained from a trip. Results imply that recreational fishing for anglers from the Great Barrier Reef region is both family and socially orientated. Jennings (1996) and P.A. Management Consultants (1984) have also reported these social aspects of fishing in the Australian context. Earlier research has suggested that father-child interactions during a fishing trip are very important in socialisation processes; so too is having a

connection with friends and other relatives whilst fishing (Diamond & Bond 1983). Although research has traditionally focused on fishing as an activity preferred by men (Hutchinson 1994; Toth & Brown 1997), longitudinal analysis of fishing trends in America showed that women comprised the fastest growing segment of new anglers (Snepenger & Ditton 1985). According to Dargitz (1986) women are increasingly being socialised into fishing because of its inherent family orientation. Being close to family members has been reflected in women's motivations for fishing and their trip satisfactions (Toth & Brown 1997). To continue to understand the reasons behind recreational fishing rates and patterns, the importance of trip companions and the meaning of fishing experiences for male and female anglers should continue to be examined.

### **3.9.3. *Activities Undertaken and the Influence of Other People and their Activities on Saltwater Anglers during their Last Trip***

Respondents who fished in saltwater were questioned about the types of activities they participated in on their last trip. Results suggest that very few people went SCUBA diving, spear fishing, snorkeling, or shell collecting. Swimming and camping by saltwater anglers were also unpopular activities. Most respondents participated in line fishing, crabbing and bait collecting. The majority of saltwater anglers spent between three to five hours line fishing, less than an hour collecting bait and from one to five hours crabbing. Appendix E describes the types of activities and amount of time spent on each by saltwater anglers of the Great Barrier Reef region during their last trip.

Respondents were asked whether the activities undertaken by other people at their last fishing location had an effect upon their experiences of the trip. Fifty-seven percent of respondents said that other people/boats were at the location of their last fishing trip. According to responses very few activities undertaken by other people had a negative or detracting experience. Commercial activities such as line fishing, trawling and netting were mentioned by some anglers as detracting from their experiences, however a high percentage reported these commercial activities as being 'not applicable' to their situation. Jet ski's and powerboats were also specified by a few respondents as having an impact upon their experiences. Overall results indicate that recreational line fishers, spear fishers and recreational users had no real influence upon the majority of saltwater anglers surveyed (see Appendix F).

### **3.9.4. *Fishing Trip Satisfactions of Anglers***

To gain an understanding of what dimensions contribute to fishing trip satisfactions, respondents were asked to rate on a scale from 1) = Poor to 5) = Excellent, how successful their last fishing trip was and reasons why. Of the 571 respondents from the Great Barrier Reef region approximately 53% rated their trip as poor (18.6% Poor and 34.2% Very Poor), 23% Average, and 24% scored their trip as being Very Good or Excellent (15.5% and 8.9% respectively). Reasons for these trip satisfactions are displayed in Table 34. Indicators of fishing trip satisfaction most frequently mentioned included: catch related experiences (Good fish catch/Poor fish catch), weather conditions, personal/social benefits and natural environment experiences.

### **3.9.5. A Discussion of Fishing Trip Satisfaction**

Fishing trip satisfaction is determined by differences between the outcomes one desires or thinks should be received (motivations) and the perceived fulfillment of these outcomes (Lawler 1973; Peterson 1974; Ditton et al. 1992). Holland, Lal & Power (1992) classifies the benefit or outcomes gained from fishing as the recreational 'experience'. This recreational 'experience' is made up of the anticipation and actual capture of fish, as well as a whole range of other possible benefits which include having fish for consumption as well as obtaining relaxation, challenge, peace and quiet. Results from the current investigation reflect that such benefits were received by respondents from their fishing activities. Catch related experiences, weather conditions, psychological and social experiences and enjoyment of the natural environment were the dimensions of fishing trip satisfaction most frequently mentioned by anglers from the Great Barrier Reef region.

Dimensions of trip satisfaction previously investigated have included: a sense of freedom, excitement, catching a fish, relaxation, enjoying a natural setting and thinking about past fishing experiences (Fedler 1984; Holland & Ditton 1992). Fedler (1984) suggests that a basic understanding of trip satisfaction should always include the three dimensions: enjoying nature, relaxation and reflection nostalgia. Research undertaken by Holland and Ditton (1992) have shown that enjoying a quality environment and feeling a sense of freedom were the two most important dimensions of fishing trip satisfaction for American respondents. Being outdoors and enjoying nature were also important contributors to trip satisfaction for many Great Barrier Reef anglers in the current investigation.

Graefe and Fedler (1986) argued that fulfilment of catch related motives for fishing were more important in determining satisfaction and dissatisfaction among anglers than were reasons such as relaxation, escape, involvement with nature and social interaction. Furthermore, they reported that overall satisfaction depended on how anglers evaluated catch in light of expectations and preferences rather than on the actual number of fish caught. Although trip attributes were not rated by anglers in the current study, trip satisfactions certainly appeared to be determined by both catch and non-catch measures. A review of current findings also remind us that although catching a fish was important in determining trip satisfaction, Psychological/Physiological and natural environment motives were stronger than those relating to the actual catching and harvesting of fish. In summary, findings reflecting these different satisfactions and motivations demonstrate the extent to which certain product attributes are demanded and preferred by various segments of the recreational fishing population from the Great Barrier Reef region.

