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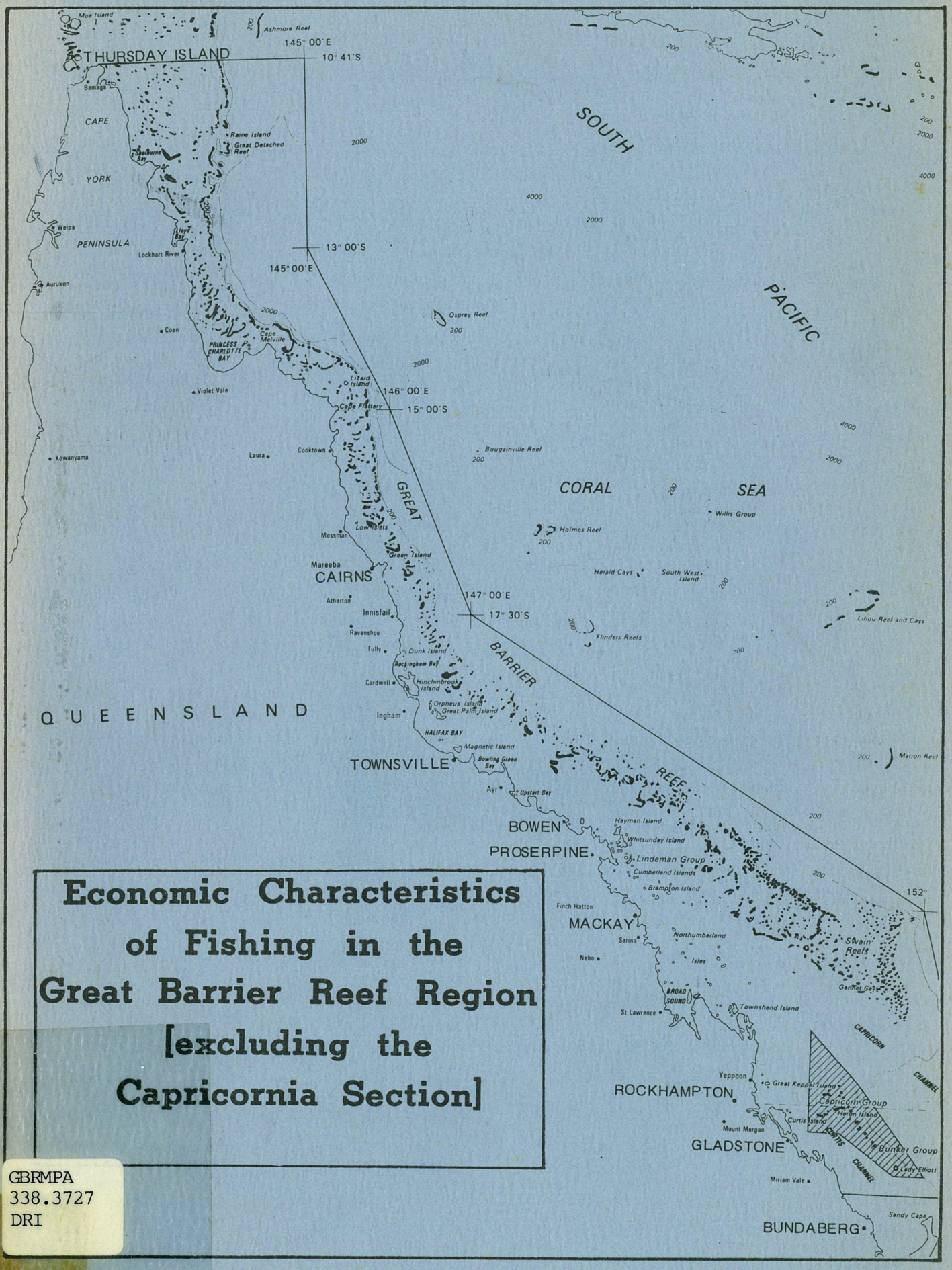

Economic Characteristics of Fishing in the Great Barrier Reef Region [excluding the Capricornia Section]

ECONOMIC CHARACTERISTICS OF FISHING IN THE GREAT BARRIER REEF REGION (EXCLUDING THE CAPRICORNIA SECTION)

A REPORT PREPARED FOR
THE GREAT BARRIER REEF MARINE PARK AUTHORITY

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PREFACE

The purpose of this report is to present information on the economics of commercial and recreational fishing activities within the Great Barrier Reef Region, excluding the Capricornia Section of the Great Barrier Reef Marine Park.

The report contains original data gathered by the Institute of Applied Social Research through surveys of commercial and recreational fishermen operating within the Great Barrier Reef Region.

A companion report entitled, Summaries of recent investigations with emphasis on the structural and economic characteristics of the Australian fishing industry and in particular the Queensland component of the industry provides background information on commercial fishing drawn from recently released studies on fishing, processing and marketing.

ACKNOWLEDGEMENTS

The authors wish to thank many people for their assistance in the preparation of this report.

Most importantly, thanks go to the large number of commercial and recreational fishermen and charter boat operators who participated in the mail surveys and field interviews. These people gave both their time and detailed personal financial information and for this we are very grateful.

The authors wish to thank various government agencies for their assistance.

The Great Barrier Reef Marine Park Authority, and in particular Wendy Craik, have given support throughout preparation of the report.

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The Division of Dairying and Fisheries, Department of Primary Industries also assisted in field work. Meryl Williams was helpful in providing fisheries statistics. Particular thanks go to Angela Pashen for her time and help in conducting and editing the field surveys.

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Finally, thanks go to Marion McInnes for typing this report.

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SUMMARY

RECREATIONAL FISHING (CHAPTER 2)

Great Barrier Reef Region

. The total number of private motor boats registered in the towns and cities adjacent to the GBR region is approximately 25,300. Fifty-nine percent of these private motor boats are used for recreational fishing in the GBR region - approximately 14,900 boats.

. In total, approximately 197,000 recreational fishing trips are made per annum by private motor boat in the GBR region.

. The total fish catch per annum from the 14,900 boats is approximately 6.6 million kilograms.

. The total value of motor boats and "capital" equipment is approximately $84.5 million (based on purchase price).

. The expenditure in 1980 on boats, capital equipment and other items associated with fishing was approximately $37 million.

. Ninety-five percent of this money is spent in local regions and virtually all money is spent within Queensland.

A breakdown of the data by the four regions adjacent to the GRB region gives the following results:

Cairns Region

. 3,530 private motor boats make an average of 14 fishing trips per annum to the GBR region - a total of 49,400 trips per annum.

- 2.308,830 kg of fish are caught per annum from within the GBR region; average weight of fish 2.7kg.

- Average boat length, 5.1 metres.

- The value of boats and "capital" equipment is $22,051,910 (based on purchase price).

- The expenditure in 1980 on boats, "capital" equipment and other items associated with fishing was $9,954,509.

- Eighty-three percent of expenditure on boats and "capital" equipment and ninety-seven percent of expenditure on annual items was made in the Cairns region.

Townsville Region

- 4,320 private motor boats make an average of 14.4 fishing trips per annum to the GBR region - a total of 62, 208 trips per annum.

- 1,881,383kg of fish are caught per annum from within the GBR region; average weight of fish 2.3kg.

- Average boat length, 5.2 metres.

- The total value of boats and "capital" equipment is $27,959,040 (based on purchase price).

- The expenditure in 1980 on boats, "capital" equipment and other items associated with fishing was $12,339,608.

- Eighty-four percent of expenditure on boats and "capital" equipment and ninety-six percent of expenditure on annual items was made in the Townsville region.

Mackay Region

- 2,597 private motor boats make an average of 10.5 fishing trips per annum to the GBR region - a total of 27,269 trips per annum.

- 1,103,655kg of fish are caught per annum from within the GBR region; average weight of fish, 2.2kg.

- Average boat length, 4.8 metres.

- The total value of boats and "capital" equipment is $13,613,474 (based on purchase price).

- The expenditure in 1980 on boats, "capital" equipment and other items associated with fishing was $4,534,521.

- Ninety-two percent of expenditure on boats and "capital" equipment and ninety-six percent of expenditure on annual items was made in the Mackay region.

Rockhampton Region

- 4,440 private motor boats make an average of 13 fishing trips per annum to the GBR region - a total of 57,720 trips per annum.

- 1,277,889kg of fish are caught per annum from within the GBR region; average weight of fish, 1.3kg.

- Average boat length, 4.5 metres.

- The total value of boats and "capital" equipment is $20,881,320 (based on purchase price).

- The expenditure in 1980 on boats, "capital" equipment and other items associated with fishing was $10,271,414.

. Ninety-two percent of expenditure on boats and "capital" equipment and one-hundred percent of expenditure on annual items was made in the Rockhampton region.

COMMERCIAL FISHING (CHAPTER 3)

Three region total*

. 361 otter trawlers (east coast only) and 395 vessels engaging in other fishing methods are based in home ports in the three regions.

. The number of people employed on fishing vessels is 1,452. (not all these people are employed full time in fishing).