In the future, as satisfaction becomes recognised as the principal product of recreational fishing, managers will want to know whether anglers are satisfied with their fishing experiences and what the relative contributions of various dimensions are to angler satisfactions (Felder & Ditton 1994). Managers will be able to use information on 'satisfactions' to differentiate various products or types of fishing and integrate this information on fishing demand and supply concerns. Product differentiation will be needed to establish clear objectives for managing the biological and social conditions that affect the satisfactions produced. For instance, managers will need to know which segments of anglers are likely to be affected by smaller bag limits or might be amenable to catch-release programs. Managers therefore need to redefine their responsibility so that they provide several variously demanded products rather than only providing catch opportunities for anglers in general (Holland & Ditton 1992). For managers and

planners gathering information about fishing satisfactions in relation to specific sites of interest, will be pertinent in order to achieve such outcomes.

**Table 34.** Reasons for fishing trip satisfaction by anglers from the Great Barrier Reef region.

Reasons for trip ratings	Positives/Negatives	Frequency (n)	Percentage (%)
Weather conditions	Good weather conditions	7	1.5
	Poor weather conditions	29	6.0
Nature appreciation/ company of others and fish catch	Positive experiences gained from other people, the environment and fish caught	32	6.7
Personal Experience	Positive Psychological/ Physiological experiences	22	4.6
Proximity/Accessibility	Close Proximity/Accessibility	1	0.2
	Inaccessible/Not in close Proximity	3	0.6
Presence/Activities of Other People	Enjoyment of others and their company	9	1.9
	Others and their impacts decreased experiences	8	1.7
Nature Appreciation	Positive experiences gained from the natural environment	3	0.6
Equipment	Good use of equipment	1	0.2
	Equipment failure	3	0.6
Catch of fish/crabs	Good catch, caught target species, enough fish caught to eat, caught several species	50	10.3
	Poor catch, small fish	194	40.4
Catch/weather conditions and company	Good conditions/good company/good catch	56	11.4
	Bad conditions/good company/few fish caught	30	6.2
Social and Psychological Experiences	Good company/positive personal experiences	7	1.5
Other reasons		26	5.3
Totals		481	100

### 3.9.6. Years of Fishing Experience by Anglers at their Last Visited Destination

Figure 30 illustrates that 40% of respondents from the Great Barrier Reef region had fished for less than five years at their last destination, whilst 10% reported having been a regular fisher for over thirty years at the location of their last trip. There were no significant differences between salt and fresh water anglers and the number of years they had regularly fished at their last destination.



**Figure 42.** Years of Fishing Experience at Anglers Last Visited Destination.

## **4.0. DISCUSSION**

### **4.1. Implications for Management**

Solving problems associated with fishing impacts and managing fishing regions to achieve sustained use is greatly dependent upon recreational anglers and their relationship with fishing environments. It is therefore important to directly involve recreational anglers in order for management agencies to better understand their values, motivations, satisfactions and behaviours. People's thoughts and behaviours will arguably be the basis for the success or failure of the sustained diversity of fish stocks within the Great Barrier Reef Marine Park. The findings from this investigation provide the Great Barrier Reef Marine Park Authority with some essential information and social science techniques that can be used as a baseline for future management and decision-making. The usefulness of this information and some implications for management are outlined below.

Findings reflect some interesting motivations for fishing by recreational anglers from the Great Barrier Reef region. Psychological/Physiological and natural environment motives were of significant value to recreational anglers, and were rated of more importance than catch dominant motivations. Fishing as a means of experiencing rest and relaxation, enjoying nature and being outdoors were the strongest motivations for pursuing fishing activities. For decision-makers these fishing motivations provide a foundation from which to implement appropriate regulations and specific strategies. The importance of the natural environment, psychological and physiological benefits make connections between fishing and environmental protection/preservation abundantly clear. Managers should be conscious of the value of these motivations to anglers and be able to meet these expectations by aiming to provide and maintain quality environments. Within specific locations and contexts, management agencies could devise strategies that restrict access, angler numbers or certain activities in order to protect high quality scenic fishing areas for peace and solitude. Fedler and Ditton (1994) have argued that instead of shrinking from the psychological and health related benefits of fishing, managers should highlight them in order to gain support.

Indicators of trip satisfactions were very reflective of anglers' motivations for fishing. Anglers' satisfactions included gaining enjoyment from the natural environment, social and psychological benefits and catch related experiences. Overall, these multi-dimensional experiences were what anglers most frequently mentioned as determining the satisfaction of their fishing trip. Fisheries managers need to better define the satisfactions or experiential products provided and relate them to the requirements of the recreational angling public. It follows that if anglers possess different attitudes and values for fishing, they will seek to fulfill different experiences and packages of motives (Driver & Cooksey 1977; Graefe 1980). If possible, managers should be informed about anglers' motivations, experiential expectations and preferences that are specific to particular locations. Linking products with anglers will ultimately determine the success of management strategies.