. The total annual expenditure associated with commercial fishing is approximately $16 million.

. Over 90% of expenditure is made within local regions.

. The total annual income (value of catch) to commercial fishing is approximately $18 million.

. The 1981 market value of vessels (and equipment) is approximately $43 million.

Cairns region

. 183 otter trawlers (east coast only) and 195 vessels engaging in other fishing methods are based in home ports in the Cairns region.

. The number of people employed on fishing vessles is 706. (Not all these people are employed full time in fishing).

. The annual expenditure by east coast otter trawlers is approximately $7,087,000. The annual expenditure by vessels engaging in other fishing methods is approximately $1,595,000. The total annual expenditure for the Cairns region is approximately $8,682,000.

* The three region total does not cover the entire GBR region as it excludes Rockhampton region data.

- Ninety-one percent of expenditure is made within the Cairns region.

- The annual income (value of catch) to east coast otter trawlers is approximately $8,332,000. The annual income to vessels engaging in other fishing methods is approximately $1,493,000. The total annual income for the Cairns region is approximately $9,825,000.

- Ninety-nine percent of catch by Cairns region vessels is landed in the Cairns region.

- The 1981 market value of east coast otter trawlers (vessels and equipment) is approximately $21,713,000. The 1981 market value of vessels engaging in other fishing methods is approximately $4,082,000. The total 1981 market value of vessels (and equipment) based in the Cairns region is approximately $25,795,000.

Townsville region

- 139 otter trawlers (east coast only) and 149 vessels engaging in other fishing methods are based in home ports in the Townsville region.

- The number of people employed on fishing vessels is 496. (Note all these people are employed full time in fishing).

- The annual expenditure by east coast otter trawlers is approximately $3,514,000. The annual expenditure by vessels engaging in other fishing methods is approximately $1,236,000. The total annual expenditure for the Townsville region is approximately $4,750,000.

- Eighty-seven percent of expenditure is made within the Townsville region.

- The annual income (value of catch) to east coast otter trawlers is approximately $4,007,000. The annual income to vessels engaging in other fishing methods is approximately $1,614,000. The total annual income for the Townsville region is approximately $5,621,000.

- Eighty-seven percent of catch by Townsville region vessels is landed in the Townsville region.

- The 1981 market value of east coast otter trawlers (vessels and equipment) is approximately $11,447,000. The 1981 market value of vessels engaging in other fishing methods is approximately $2,330,000. The total 1981 market value of vessels (and equipment) based in the Townsville region is approximately $13,777,000.

Mackay region

- 36 otter trawlers (east coast only) and 89 vessels engaging in other fishing methods are based in home ports in the Mackay region.

- The number of people employed on fishing vessels is 250. (Not all these people are employed full time in fishing).

- The annual expenditure by east coast otter trawlers is approximately $1,149,000. The annual expenditure by vessels engaging in other fishing methods is approximately $1,333,000. The total annual expenditure for the Mackay region is approximately $2,482,000.

- Ninety-five percent of expenditure is made within the Mackay region.

- The annual income (value of catch) to east coast otter trawlers is approximately $1,094,000. The annual income to vessels engaging in other fishing methods is approximately $1,589,000. The total an nual income for the Mackay region is approximately $2,683,000.

. Ninety one percent of catch by Mackay region vessels is landed in the Mackay region.

. The 1981 market value of east coast otter trawlers (vessels and equipment) is approximately $1,836,000. The 1981 market value of vessels engaging in other fishing methods is approximately $1,230,800. The total 1981 market value of vessels (and equipment) based in the Mackay region is approximately $3,066,800.

CHARTER BOAT FISHING (CHAPTER 4)

Cairns Region

- 32 game boats and 7 mother ships participated in the 1979 marlin season
- replacement value of vessels and equipment is $9,935,00 (1979)
- annual expenditure by charter boats is $2,093,000 (1979)
- annual income from charter boat fees is $2,780,000 (1979)

Townsville Region

- 10 charter boats worked out of the port of Townsville in 1981
- annual fish catch from charter boats is 94,300kg
- market value of vessels and equipment is $1,850,000 (1981)
- annual expenditure by charter boats is $593,000 (1981)
- ninety-two percent of expenditure is made within the Townsville region
- annual income from charter boat fees is $566,600 (1981)

Mackay Region

- sixty charter boats worked in the Mackay region, mostly around the Whitsunday Islands in 1981
- annual fish catch from charter boats is 340,000kg
- annual fish catch by Whitsunday Islands campers is 49,400kg.

Rockhampton Region

- ten charter boats from ports within the Rockhampton region worked in the GBR region in 1980
- annual fish catch from charter boats is 127,500kg to 161,500kg
- replacement value of vessels and equipment is approximately $2 million (1980)
- ninety percent of expenditure is made within the Rockhampton region
- annual income from fishing trip fees is approximately $650,000 (1980)

CHAPTER 1

INTRODUCTION

INTRODUCTION

The purpose of this report is to present information on the economics of commercial and recreational fishing within the Great Barrier Reef region [1] (excluding the Capricornia Section of the Great Barrier Reef Marine Park).

This report presents original data gathered over the last 12 months by the Institute of Applied Social Research. The data pertain to fishing activity in all modes of commercial fishing and in recreational fishing from both private motor boats and from charter boats. The data collected are basically economic in nature with emphasis on the costs involved in commercial and recreational fishing and the geographical location of expenditure. Data was also collected on fish catch and income from the sales of catch.

This report is divided into chapters on commercial fishing, recreational fishing from private motor boats and from charter boats. Commercial fishing is defined as fishing undertaken from vessels with commercial fishing licences (either Commonwealth or Queensland licences). Recreational fishing becomes, by definition, all fishing other than fishing from licenced commercial fishing vessels. Recreational fishing is not always strictly speaking "amateur" as a number of recreational fishermen sell their catch. Although much of the sales activity is small-scale, there is some grey area where recreational fishermen catch and sell volumes of product comparable to commercial fishing operations.

The Institute of Applied Social Research has produced two reports containing information on fishing within the GBR region for the Great Barrier Reef Marine Park Authority previous to this report. The first of these reports is entitled Economic Characteristics of

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1. Great Barrier Reef region is abbreviated as GBR region throughout this report.

Fishing in the Capricornia Section of the Great Barrier Reef Marine Park and is dated July, 1980. As the title suggests, consideration is focused on the Capricornia Section of the GBR region which is the first Marine Park to be declared. The Capricornia Section is approximately 12,000 Km^2 in area and lies off the coastal towns from Bundaberg to Yeppoon. The area declared as Marine Park encompasses the Capricorn and Bunker groups of reefs and cays.

The report on economic characteristics of fishing in the Capricornia Section covered commercial fishing and recreational fishing from private motor boats, charter boats and resorts. It was possible to identify the recreational fishing activity taking place within the boundaries of the Capricornia Section as that area of reefs and cays was the destination of private motor boat and charter boat trips. All resort fishing considered took place within the Capricornia Section. The report therefore considered recreational fishing only within the Capricornia Section. For the purposes of this present report, data on all recreational fishing from the home ports from Bundaberg to Yeppoon have been collected. These data pertain to fishing activity within any part of the GBR region.

With regard to commercial fishing, most commercial fishing vessels which fished in the Capricornia Section also fished elsewhere. Data were gathered on all commercial fishing operations with home ports from Bundaberg to Yeppoon. The report therefore contained information on the economic characteristics of all commercial fishing operations from the abovementioned home ports regardless of where fishing took place.

The data on economic characteristics of all commercial fishing from home ports from Bundaberg to Yeppoon were reported in a form consistent with the aims of this present report. For this reason, no new data have been collected for the present report. The data on

commercial fishing from home ports Bundaberg to Yeppoon were collected by mail survey and so are slightly different in form to the data collected by field interviews for this present report. However, both sets of data are finally presented in a form suitable for input-output analysis.

The other report recently produced by the Institute of Applied Social Research is entitled Proposed Cairns Section of the Great Barrier Reef Marine Park: Some Economic Characteristics and Multipliers and dated April 1981. This report presented preliminary analysis of data on commercial fishing and recreational fishing from private motor boats and charter boats for home ports in the Cairns economic region (Tully to Cooktown). This present report repeats some of that data along with further descriptive data on commercial fishing and recreational fishing from private motor boats. This present report does not repeat the input-output analysis included in the Cairns Section report. Information on recreational fishing from charter boats in the Cairns Region is repeated in summary form only in this present report.

1.1 COMMERCIAL FISHING

This report presents new information on commercial fishing in the GBR region. The focus of the report is on economic information though information on fishing activity is also reported. The chapter covers a variety of fisheries within the GBR region.

Commercial fishing in the GBR region includes all east coast fisheries north of the region's southern boundary (which lies at 24°30' South, 154°00' East).

Apart from inshore fishing which in part takes place in rivers and streams and in part takes place in estuaries and the sea, all other east coast fisheries exist entirely within the boundaries of the GBR region.

Commercial fisheries within the GBR region are: the east coast prawn fishery; the scallop fishery; the spanish mackerel fishery; the demersal reef fishery and the inshore fishery. A brief description of these fisheries follows. Further description of these fisheries is included in the companion volume to this report. [2]

EAST COAST PRAWN FISHERY

This fishery extends along the entire Queensland east coast, though it can be divided into a Moreton Bay section (which extends from the Queensland/New South Wales border to approximately the northern tip of Fraser Island) and the remaining section of the Queensland east coast. It should be noted that the limited entry northern prawn fishery in the Gulf of Carpentaria is excluded but that some vessels work both in the northern prawn fishery and on the Queensland east coast.

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2. The description of east coast fisheries, summarized from Williams 1980, is contained in: Summaries of recent investigations with emphasis on the structural and economic characteristics of the Australian fishing industry and in particular the Queensland component of the industry.

   Hundloe, T., Driml, S., Institute of Applied Social Research, Griffith University, 1981.

The east coast prawn fishery is the subject of temporary freeze on the entry of vessels to Queensland territorial waters. Boats under construction at the time of the announcement of the freeze, September 1979, were allowed to enter the fishery until October 1981. To the extent that a temporary freeze on entry is in force, the fishery could be considered to be approaching a closed (or limited entry) fishery.

The major types of prawns trawled are eastern king, brown tiger, banana and green-tail. The standard gear used is the otter trawl. As the prawn grounds are relatively close to the coast the average size of vessels is comparatively small.

Though the trawl industry is mainly based upon prawns, there is a trawl-scallop industry, with some boats working both. By-product catches of non-prawn crustacea and fish are associated with trawling.

SCALLOP FISHERY

The main scallop grounds lie in the Bustard Heads and Yeppoon regions. As mentioned above, scallops are usually trawled by boats otherwise working the prawn fishery.

SPANISH MACKEREL FISHERY

This fishery extends north along the Queensland coast from the southern end of the Great Barrier Reef to north of Cairns. Fishing is undertaken by trolling, that is, running lines from a moving boat. Mackerel fishing is an open entry fishery and is undertaken by both commercial and amateur fishermen.

DEMERSAL REEF FISHERY

This fishery is an open entry fishery, with emphasis on demersal species such as coral trout, sweet lip, parrot, etc. It is largely a handline operation, undertaken by both commercial and amateur fishermen.

INSHORE FISHERIES

Inshore fisheries include gill netting for barramundi, threadfin, salmon, mullet and other estuary fish; beam trawling; beach seining for bait fish, whiting etc., and crabbing.

The barramundi fishery is subject to limited entry and seasonal closure.

1.2 RECREATIONAL FISHING

The GBR region has its western boundary at low water mark along the Queensland eastern coast. The GBR region is therefore the destination of a large proportion of recreational fishermen - those who fish just a short distance from the shore as well as those who fish on reefs.

Access to the GBR region for recreational fishing may be by privately owned motor boat or charter boat or, because the GBR region ends at low water mark, fishing from beaches, rocks, jetties and islands may be within the GBR region. Only the first two means of fishing are considered in this report.

Recreational fishing from private motor boats and charter boats may take place on an individual basis or in organized groups such as fishing clubs or through commercial tourist operations. This report covers all the above.

Recreational fishing is undertaken by tourists from island resorts. As resort fishing is mainly undertaken from charter boats, this is covered in the chapter on charter boat fishing.

RECREATIONAL FISHING FROM PRIVATE MOTOR BOAT

One major means of access for recreational fishing is by private motor boat. There are registered private motor boats in the coastal towns adjacent to the GBR region and these all potentially visit the GBR region. The aim of this report is to determine the actual level of fishing activity within the GBR region, and to present economic and fishing activity information. Little is currently known about recreational fishing in the GBR region. This report is the first study of recreational fishing from private motor boats in the entire GBR region. Valuable work has been previously undertaken by the Great Barrier Reef Marine Park Authority in analysing records of fishing clubs and in conducting surveys at selected boat ramps (some in association with the Institute of Applied Social Research).

RECREATIONAL FISHING FROM CHARTER BOATS

There are approximately 120 charter boats currently operating within the GBR region. Most of these boats offer some fishing activity. Attempts have been made to report on those boats which offer fishing and to evaluate the extent of that fishing activity. The economic information contained in the chapter on charter boats pertains to all income and expenditure by charter boats - not just that part which relates to fishing activity. This report presents some new data and compiles some existing data on charter boat activity within the GBR region, particularly with respect to recreational fishing.

1.3 DEFINITION OF TERMS

The areas referred to in this report - the Great Barrier Reef region, the Capricornia Section of the Great Barrier Reef Marine Park and the four Queensland economic regions - are defined below. Definitions of some economic terms are included in a previous report.[3]

Great Barrier Reef Region

The definition of the GBR region adopted in this report is as defined in the schedule to the Great Barrier Reef Marine Park Act 1975.

Capricornia Section of the Great Barrier Reef Marine Park

The definition of the Capricornia Section adopted in this report is as defined in the Zoning Plan for the Capricornia Section of the Great Barrier Reef Marine Park.

Economic Regions

All economic activity within the Great Barrier Reef region occurs in association with the towns and cities along the Queensland coast adjacent to the GBR region. Four "economic regions" have been defined which incorporate both sections of the Queensland mainland and adjacent sections of the GBR region. These economic regions are shown in Map 1.

Cairns Economic Region

This region is so named because the city of Cairns is the economic focus of the region. The region is equivalent to the Far North Statistical Division as defined for data collection by the Australian Bureau of Statistics. The region stretches approximately from Tully in the South to the tip of Cape York in the north. The Cairns

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3. Hundloe, T., Driml, S., Shaw, S., Trigger, J., Jenson, R., West, G. Proposed Cairns Section of the Great Barrier Reef Marine Park : Some Economic Characteristics and Multipliers, Institute of Applied Social Research, Griffith University, 1981.

Economic Region is referred to in the text simply as the Cairns region.

Townsville Economic Region

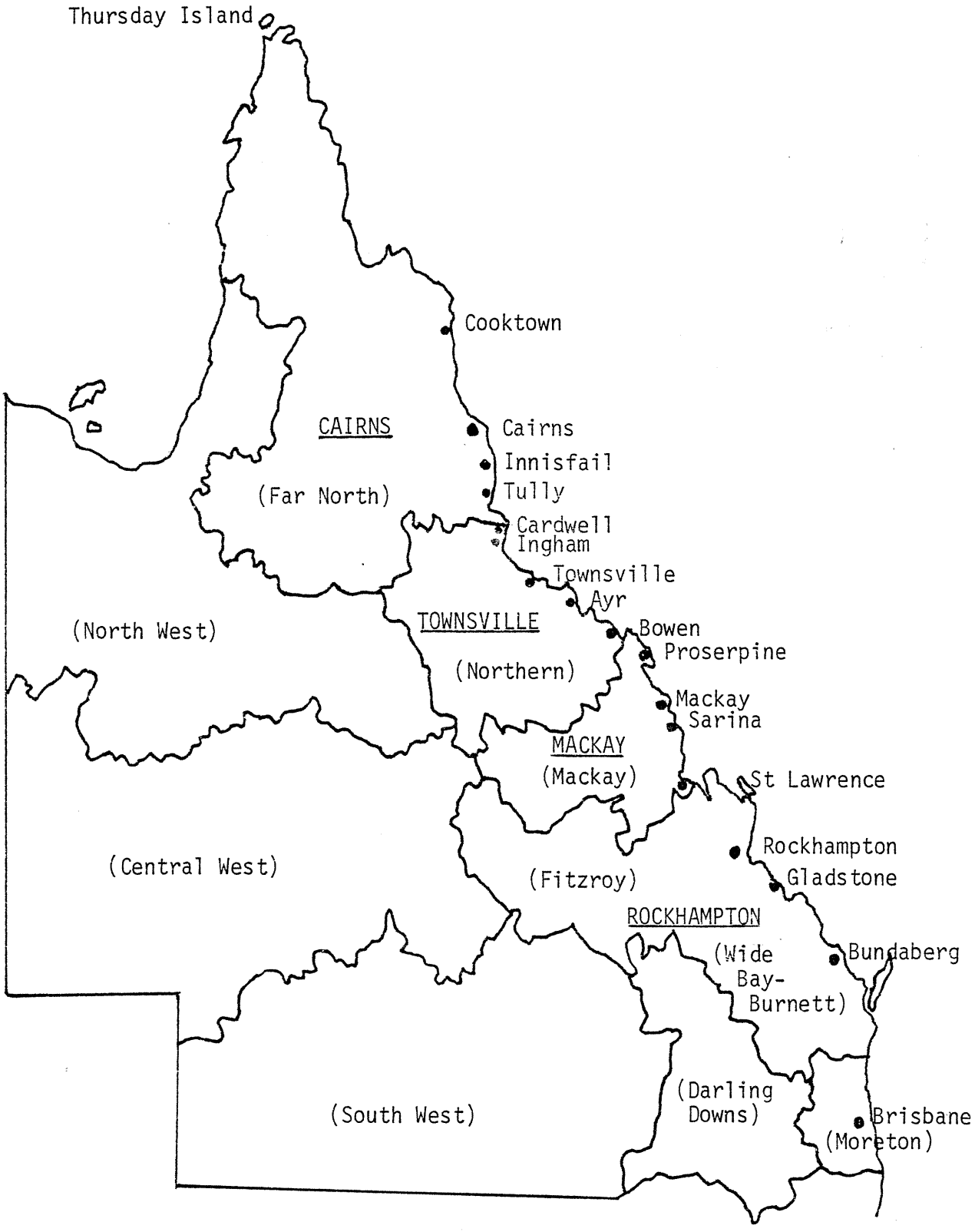
This region is so named because the city of Townsville is the economic focus of the region. The region is equivalent to the Northern Statistical Division as defined for data collection by the Australian Bureau of Statistics. The region stretches approximately from Bowen in the south to Cardwell in the north. The Townsville Economic Region is referred to in the text simply as the Townsville region.