Although findings illustrate the significance of non-catch motivations, fishing for the 'pleasure' of catching a fish was of paramount importance to recreational anglers. Trip satisfactions also reflected that catch related experiences were some of the most important aspects in the overall rating of a fishing trip. These anglers' motivations and the importance of actually catching fish are essential pieces of information for resource management. By disregarding angler motivations, managers might not be providing an appropriate balance of angling opportunities to meet public needs fully. For example,

if a group is specifically focused on high catch rates, yet indicates a lower interest in harvesting fish, managers could devote more effort towards implementing catch and release programs. For other groups of anglers, greater importance may be placed on catching, harvesting and consuming fish; therefore managers may need to consider supplementing stock and introducing bag limits. In the case of these Great Barrier Reef anglers, one of the most important aspects in the pursuit of fishing was not to catch fish on every trip, but to have the opportunity to catch a fish. If this opportunity was taken away, fishing as a recreational activity would likely decline. To reiterate, managers must consider the significance of various motivations and expectations of anglers in order to ensure that the right strategies are implemented for particular groups.

This investigation has shown how anglers differ in terms of their fishing experience, ability and expertise. In the future it may become necessary for authorities to allocate fishery resources to various types of anglers based on knowledge of their experience and ability to catch a fish. Fishery allocations could be devised for different groups by segmenting or typing anglers. As discussed previously, recognising the variation among anglers in terms of their motivations and specialisation may help authorities to better understand the assorted social and economic effects that management decisions may have on different groups.

Future management efforts need to focus on assessing angler preferences, providing a diversity of opportunities and modifying values in order to improve compliance (Val Vooren 1991). As a management strategy, Van Vooren (1991) suggests that controlling non-compliance and in turn increasing the effectiveness of fishing regulations through heightened enforcement, is neither effective nor practical on a large scale. What will clearly be the key to effective fisheries management is self-regulation and voluntary angler compliance. Managers should focus on placing less emphasis on predicting the biological consequences of a regulation and more on determining the support from different segments of the recreational fishing public. Where appropriate, modifying social values and attitudes placed on natural resources such as fish stocks, will have significant benefits in predicting harvest ethics towards certain species whilst ensuring angler compliance (WBM Oceanics Australia 1994). These social factors can be addressed through the administration of educational campaigns and increasing public awareness. Continued efforts by management agencies should therefore look to address the changing of social, rather than biological factors in relation to recreational fishing activities.

#### **4.2. Research Recommendations**

As a preliminary investigation some valuable information was obtained about recreational anglers and their activities. However there are several areas which require considerably more research attention in order to ensure that management techniques used for the Great Barrier Reef Marine Park are both effective and acceptable to the fishery. These research recommendations are briefly discussed below.

Findings have reflected that anglers are not a homogenous group. They possess significantly different motivations, satisfactions and levels of fishing experience. As such, there is clearly a need for research to extend this type of work and develop meaningful ways of identifying and explaining the variability present amongst recreational anglers. Unfortunately data limitations had made it impossible to classify anglers into groups based on their 'specialisation'. To develop conceptual typologies, future research should extend questions to assess angler's normal fishing behaviours and preferences. Devising angler typologies requires information about: the type of

water normally fished in, choice of equipment, species sought, setting preferences, frequency of participation, fishing mode etc. In conjunction with fishing motivations this information will assist in deciding the most acceptable management regime given the nature of the user's specialisation, whilst achieving conservation goals. As mentioned earlier, if further research can illustrate how anglers at varying levels of specialisation possess differing motivations and seek different experiences, the implications for various management allocations and decisions may be great.

Questioning anglers about the type of water normally fished in and species sought is very important information for resource managers. Studies should continue to attain a baseline from which to measure the value of fish to various sectors of the fishing community, and in doing so gain a better understanding of recreational anglers on the basis of species sought and fishing mode. Social values held towards certain species should be determined in future research because social acceptability factors will give an indication of angler compliance and the likelihood of fish harvest. Knowledge about the types of fish most commonly targeted will also enable managers to estimate the amount of fishing pressure to a particular species. Additionally, information about targeted species will allow management agencies to review current laws and regulations in relation to specific types of fish.

When considering the future protection of the fishery, managers should acknowledge that people management is as important as resource management. For a management strategy to be successful it should not only protect fish stocks from overfishing, it must also be acceptable to the fishery. For certain management strategies to achieve acceptance and compliance, further research is required that examines angler responses to regulatory measures that are context specific. Specifically, scenarios regarding management alternatives should be developed and evaluated by sub-samples of anglers so that decision-makers can determine their respective preferences and better predict behavioural responses. This research needs to be supported by fisheries agencies and involve trained social science personnel.

Finally, there are other levels to which GBRMPA management can apply the socio-motivational information collected in this study. For example, information gathered could be further examined and used to: reduce potential conflicts between fishing groups, develop enforcement strategies in specific regions, consider the issue of social equity (who pays and who benefits), and evaluate various management tools and techniques. Further analysis of trip data could potentially illustrate that certain patterns of use within marine fisheries can be predicted from a small number of vessel characteristics i.e. boat length, horsepower and fuel capacity. Spatial analysis could also be applied to look at distances traveled offshore in relation to boat equipment data and display the more popular fishing destinations (Ditton, Graefe & Fedler, 1980). Analysing this data by use of spatial analysis provides a means for better understanding Marine Park use and values associated with the Great Barrier Reef region in general.