Mackay Economic Region

This region is so named because the city of Mackay is the economic focus of the region. The region is equivalent to the Mackay Statistical Division as defined for data collection by the Australian Bureau of Statistics. The region stretches approximately from St. Lawrence in the south to Proserpine in the north. The Mackay Economic Region is referred to in the text simply as the Mackay region.

Rockhampton Economic Region

This region is so named because the city of Rockhampton is the economic focus of the region, however the cities of Gladstone and Bundaberg are important focal points also. The region is the equivalent of the combined Wide Bay-Burnett and Fitzroy Statistical Divisions as defined for data collection by the Australian Bureau of Statistics. The region stretches approximately from Gympie in the south to Broadsound in the north. The Rockhampton Economic Region is referred to in the text simply as the Rockhampton region.



MAP 1 : ECONOMIC REGIONS

CHAPTER 2

RECREATIONAL FISHING FROM PRIVATELY OWNED MOTOR BOATS.

RECREATIONAL FISHING FROM PRIVATELY OWNED MOTOR BOATS

2.0 INTRODUCTION

This chapter is concerned with one method of recreational fishing in the GBR region, that is, fishing undertaken from privately owned motor boats. There were a total of around 25,270 privately owned motor boats registered in the Queensland coastal and near coastal towns from Bundaberg north to Cooktown in September 1980. All these boats potentially are used for fishing in the GBR region. Mail surveys were used to determine the actual number of those boats used for fishing in the GBR region. In addition the mail surveys were used to gather information on fish catches and expenditure on fishing by the owners of private motor boats.

The data presented in this chapter relies heavily on those mail surveys but also draws on other work carried out by the Institute of Applied Social Research (IASR) and the Great Barrier Reef Marine Park Authority. Virtually no research has been undertaken on recreational fishing in the GBR region other than by the two bodies noted above. The IASR has previously reported on recreational fishing in the Capricornia Section of the Great Barrier Reef Marine Park and on the expenditure associated with fishing in the Cairns economic region.[1] This present chapter reports further information on fishing in the Cairns economic region. As the study of fishing in the Capricornia Section of the Great Barrier Reef Marine Park was an area-specific study, a further more general study of fishing undertaken by private motor boat owners with boats registered in the Rockhampton economic region has been undertaken for the purposes of uniformity in this present study.

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1. Hundloe, T.J., Driml, S.M., Lack, S.W., McDonald, G.T. 1980 Economic Characteristics of Fishing in the Capricornia Section of the Great Barrier Reef Marine Park. Report to the Great Barrier Reef Marine Park Authority.

   Hundloe, T.J., Driml, S.M., Shaw, S., Trigger, J.A., Jensen, R.C., West, G. 1981. Proposed Cairns Section of the Great Barrier Reef Marine Park. Report to the Great Barrier Reef Marine Park Authority.

This chapter is presented in four sections. The first section outlines the survey methodology and identifies the population of private motor boat owners who use their boats to fish in the GBR region. Section two describes fishing activity, including the area fished and volume and species caught. A section reporting economic data follows, with information on the amount and location of expenditure associated with recreational fishing from private motor boats. Finally, a summary of findings is presented. All the information presented is based on the four economic regions outlined in Chapter 1 and shown on Map 1.

2.1 SURVEY METHOD

As noted above, the mail survey was the main data-gathering instrument adopted for investigating fishing from privately owned motor boats. In addition, the authors participated in personal interview surveys conducted at boat ramps. The personal interviews provided valuable background information on recreational fishing as well as providing data which may be used as a check on mail survey data.

The mail survey was used because it provided an efficient means of sampling the entire population of private motor boat owners in order to determine the proportion of boats used for fishing in the GBR region. Comparative studies undertaken by the IASR have shown that the economic and fishing method data gathered by mail survey closely approximated data gathered by personal interview of private motor boat owners. [2]

The surveys conducted were based on the four economic regions adjacent to the GBR region, namely the Cairns, Townsville, Mackay and Rockhampton regions. The surveyed areas are described and shown on maps below.

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2. See Section 2.4 - SUMMARY.

The economic region basis was adopted as the economic data collected on recreational fishing was needed in a form suitable for further analysis.

The survey sample of private motor boat owners was selected from Queensland Marine Board records of private motor boat registrations. Random samples were selected on an economic region basis but no other stratification was used. The mail surveys were carried out from December 1980 to May 1981. Further information on the representativeness of the sample of each economic region is outlined below.

2.1.1 Cairns Region

The mail survey of the Cairns economic region covered private motor boats registered in the coastal towns/cities from Tully to Cooktown and as far inland as Mt. Garnet on the Atherton Tableland. This survey "catchment area" is shown on Map 2.1.

The number of private motor boats registered in this area was 4,700 in December 1980. A total of 380 questionnaires were posted and a response rate of 29% resulted (without follow-up).

From the survey, the following results were determined at the 95% confidence interval. A proportion - 14.4% $\pm$ 4% - of private motor boats were not used for fishing at all. The number of boats not used for fishing was 677 $\pm$ 188.

A further 10.5% $\pm$ 3% of boats or 494 $\pm$ 141 boats were used only for fishing in inland waters (rivers, lakes and estuaries). The proportion of boats which did some fishing at sea, that is, within the GBR region, was 75% $\pm$ 3% of registered private motor boats. This proportion represents 3,530 $\pm$ 188 boats. It is this population of 3,530 boat owners on which all the following analysis is based.

2.1.2 Townsville Region

The mail survey of the Townsville economic region covered private motor boats registered in the coastal towns/cities from Bowen to Cardwell and as far inland as Charters Towers. This survey "catchment area" is shown on Map 2.2.

The number of private motor boats registered in this area was 7,969 in December 1980. A total of 631 questionnaires were posted and a response rate of 26% resulted (without follow-up).

From the survey, the following results were determined at the 95% confidence interval. A proportion - 18.9% ± 3% - of private motor boats were not used for fishing at all. The number of boats not used for fishing was 1,408 ± 224. A further 23.3% ± 3% of boats or 1,740 ± 224 boats were used only for fishing in inland waters (rivers, lakes and estuaries). The proportion of boats which did some fishing at sea, that is, within the GBR region, was 57.9% ± 4% of registered private motor boats. This proportion represents 4,320 ± 299 boats. It is this population of 4,320 boat owners on which all the following analysis is based.

2.1.3 Mackay Region

The mail survey of the Mackay economic region covered private motor boats registered in the coastal towns/cities from St. Lawrence to Proserpine and as far inland as Moranbah and Dysart. This survey "catchment area" is shown on Map 2.3.

The number of private motor boats registered in this area was 4,774 in December 1980. A total of 362 questionnaires were posted and a response rate of 25% resulted (without follow-up).

From the survey, the following results were determined at the 95% confidence interval. A proportion - 25.6% ± 4% - of private motor boats were not used for fishing at all. The number of boats not used for fishing was 1,222 ± 191. A further 20% ± 4% of boats or 955 ± 191 boats were used only for fishing in inland waters (rivers, lakes and estuaries). The proportion of boats which did some fishing at sea, that is, within the GBR region, was 54.4% ± 5% of registered private motor boats. This proportion represents 2,597 ± 239 boats. It is this population of 2,597 boat owners on which all the following analysis is based.

2.1.4 Rockhampton Region

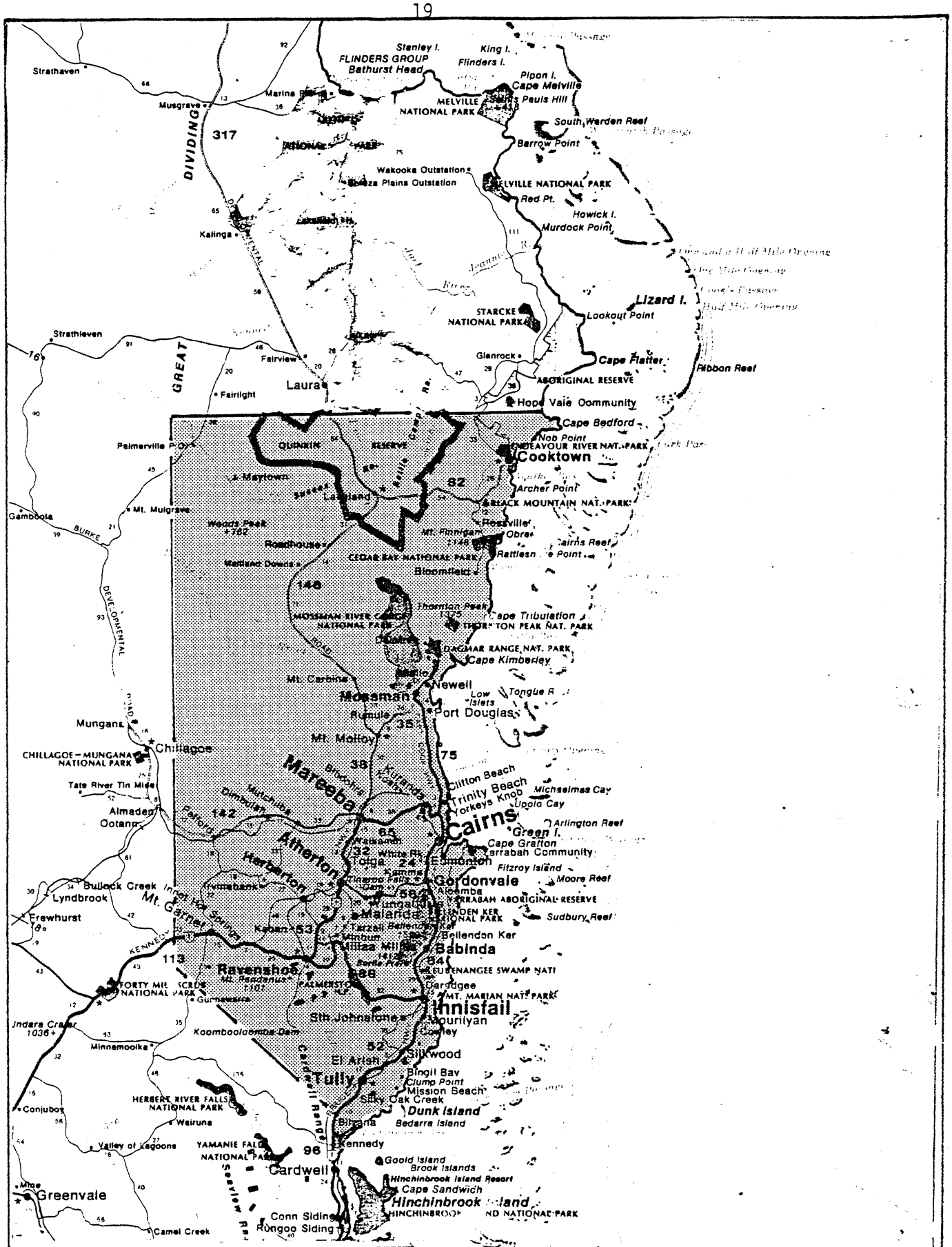
The mail survey of the Rockhampton economic region covered private motor boats registered in the coastal towns/cities from Howard to south of St. Lawrence and inland as far as Clermont in the north and Monto in the south. This survey "catchment area" is shown on Map 2.4. A comparison of results between Capricornia Section and Rockhampton region data is presented in section 2.4. The samples selected for both surveys were different in that only boats over 4.5 metres were surveyed in the Capricornia Section study.

The number of private motor boats registered in this area was 8,331 in December 1980. A total of 393 questionnaires were posted and a response rate of 27% resulted (without follow-up).

From the survey, the following results were determined at the 95% confidence interval. A proportion - 29.5% ± 5% - of private motor boats were not used for fishing at all. The number of boats not used for fishing was 2,485 ± 375. A further 17.1% ± 3% of boats, or 1,425 ± 250 boats were used only for fishing in inland waters (rivers, lakes and estuaries). The proportion of boats which did some fishing at sea, that is, within the GBR region, was 53.3% ± 5% of registered private motor boats. This proportion represents 4,440 ± 417 boats. It is this population of 4,440 boat owners on which all the following analysis is based.

TABLE 2.1 : NUMBER OF PRIVATE MOTOR BOATS USED FOR FISHING IN THE GREAT BARRIER REEF REGION

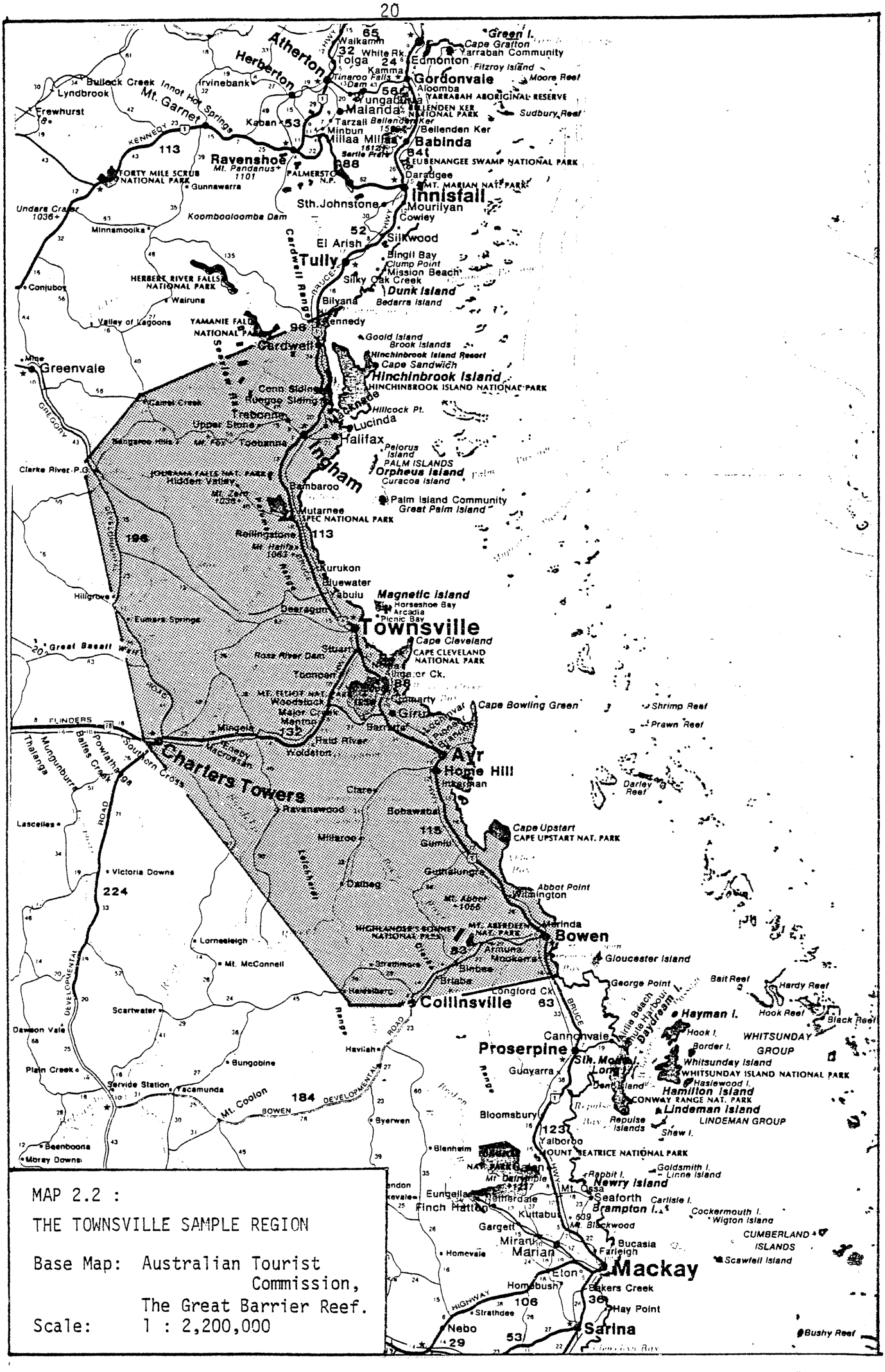
Economic Region	Number of Private Motor Boats Registered (December 1980)	Estimated number of private motor boats used for fishing in the Great Barrier Reef Region	
Cairns	4,700	3,530	(75%)
Townsville	7,469	4,320	(56%)
Mackay	4,774	2,597	(54%)
Rockhampton	8,331	4,440	(53%)
	25,274	14,887	



MAP 2.1 : THE CAIRNS SAMPLE REGION

Base Map: Australian Tourist Commission, The Great Barrier Reef.