To summarise, additional research is clearly required before anglers' reactions and the effects on fishery stocks can be predicted with precision. Future data collection through surveys and interview techniques must adopt the use of standardised motive and satisfaction statements that provide consistent question wording and response formats with known validity and reliability. Investigations should also build on previous work so that findings can be compared, and common dimensions extracted. In order to achieve a greater understanding of why people go fishing, work needs to be extended



to look at angler motivations in relation to fishing satisfactions and destination attractions. It would be valuable to explore in more detail anglers' most visited locations and assess their frequencies of visits to give an indication as to the attractions of that destination and the fishing pressure applied. Extended over a period of time, the collection of this social science data could assess changes (social and biological) in relation to specific management strategies, and apply this to particular locations of interest. Addressing these research recommendations would provide valuable information to the GBRMPA and other management agencies and in doing so show the importance of directly involving the fishing community in research for future management.

## **5.0. CONCLUSION**

Fishing effort along the Queensland coastline has continued to increase and now represents one of the most extractive activities occurring within the Great Barrier Reef Marine Park. Management agencies such as the Queensland Fisheries Management Authority and the Great Barrier Reef Marine Park Authority are challenged with the task of conserving targeted fish stocks, managing users and their activities while ensuring equitable resource allocations. Management authorities recognise that fishing is a popular leisure time activity, whereby recreational anglers play an important role in the maintenance and protection of fish stocks and the environment that sustains them. Information from the QFMA's Recreational Fishing Survey provides management with a greater understanding of the social, motivational and experiential aspects of recreational fishing by anglers from Queensland and more specifically the Great Barrier Reef region.

Findings illustrated the diversity present amongst recreational anglers from the Great Barrier Reef region in terms of their motivations for fishing, levels of fishing experience and benefits received. Recreational anglers appear not to be a homogeneous group, and advisably authorities should be cautious about implementing strategies that manage for the 'average' angler. Fishing to Queensland anglers involved many dimensions besides that of simply catching fish. The significance of social, psychological, physiological and natural environment expectations were equally important as the catch-related benefits associated with fishing, if not more so. This information suggests that managers need to redefine their responsibility to ensure that anglers' experiential preferences are met, rather than only providing catch opportunities for recreational users. Instead of focusing upon predicting the biological consequences of a regulation, authorities should place more emphasis on providing satisfaction as the principle product of recreational fishing. Continued protection of fish stocks and species may well rest on the fuller recognition of gaining support from different segments of the recreational fishing public. Ultimately, a multidisciplinary approach (biological and social) is the key to enable management agencies to provide an appropriate mix of experiential opportunities to anglers whilst protecting the fishery and its environment.

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## **7.0. APPENDICES**

### **Appendix A. Recreational Fishing Survey**

Please note: The following is a scanned copy only.



# Recreational Fishing Survey

## How much does it cost you to go fishing?

This survey complements the Recreational Fishing Log Book program in which you are involved.

This survey is designed to obtain more detailed information on what level of investment you have in recreational fishing and why you enjoy fishing.

The results will provide a much more complete figure of the cost of recreational fishing and what the primary reasons are for people going fishing.

**ALL INFORMATION COLLECTED IS CONFIDENTIAL.**

**This survey is to be completed neatly by the log book participant and returned in the large reply-paid envelope as soon as possible.**



If you have any queries regarding this survey, please contact the Project Manager, Recreational Fishing Information System, Queensland Fisheries Management Authority on (07) 3227 8791.

### — Instructions —

To complete this survey simply place a cross 'X' in the box of your choice, using a blue or black pen. For example:

1. Approximately how many years have you been fishing?

☐ Less than 5 years    ☒ 5 - 9 years    ☐ 10 - 29 years    ☐ 30 years or longer

9. Was this trip: ☐ A Single Outing

or

☒ Part of a longer fishing trip → This trip was part of a  day fishing trip.





## Part I - Fishing Experience and Motivations



1. Approximately how many years have you been fishing?
- ☐ Less than 5 years    ☐ 5 - 9 years    ☐ 10 - 29 years    ☐ 30 years or longer
2. How much of your leisure time is spent going fishing?
- ☐ Less than a quarter of the time    ☐ Half to less than three quarters of the time  
☐ A quarter to less than half of the time    ☐ Three quarters or more of the time
3. How would you rate your fishing ability?    Not good    1    2    3    4    5    Very good
- ☐    ☐    ☐    ☐    ☐
4. People go recreational fishing/crabbing for different reasons. Please indicate on the list of items below how important each one is to you.
- |   | Not important            | 1                        | 2                        | 3                        | 4                        | 5                        | Very important |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------------|
| To obtain fish/crabs for eating         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| To escape routine                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| To enjoy nature                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| To test fishing equipment               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| To be with friends                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| To be with family                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| For rest and relaxation                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| For the challenge                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| To be outdoors                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| To improve my skills                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| For the pleasure of catching fish/crabs | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| To learn about nature                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| To be close to the water                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| To get away from other people           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
5. Please indicate the degree to which you agree or disagree with each of the following statements:
- |   | Strongly disagree        | 1                        | 2                        | 3                        | 4                        | 5                        | Strongly agree |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------------|
| A fishing trip can be successful even if no fish or crabs are caught                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| I usually eat the fish or crabs I catch   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| I would rather catch one or two big fish than ten smaller fish  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| It doesn't matter to me what type of fish I catch   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| The more fish or crabs caught, the better the fishing trip  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| I'm just as happy if I don't keep the fish/crabs I catch  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| It doesn't matter to me if I don't catch fish every trip, so long as the opportunity exists to catch fish | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| I like to fish where there are several kinds of fish to catch   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| I want to keep all the fish/crabs I catch   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| I catch fish/crabs for sport and pleasure rather than for food  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| I usually give away the fish/crabs I catch  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| I like to fish where I know I have a chance of catching a 'trophy fish'                                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
| I like to release most of the fish I catch  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |



## Part 2 - Details of your Last Fishing Trip in Queensland



The following questions focus on the LAST fishing trip in Queensland that you entered in your log book. If you have not been fishing this year, please answer the questions in relation to the last fishing trip you went on in Queensland.

7. What date did this fishing trip commence?

D	D	M	M	Y	Y

8. If you entered details in your Log Book, what was the log book number and the log book page number for that trip?

Log Book  
Number

--	--	--	--

Log Book  
Page Number

--	--	--

9. Where did you go?

Fishing Location \_\_\_\_\_

Nearest Town \_\_\_\_\_

Office use only


10. Was this trip:

☐ A Single Outing

or

☐ Part of a longer fishing trip → This trip was part of a 

--	--

 day fishing trip.

10. On this LAST trip were you targeting specific species of fish or crabs?

☐ No

☐ Yes, I was mainly targeting (please specify)

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

Office use only


11. Did you go on this trip: (cross all applicable)

☐ By yourself

☐ With family

☐ With friends

☐ With a fishing club

☐ Other (please specify) \_\_\_\_\_

Office use only

--	--

12. How many people went on this last trip (including yourself), and how many fished?

	Total Numbers	Number that fished				
Males 15 years and over	<table><tr><td></td><td></td></tr></table>			<table><tr><td></td><td></td></tr></table>		
Females 15 years and over	<table><tr><td></td><td></td></tr></table>			<table><tr><td></td><td></td></tr></table>		
Children 5 years to 14 years	<table><tr><td></td><td></td></tr></table>			<table><tr><td></td><td></td></tr></table>		
Children under 5 years	<table><tr><td></td><td></td></tr></table>			<table><tr><td></td><td></td></tr></table>		

part 2 continued...

13. On this last fishing trip, indicate if you personally took part in any of the following activities:

Activity	Did take part in activity Time Spent						Did NOT part in acty
Line Fishing	<input type="checkbox"/> < 1hr	<input type="checkbox"/> 1-2 hrs	<input type="checkbox"/> 3-5 hrs	<input type="checkbox"/> 6-12 hrs	<input type="checkbox"/> 13-24 hrs	<input type="checkbox"/> > 1 day	<input type="checkbox"/>
Cribbing	<input type="checkbox"/> < 1hr	<input type="checkbox"/> 1-2 hrs	<input type="checkbox"/> 3-5 hrs	<input type="checkbox"/> 6-12 hrs	<input type="checkbox"/> 13-24 hrs	<input type="checkbox"/> > 1 day	<input type="checkbox"/>
Spear Fishing	<input type="checkbox"/> < 1hr	<input type="checkbox"/> 1-2 hrs	<input type="checkbox"/> 3-5 hrs	<input type="checkbox"/> 6-12 hrs	<input type="checkbox"/> 13-24 hrs	<input type="checkbox"/> > 1 day	<input type="checkbox"/>
Bait Collecting	<input type="checkbox"/> < 1hr	<input type="checkbox"/> 1-2 hrs	<input type="checkbox"/> 3-5 hrs	<input type="checkbox"/> 6-12 hrs	<input type="checkbox"/> 13-24 hrs	<input type="checkbox"/> > 1 day	<input type="checkbox"/>
Shell Collecting	<input type="checkbox"/> < 1hr	<input type="checkbox"/> 1-2 hrs	<input type="checkbox"/> 3-5 hrs	<input type="checkbox"/> 6-12 hrs	<input type="checkbox"/> 13-24 hrs	<input type="checkbox"/> > 1 day	<input type="checkbox"/>
SCUBA Diving	<input type="checkbox"/> < 1hr	<input type="checkbox"/> 1-2 hrs	<input type="checkbox"/> 3-5 hrs	<input type="checkbox"/> 6-12 hrs	<input type="checkbox"/> 13-24 hrs	<input type="checkbox"/> > 1 day	<input type="checkbox"/>
Swimming	<input type="checkbox"/> < 1hr	<input type="checkbox"/> 1-2 hrs	<input type="checkbox"/> 3-5 hrs	<input type="checkbox"/> 6-12 hrs	<input type="checkbox"/> 13-24 hrs	<input type="checkbox"/> > 1 day	<input type="checkbox"/>
Snorkeling	<input type="checkbox"/> < 1hr	<input type="checkbox"/> 1-2 hrs	<input type="checkbox"/> 3-5 hrs	<input type="checkbox"/> 6-12 hrs	<input type="checkbox"/> 13-24 hrs	<input type="checkbox"/> > 1 day	<input type="checkbox"/>
Camping	<input type="checkbox"/> 1 day	<input type="checkbox"/> 2 days	<input type="checkbox"/> 3-5 days	<input type="checkbox"/> 6-7 days	<input type="checkbox"/> > 1 week		<input type="checkbox"/>