Scale: 1 : 2,200,000

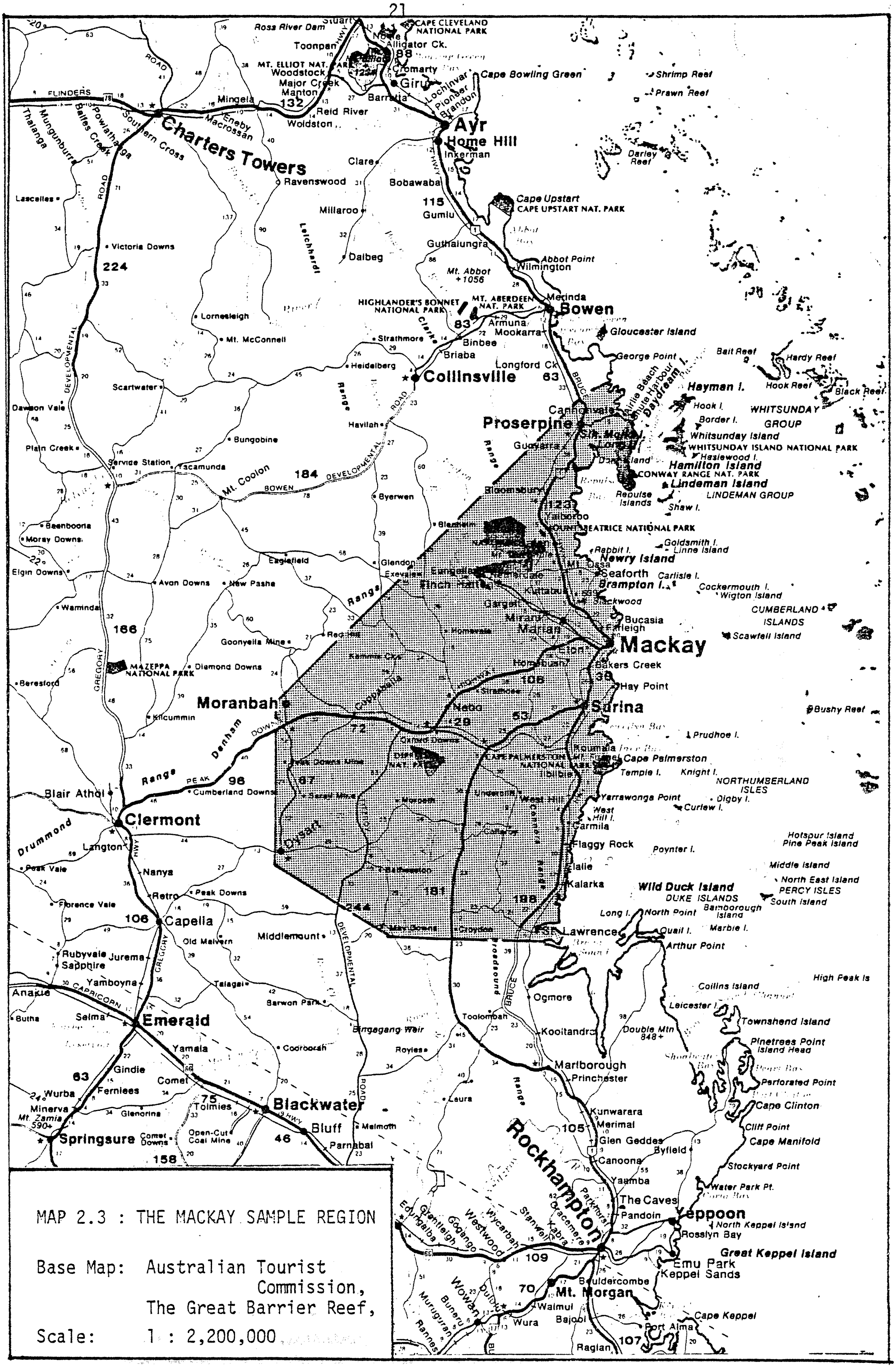


MAP 2.2 :

THE TOWNSVILLE SAMPLE REGION

Base Map: Australian Tourist Commission, The Great Barrier Reef.

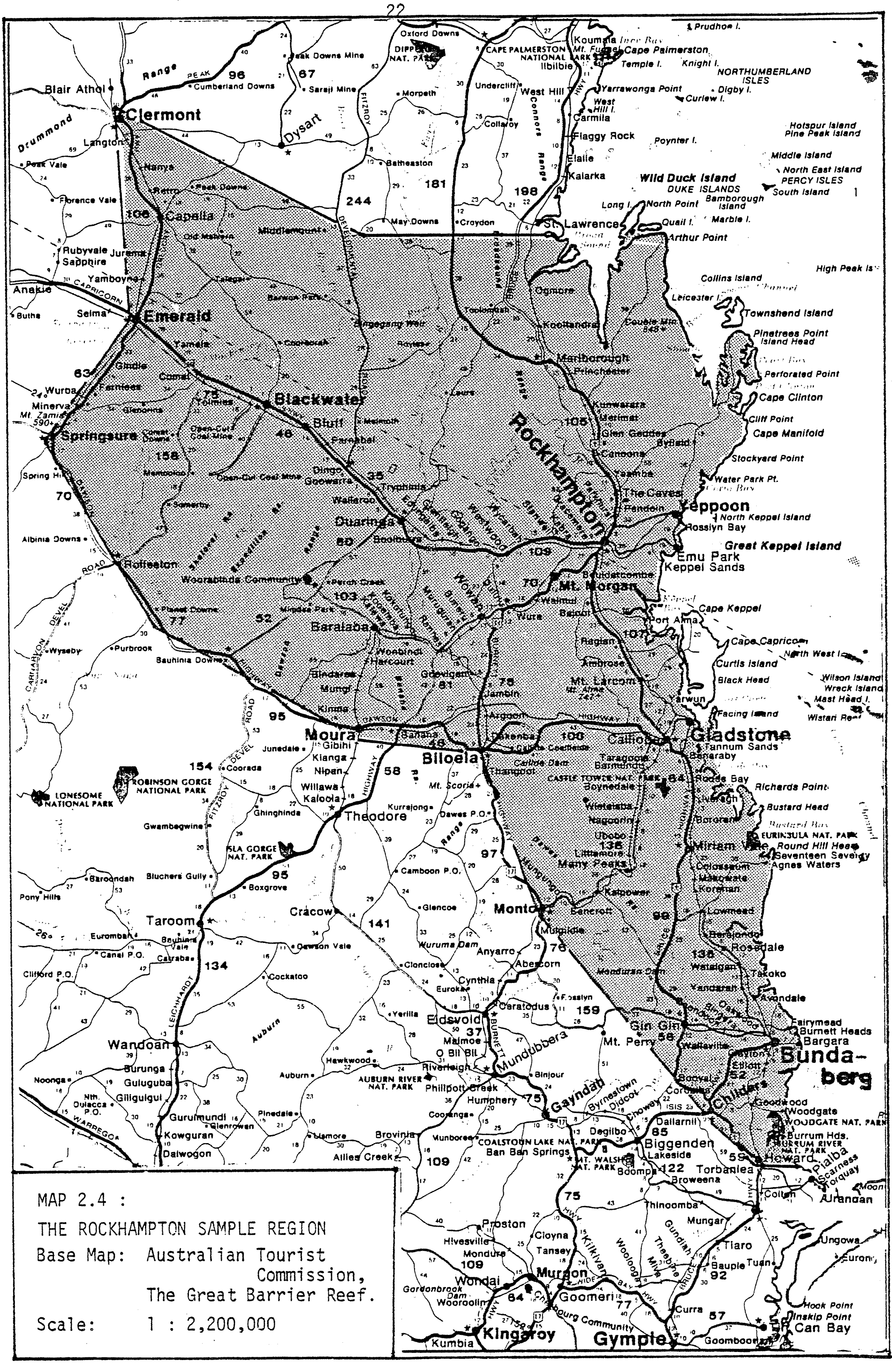
Scale: 1 : 2,200,000



MAP 2.3 : THE MACKAY SAMPLE REGION

Base Map: Australian Tourist Commission, The Great Barrier Reef,

Scale: 1 : 2,200,000



MAP 2.4 :

THE ROCKHAMPTON SAMPLE REGION

Base Map: Australian Tourist Commission, The Great Barrier Reef.

Scale: 1 : 2,200,000

2.2 FISHING ACTIVITY

This section contains information on: the number of fishing trips, area fished, boat characteristics and fish catch for private motor boat owners from the four economic regions. In order to gather information on fish catch, respondents were asked about fishing activities on both a "usual" fishing trip and their last fishing trip. In order to avoid problems with recall, it is most effective to ask respondents about their last trip. It was however, decided to also ask respondents about their "usual" trip in order to check the representativeness of last trip data. Data on both types of trip are presented.

"Last trip" data has been broken up into two categories depending upon the destination of the trip. The population of boat owners who fish at sea (as calculated in the previous section) do not on average make all their fishing trips to sea (see Table 2.2). Thus, information on the last trip for that population contains information on some trips to inland waters. It was found that for over three-quarters of respondents, their last trip was made to a destination within the GBR region (see Table 2.3).