14. How successful would you rate your last fishing trip? Poor 1 2 3 4 5 Excellent
- ☐ ☐ ☐ ☐ ☐

15. What aspects of the trip made you give it this rating?

\_\_\_\_\_

\_\_\_\_\_

Office use only

☐ ☐

16. Did you fish from a boat?

☐ No

☐ Yes

Was this boat:

☐ Your own boat

☐ Fishing charter boat

☐ Hire boat

☐ Fishing club boat

☐ Other family member's boat

☐ Friends/relative's boat

☐ Other (please specify) \_\_\_\_\_

Office use only

☐ ☐

17. Were there other people/boats at the main fishing location?

☐ Yes → Go to Q18

☐ No → Go to Q19

18. If YES to Q17, please indicate the activities undertaken by them and how they affected your experience:

Activity	Enhanced	Detracted	Had no influence	Not Applicable
Recreational fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spear fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Commercial line fishing operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Commercial trawling operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Commercial netting operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Powerboat activities (incl. jet skis)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other recreational use (diving, snorkeling, swimming)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tourist operations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boating and Fisheries Patrol inspectors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fishcare Volunteers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Office use only

☐ ☐

1

- 

20.

- ☐ Less than 5 years    ☐ 5 - 9 years    ☐ 10 - 29 years    ☐ 30 years or longer

Office use only					

- |                 |  |  |  |  |  |
|-----------------|--|--|--|--|--|
| Office use only |  |  |  |  |  |
|                 |  |  |  |  |  |

Office use only	

- |                 |  |  |  |  |
|-----------------|--|--|--|--|
| Office use only |  |  |  |  |
|                 |  |  |  |  |

Office use only		
<table border="1"><tr><td></td><td></td></tr></table>		

### Part 3 - Expenditure On Fishing

This section investigates the costs of your fishing activity. This information is important to understand the amount of money recreational fishers invest in recreational fishing. If you don't know actual amounts, please provide careful estimates.

22. How much did you spend on the following items in the last 12 months, and where indicated, the last 5 years?

#### Fishing Equipment

	Cost (Last 12 Months)	Cost (Last 5 years)
Tabby Pumps	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00
Fishing Rods, Reels, Hand Lines	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00
Tackle	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Bait Nets / Cast Nets	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00
Fishing Equipment Maintenance	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Spear fishing guns	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00
Protective Clothing eg. Waders, Wetsuits, Sunglasses etc	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00
Crab Pots / Dillies	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00
Snorkel Gear	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00
Other (please specify) _____	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	Office use only <input type="text"/> <input type="text"/>

#### Boats And Boat Trailers

	Cost (Last 12 Months)	
Boats	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Boat Trailers	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Boat & Trailer Insurance	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Boat & Trailer Registration	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Boat & Trailer Maintenance	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Outboard Motors	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Stem Drive Motors / Legs	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Inboard Motors / Gearboxes etc	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Motor Maintenance	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Boat Fuel / Oil related to fishing	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Boating Accessories eg. Sounder, radio, GPS	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Safety Gear eg. Life jackets, flares, V sheets	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Radio License	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Fishing / Boating Permits	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Berthing Fees / Marina Storage	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	
Other (please specify) _____	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	Office use only <input type="text"/> <input type="text"/>

part 3 continued...

Vi Yes

Cost (Last 12 Months)

4 Wheel Drive Vehicles	\$							.00
Other Vehicles	\$							.00
Vehicle accessories for fishing eg. Sand tyres, tow bar, roof racks	\$							.00
Vehicle Maintenance	\$							.00
Vehicle Insurance	\$							.00
Vehicle Registration	\$							.00
Vehicle Hire	\$							.00
Vehicle Fuel / Oil related to fishing	\$							.00
Other (please specify) _____	\$							.00

Office  
use  
only

Camping / Caravan Expenses (as related to fishing trips)

Cost (Last 12 Months)

Caravan / Campervan	\$							.00
Caravan / Campervan Maintenance	\$							.00
Caravan / Campervan Insurance	\$							.00
Caravan / Campervan Registration	\$							.00
Camping Gear	\$							.00
Caravan Park / Camping Fees	\$							.00
Other (please specify) _____	\$							.00

Office  
use  
only

Other (as related to fishing trips)

Cost (Last 12 Months)

Fishing / Boating Club Fees	\$							.00
Eskies / Portable Fridges etc.	\$							.00
Magazine / Subscriptions	\$							.00
Ice / Dry Ice	\$							.00
LP Gas	\$							.00
Boat Hire	\$							.00
Charter Boat Fees	\$							.00
Bait	\$							.00
Fishing Competition Fees	\$							.00
Accommodation	\$							.00
Ferry / Barge Fees	\$							.00
Other (please specify) _____	\$							.00

Office  
use  
only

23. If you own any of the following, please complete details:

Item	Cost	Year Purchased	% of total use for Recreational Fishing	% of owners not sole ov
Four Wheel Drive Vehicles	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %
	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %
Other Vehicles	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %
	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %
Snorkel Gear	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %
	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %
Camping Gear	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %
	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %
Protective Clothing	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %
	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %
Eskies / Portable fridges etc	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %
	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %
Spear Fishing Guns	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %
	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %
Caravans / Campervans	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %
	\$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> .00	19 <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> %	<input type="text"/> %

24. How many boats (including dinghies) in which you have ownership do you use for recreational fishing?

- ☐ None → Go to Q25
 ☐ Two
- ☐ One
 ☐ More than two → How many?