Those respondents who made their last trip to a location within the GBR region were selected out and data for their last trip are reported under the title "last trip to the sea". This information pertains only to fishing done within the GBR region and is the most important fishing activity data in terms of this report.

This section therefore contains information on fish catch and associated variables for four separate economic regions - Cairns, Townsville, Mackay and Rockhampton - and for three categories of fishing trip - "usual" trip, last trip and last trip to sea.

TABLE 2.2 : NUMBER AND DESTINATION OF FISHING TRIPS BY PRIVATE MOTOR BOAT

	Mean number fishing trips to inland waters/ annum.	Mean number fishing trips to within 5km of the coast/ annum	Mean number fishing trips further than 5km from coast/ annum	Mean number fishing trips/ annum	Mean number non-fishing trips/ annum	Mean number trips/ annum
Cairns	5 (26%)	5 (26%)	9 (47%)	19 (100%)	0.7	19.7
Townsville	5.6 (28%)	7.4 (37%)	7 (35%)	20 (100%)	0.6	20.6
Mackay	7.2 (41%)	4.8 (27%)	5.7 (32%)	17.7 (100%)	0	17.7
Rockhampton	11 (46%)	7.4 (31%)	5.6 (23%)	24 (100%)	0.4	24.4

TABLE 2.3 : DESTINATION OF LAST TRIP

	Percentage Whose Last Trip was to Inland Waters	Percentage Whose Last Trip was to the Sea	All Last Trip
Cairns	24.4 %	75.6 %	100 %
Townsville	18.5 %	81.5 %	100 %
Mackay	24.4 %	75.6 %	100 %
Rockhampton	21.4 %	78.6 %	100 %

2.2.1 Cairns Economic Region : Fishing Activity Data

Area Fished

The areas of the Great Barrier Reef Region fished by private motor boat owners with an address within the Cairns economic region are shown on Map 2.5, Appendix I. This map was compiled from mail survey maps where fishermen had marked the destination of their "usual" fishing trip.

The Map shows four fishing zones, based on the towns where boats were launched. Boats from the Cairns region ranged as far as the outer reef (which is relatively close to the coast in this area). The northern extent of fishing was Cape Flattery and the southern extent of fishing was Rockingham Bay (south of Dunk Island).

Use of the reef area in Cairns region was relatively high with only 23% of boats fishing exclusively within 5km of the coast. For 42% of boats, all trips to the GBR region were made to a destination greater than 5km from the coast. The mean return trip distance travelled by boats on the last trip was 51km (range 0km to 560km).

Number of Trips

The mean[3] number of fishing trips made by respondents over the last 12 months was 19 trips [4] (median 12.5, mode 10.0, range 1 to 70). Fishing trips accounted for 100% of all private motor boat trips for the majority of respondents. As fishermen who fish exclusively in inland waters have been excluded from this analysis, only fishermen who do some fishing in the sea are considered here. Nevertheless, the "average fisherman" made an average (mean) 5.0 trips (median 1.5, mode 0, range 0 to 52) to inland waters and estuaries. The remaining 14 trips made to sea represent 74% of all fishing trips by the "average fisherman".

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3. Means are presented at the 95% confidence interval unless otherwise stated.

4. The total mean annual number of trips by boat was 19.7, indicating that a small number of trips made by respondents were not fishing trips. See Table 2.2.

Of the 14 trips to sea the mean number of trips to within 5km of the shore was 5 trips (median 1.5, mode 0, range 0 to 40) and the mean number of trips made to reefs and islands further than 5km from the shore was 9 trips (median 6.5, mode 0, range 6.5 to 70).

Length of Boat

The boats owned by respondents ranged in length from 1.3 metres to 20 metres. The mean length reported was 5.1 metres while the median was 4.5 metres and the mode was 4 metres.

Horsepower of Motors

The reported range of horsepower of outboard motors was 6 to 280 Hp. The mean was 70.2 Hp, median was 59.8 Hp and the mode was 20.0 Hp.

"USUAL" FISHING TRIP DATA

The following information relates to the "usual" fishing trip by private motor boat owners from the Cairns economic region. On average, 26% of these trips were to inland waters and 74% of trips were to sea (i.e., the GBR region).

Duration of the Usual Trip

It is estimated that the average "usual" fishing trip in the Cairns region lasts 12 hours (mean 12.1 $\pm$ 2.7, median 8.0, mode 8.0). The distribution is positively skewed with a range from 1 hour (1.3% of boats) to 72 hours (1.3% of boats).

Usual Number of Fish Caught

The mean number of fish caught, per boat, on a "usual" fishing trip is 14.8 $\pm$ 4.0 fish (median 10.1, mode 6.0). The distribution is positively skewed with a range of catches from 1 fish (2.8% of boats) to 126 fish (1.4% of boats).

Usual Weight of Fish Caught

This information refers to the total weight of whole fish caught on the "usual" trip. The mean weight of total fish catch, per boat, on the "usual" fishing trip is 30.0 $\pm$ 8.1kg. The distribution is

positively skewed with a median weight of 16.0kg (mode 10.0kg) and a range from 1kg (4.2% of boats) to 170kg (1.4% of boats).

Summary of catch data for the "usual" fishing trip

From the above it is estimated that the average "usual" fishing trip by fishermen from the Cairns region lasts for 12.1 ± 2.7 hours. The mean fish catch on such a trip is 14.8 fish per boat.

TABLE 2.4 : CAIRNS REGION, "USUAL" TRIP DATA

	Mean	Median	Mode	Range	
				Min.	Max.
Fishing Trips	19.14 ± 3.52	12.5	10.00	1 (1.3%)	70 (1.3%)
Duration (hrs)	12.10 ± 2.74	7.97	8.00	1 (1.3%)	72 (1.3%)
No. of fish caught/ boat	14.76 ± 3.98	10.14	6.00	1 (2.8%)	126 (1.4%)
Weight of catch/ boat (kgs. of whole fish)	29.97 ± 8.06	16.00	10.00	1 (4.2%)	170 (1.4%)

Estimated total annual fish catch by recreational fishermen in the Cairns region (based on usual trip data for resident motor boat owners).

Estimated population of motor boat owners who use their boats for fishing and fish at sea - 3,530 owners.

Estimated total annual fish catch for Cairns region.

Number of fish	=	population of boat owners	x	average number of trips	x average number of fish caught/ boat/trip
	=	3,530		19.141	14.761
	=	997,367 fish.			
Weight of whole fish	=	population of boat owners	x	average number of trips	x average weight of whole fish/ boat/trip
	=	3,530		19.141	29.972
	=	2,025,140 kg.			
Weight of the average fish	=	2.03 kg.			

LAST FISHING TRIP DATA

The following information relates to fish catch on the last fishing trip by private motor boat owners from the Cairns economic region. 24.4% of these trips were made to inland waters and 75.6% of trips were made to the sea (i.e., the GBR region).

Month of last fishing trip

Of the respondents who had been fishing during the previous twelve months, 54.1% had been fishing during October 1980, the month of the survey, and 20.3% had been fishing during the previous two months. Because such a large proportion of fishing trips occurred during the three months prior to the survey it can be assumed that the data for

the last fishing trip is reasonably accurate (i.e., assuming that accuracy diminishes with the length of time over which respondents must recall information).

Number of fish caught on the last trip

The mean number of fish caught, per boat, on the last fishing trip was 15.3 ± 5.2 (median 6.8, mode 0). However, the distribution was positively skewed and the range of catches was from 0 fish (9.3% of boats) to 150 fish (1.3% of boats). 75% of boats caught 20 fish or less and 50% caught less than 7 fish.

Weight of fish caught on the last trip

The mean total weight of whole fish caught, per boat, on the last outing was 37.8 ± 12.3kg (median 19.0, mode 0). However, the weight of the total fish catch ranged from 0kg (8.1% of boats) to 300 kg (1.4% of boats) and the distribution was positively skewed.

Weight of biggest fish caught on the last trip

The mean weight of the biggest fish caught on the last fishing trip (based on the biggest fish per boat) was 6.1 ± 1.3kg. The distribution was positively skewed with a median of 4.6kg (mode 1.0kg) and a range from 0kg (8.2% of boats) to 30kg (1.4% of boats).

Species of biggest fish caught on the last trip

From Table 2.5 it can be seen that coral trout and red emperor were most frequently the biggest fish caught on the last trip. The biggest fish overall was a 30kg cod.

Number of fishermen per boat on the last trip to the Cairns Region

The distribution of the number of people fishing per boat (including the owner) approaches the normal distribution with a mean of 2.5 ± 0.2 (median 2.4, mode 2.0). The number of people fishing, per boat, ranged from 1 (11.7% of boats) to 5 (2.6% of boats).

Time spent with lines in the water on the last trip to the Cairns Region

The mean length of time spent with lines in the water on the last fishing trip was 7.1 ± 1.5 hours (median 4.9, mode 4.0). However, the distribution was positively skewed with times ranging from 1 hour (1.3% of boats) to 30 hours (1.3% of boats).