4. If you own one or more boats used for recreational fishing, please fill out the details for each boat.  
(Attach details if more than two boats are owned)

	Boat 1	Boat 2
When did you purchase your boat?	19 <input type="text"/>	19 <input type="text"/>
How old was the boat when purchased?	<input type="checkbox"/> Purchased New <input type="checkbox"/> Purchased Used <input type="text"/> years	<input type="checkbox"/> Purchased New <input type="checkbox"/> Purchased Used <input type="text"/> years
Are you sole owner or part owner of the boat?	<input type="checkbox"/> Sole Owner <input type="checkbox"/> Part Owner % Owned <input type="text"/> %	<input type="checkbox"/> Sole Owner <input type="checkbox"/> Part Owner % Owned <input type="text"/> %
What was the cost of the boat (including scumder, safety gear etc)?	\$ <input type="text"/> .00	\$ <input type="text"/> .00
If trailer purchased separately, when & for how much did you buy the trailer?	19 <input type="text"/> \$ <input type="text"/> .00	19 <input type="text"/> \$ <input type="text"/> .00
When and how much have you paid for motors since owning the boat?	19 <input type="text"/> \$ <input type="text"/> .00  19 <input type="text"/> \$ <input type="text"/> .00	19 <input type="text"/> \$ <input type="text"/> .00  19 <input type="text"/> \$ <input type="text"/> .00
What is the boat's current main motor size? (to nearest hp)	<input type="text"/> hp	<input type="text"/> hp
What is the boat's fuel capacity?	<input type="text"/> Litres	<input type="text"/> Litres
What is the length of the boat? (to nearest metre)	<input type="text"/> Metres	<input type="text"/> Metres
How do you classify this boat?	<input type="checkbox"/> Speed Boat (ie. Speed of 10 knots or more) <input type="checkbox"/> Motor Boat (Speed of less than 10 knots) <input type="checkbox"/> Other	<input type="checkbox"/> Speed Boat (ie. Speed of 10 knots or more) <input type="checkbox"/> Motor Boat (Speed of less than 10 knots) <input type="checkbox"/> Other
Does it have sails?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Approximately what percentage of the boats use is for recreational fishing?	<input type="text"/> %	<input type="text"/> %



## Part 4 - Demographic Information

The last part of the questionnaire asks you for some personal details.  
Please remember that this information will be kept confidential.

26. What is your age?

☐ 15 - 19 years

☐ 20 - 29 years

☐ 30 - 39 years

☐ 40 - 49 years

☐ 50 - 59 years

☐ 60 plus years

27. What is your sex?

☐ Male

☐ Female

28. Which one of the following best describes you?

☐ A Wage / salary earner

☐ Unemployed

☐ Student → Go to Q30

☐ Conducting your own business

☐ Pensioner → Go to Q30

☐ Home Duties → Go to Q30

☐ Unpaid helper

☐ Retired → Go to Q30

☐ Other

29. What is your occupation? Please give full title and description of tasks performed:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Office use only

☐

30. What is your residential postcode?

31. How long have you lived at this residential postcode?

☐ Less than 5 years

☐ 5 - 9 years

☐ 10 - 29 years

☐ 30 years or longer

32. Are you of Aboriginal or Torres Strait Islander Origin?

☐ No

☐ Yes - Aboriginal person

☐ Yes - Torres Strait Islander person

33. What is the highest level of education that you have completed or are still attending?

☐ Primary

☐ Secondary

☐ Tertiary

☐ Trade/technical/TAFE

34. What is your annual (gross) income from all sources?

☐ \$0 - \$5,199

☐ \$5,200 - \$10,399

☐ \$10,400 - \$20,799

☐ \$20,800 - \$41,599

☐ \$41,600 - \$77,999

☐ \$78,000 or more

☐

☐

Are there any comments you wish to make regarding this questionnaire?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Thank you for your time

## **Appendix B. Queensland Regions and Statistical Areas**

<b>Queensland Region</b>	<b>Statistical Areas Included</b>
South East Queensland	Brisbane City/Brisbane Balance/Caboolture/Gold Coast/Moreton Balance/Redland Shire/ Sunshine Coast/Wide Bay Burnett/ Logan City
Great Barrier Reef Region	Far Northern/Northern/Mackay/Fitzroy
Western Queensland	Darling Downs/CW/SW/NW

**Appendix C. Frequency Of Days Spent Fishing On The Last Fishing Trip By  
Anglers From The Great Barrier Reef Region**

**Number of Days spent on a Fishing trip by GBR Anglers**

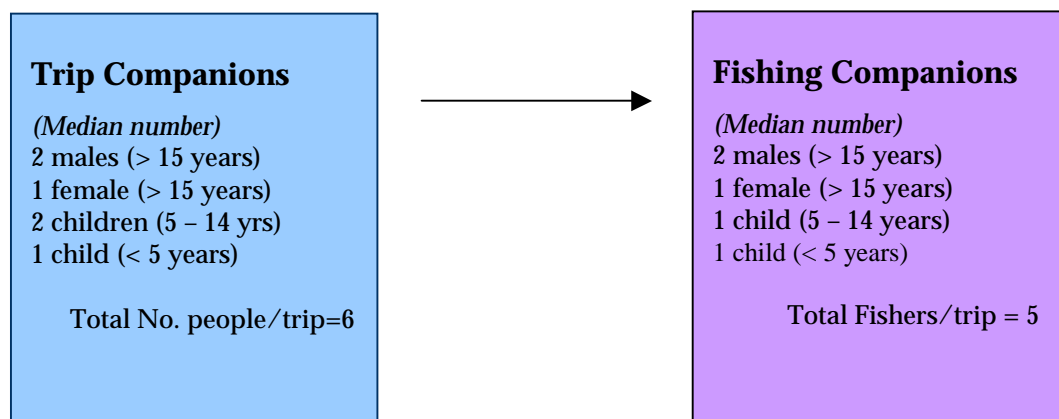
		Frequency	Percent	Valid Percent
Valid	1	3	.6	3.8
	2	32	6.3	40.0
	3	9	1.8	11.3
	4	11	2.1	13.8
	5	9	1.8	11.3
	6	2	.4	2.5
	7	6	1.2	7.5
	10	2	.4	2.5
	11	1	.2	1.3
	12	1	.2	1.3
	14	2	.4	2.5
	21	1	.2	1.3
	40	1	.2	1.3
	Total	80	15.6	100.0
Missing	System			
	Missing	432	84.4	
	Total	432	84.4	
Total		512	100.0	

## Appendix D. Trip Companions On Anglers Last Fishing Trip

**Table 1.** Trip companions accompanying anglers on their last fishing trip.

<b>Trip Companions</b>	<b>Total Number % (n)</b>	<b>Number fished % (n)</b>
Males over the age of 15	89.1 (456)	85.0 (437)
Females over the age of 15	38.5 (197)	34.8 (178)
Children aged 5 to 14 years	23.0 (118)	21.1 (108)
Children under the age of 5	8.6 (44)	4.9 (25)

The median number of people on a given trip is presented below. To summarise the median number of companions were: two males over the age of fifteen, one female over the age of fifteen, two children aged between five and fourteen, and one child under five years of age. Of these the median number of fishers were: two adult males, one adult female, one child over the age of 5, and one child under the age of five.



**Figure 1.** Median number of Fishing Trip Companions on Great Barrier Reef Respondents' Last Trip.

**Appendix E. Amount Of Time Spent Participating In Various Activities By  
Saltwater Anglers On Their Last Trip**

<b>Activity</b>	<b>Amount of Time Spent on Activity (Percentage of Time)</b>						
	<b>&lt; 1 hr.</b>	<b>1-2 hrs.</b>	<b>3 – 5 hrs.</b>	<b>6-12 hrs.</b>	<b>13- 24hrs.</b>	<b>&gt; 1 day</b>	<b><i>Didn't Participate</i></b>
Line Fishing (n = 255)	5.9	25.9	41.2	14.1	4.3	5.9	2.7
Crabbing (n= 141)	2.1	10.6	9.9	2.1	1.4	3.5	70.2
Spearfishing (n=123)	1.6	2.4	-	-	-	-	95.9
Bait collecting (n=153)	28.8	7.2	4.6	0.7	0.7	-	58.2
Shell collecting (n=125)	4.8	0.8	0.8	-	-	-	93.6
Scuba diving (n=123)	0.8	0.8	-	-	-	-	98.4
Swimming (n=130)	10.8	5.4	4.6	0.8	-	0.8	77.7
Snorkelling (n=128)	3.1	3.9	2.3	-	-	-	90.6
Camping (n=134)	3.0	10.4	6.7	0.7	1.5	-	77.6

**Appendix F. Others Activities And Their Influences On The Experiences Of Great Barrier Reef Saltwater Anglers**

<b>Other Activities</b>	<b>Influence of Other People (% of responses)</b>			
	<i><b>Enhanced</b></i>	<i><b>Detracted</b></i>	<i><b>No Influence</b></i>	<i><b>Not Applicable</b></i>
Recreational Fishing (n=131)	5.3	1.5	92.4	0.8
Spear fishing (n=79)	-	-	8.9	91.1
Commercial line fishing (n= 88)	2.3	4.5	12.5	80.7
Commercial trawling Operations (n= 80)	2.5	5.0	7.5	85.0
Commercial netting Operations (n= 79)	1.3	10.1	5.1	83.5
Power boats (jet ski's) (n = 82)	-	9.8	14.6	75.6
Recreational use (diving, snorkelling) (n= 78)	1.3	-	20.5	78.2
Tourist operators (n=84)	1.2	3.6	14.3	81.0
Boating and Fisheries Patrol Inspectors (n = 80)	1.3	-	5.2	93.5