	Frequency		Mean	Median	Mode	Range (kg)	
	Absolute	%	(kg)	(kg)	(kg)	Min	Max
Red Emperor	11	17	9.5	7.0	7	4	14
Reef Bream	1	2	8.0	8.0	8	8	8
Trevally	2	3	2.5	2.5	-	1	4
Cod	7	11	11.4	10.0	-	1	30
Queen Fish	2	3	4.5	4.5	-	4	5
Coral Trout	12	18	4.0	4.5	5	1	6
Mackerel	9	13	9.0	10.0	-	3	13
Catfish	1	2	1.0	1.0	1	1	1
Salmon	1	2	4.0	4.0	4	4	4
Grunter	3	5	2.0	2.0	2	2	2
Big Scale Red Bream	1	2	2.0	2.0	2	2	2
Black Marlin	1	2	20.0	20.0	20	20	20
Black Bream	1	2	1.0	1.0	1	1	1
Barramundi	3	5	5.0	6.0	-	1	9
Spangled Emperor	2	3	3.0	3.0	-	2	4
Flowery Cod	1	2	18.0	18.0	18	18	18
Silver Bream	1	2	1.0	1.0	1	1	1
Shovel Nose Ray	1	2	7.0	7.0	7	7	7
Bream	1	2	1.0	1.0	1	1	1
Shark	1	2	5.0	5.0	5	1	1
Javelin Fish	1	2	1.0	1.0	1	1	1
Jewfish	1	2	9.0	9.0	9	9	9
Mangrove Jack	1	2	2.0	2.0	2	2	2

TABLE 2.5 : Average weight by species for the "biggest" fish caught by fishermen from the Cairns Region during their last fishing trip.

NOTE : Table 2.5 refers to the biggest fish for each boat, therefore, it only indicates the number of occasions a particular species was the biggest fish and the average weight for that species when it was the biggest fish.

Summary of catch data for the last trip

From the catch data for the last fishing trip, it is estimated that the "average fisherman" in the Cairns region fishes for 7.1 $\pm$ 1.5 hours and (based on 3.6 people per boat) can expect to catch 6.1 fish with a total weight of 15.0kg. The biggest fish, on the average weighs of 6.1 $\pm$ 1.3kg. That is, the average fisherman in the Cairns region can expect to catch 0.9 fish for every hour spent fishing and this is equivalent to 2.1kg of fish per hour. (The above information is based on the mean figures for the last trip by respondents from the Cairns region.)

Ranking of fishermen in the Cairns region

Table 2.6 indicates the catch data for the individual fisherman in the Cairns region.

$$\text{based on: } \frac{\text{number of fish/boat on the last trip}}{\text{number of fishermen/boat on the last trip}}$$

From Table 2.6 it can be seen that the top 10% of fishermen caught 40.9%of the fish and that 30% of fishermen caught approximately 75% of the fish. This means that on an average trip (assuming the last trip to be an average trip) 30% of fishermen catch an average of 16.0 fish each.

	ABSOLUTE*						CUMULATIVE**					
	Percent of total catch (%)	Number of Fish Caught			range		Percent of total catch (%)	Number of Fish Caught			range	
		mean	median	mode	min	max		mean	median	mode	min	max
10	40.90	25.68	25.00	-	15.00	39.00	40.90	25.68	25.00	-	15.00	39.00
20	19.70	12.37	12.00	10.00	10.00	15.00	60.60	19.03	15.00	-	10.00	39.00
30	13.80	8.68	9.00	-	7.00	10.00	74.40	15.58	12.00	-	7.00	39.00
40	10.20	6.42	5.00	6.00	4.00	6.00	84.60	13.29	10.00	6.00	4.00	39.00
50	5.80	3.63	4.00	4.00	3.00	4.00	90.40	11.36	9.00	4.00	3.00	39.00
60	3.90	2.47	2.00	2.00	2.00	3.00	94.30	9.87	6.50	4.00	2.00	39.00
70	3.00	1.89	2.00	2.00	1.00	2.00	97.30	8.73	5.00	2.00	1.00	39.00
80	1.60	1.00	1.00	1.00	1.00	1.00	98.90	7.77	4.00	1.00	1.00	39.00
90	1.10	0.68	1.00	1.00	0	1.00	100.00	6.98	4.00	1.00	0	39.00
100	0	0	0	0	0	0	100.00	6.28	2.00	1.00	0	39.00

TABLE 2.6 : Ranking of fishermen by number of fish caught on the last trip to the Cairns Region.

* ABSOLUTE - Shows breakdown of each 10% group, i.e., Top 10%; 2nd 10%... bottom 10%.

** CUMULATIVE - Shows top 10, 20, 30... 100 percent.

TABLE 2.7 : CAIRNS REGION, LAST TRIP DATA

	Mean	Median	Mode	Range	
				Min	Max
No. of fish caught/ boat	15.35 ± 5.22	6.75	-	0 (9.3%)	150 (1.3%)
Weight of catch/ boat (kgs of whole fish)	37.82 ±12.33	19.00	0	0 (8.1%)	300 (1.4%)
Weight of biggest/ fish boat	6.11 ± 1.30	4.58	1.00	0 (8.2%)	30 (1.4%)
No. of fishermen/ boat	2.52 ± 0.22	2.37	2.00	1 (11.7%)	5 (2.6%)
No. of hrs lines were in water/ boat	7.13 ± 1.49	4.90	4.00	1 (1.3%)	30 (1.3%)

Estimated total annual fish catch by recreational fishermen in the Cairns region (based on last trip data for resident motor boat owners)

Estimated population of motor boat owners who use their boats for fishing and fish at sea - 3,530 owners.

Estimated total annual fish catch for Cairns region.

Number of fish = population of boat owners x average number of trips x average number of fish caught/ boat/trip

= 3,530 19.14 15.347

= 1,036,970 fish

Weight of whole fish = population of boat owners x average number of trips x average weight of whole fish/ boat/trip

= 3,530 19.14 37.824

= 2,555,548 kg.

Weight of the average fish = 2.46 kg.

LAST FISHING TRIP TO THE SEA DATA

Last trip data for trips to the sea

Seventy-five percent of fishermen from the Cairns region identified the sea (i.e., the GBR region) as the place where they conducted their last fishing trip. The following provides some imformation on the fish catch for those fishermen on that trip.

Number of fish caught on the last trip to the sea

The mean number of fish caught, per boat, on the last outing to the GBR region was 16.8 ± 6.4 (median 7.8, mode 1.0). However, the distribution was positively skewed with a range from a minimum of 0 fish per boat (6.9% of boats) to a maximum of 150 fish per boat (1.7% of boats). Approximately 90% of boats caught 40 fish or less and approximately 50% caught 8 fish or less.

Weight of fish caught on the last trip to the sea

The mean total weight of whole fish caught, per boat, on the last outing to the GBR region was 44.9 ± 15.4 kg (median 20.2kg, mode 20.0kg). However, the weight of fish caught ranged from 0kg (5.3% of boats) to 300kg (1.8% of boats) and the distribution was positively skewed.

Weight of the biggest fish caught on the last trip to the sea

The mean weight of the biggest fish caught, per boat, on the last fishing trip to the GBR region was 7.1 ± 1.5kg. The distribution was positively skewed with a median of 5.5kg (mode 4.0kg) and a range from 0kg (5.2% of boats) to 30kg (1.7% of boats).

Number of fishermen per boat on the last trip to the sea

The mean number of fishermen per boat on the last trip to the GBR region was 2.6 ± 0.3 (median 2.4, mode 2.0). The range of people fishing per boat was from 1 (11.9% of boats) to 5 (3.4% of boats).

Ranking of fishermen with last trip to the sea

Table 2.8 indicates the catch data for the individual fishermen in the Cairns region whose last fishing trip was to the sea.

$$\text{based on: } \frac{\text{number of fish/boat on last trip to the sea}}{\text{number of fishermen/boat on last trip to the sea}}$$

From Table 2.8 it can be seen that the top 10% of fishermen in the Cairns region catch 39.6% of the fish and that 30% of fishermen catch more than 75% of the fish. This means that on an average trip to the sea (assuming the last trip to be an average trip) 30% of fishermen catch 17 fish each.

	ABSOLUTE*						CUMULATIVE**					
	Percent of total catch (%)	Number of fish caught			Range		Percent of total catch (%)	Number of fish caught			Range	
		mean	median	mode	min	max		mean	median	mode	min	max
10	39.64	27.37	25.00	11.70	16.70	37.50	39.64	27.37	25.00	25.00	16.70	37.50
20	20.46	14.64	14.00	-	11.70	16.70	60.22	20.72	16.70	25.00	11.70	37.50
30	14.84	10.20	10.00	10.00	9.00	11.70	75.05	17.22	14.00	10.00	9.00	37.50
40	9.68	6.66	7.30	-	5.30	9.00	84.73	14.58	11.70	10.00	5.30	37.50
50	5.94	4.08	4.00	4.00	4.00	5.30	90.67	12.48	10.00	4.00	4.00	37.50
60	4.33	2.98	2.75	2.50	2.50	4.00	95.00	10.90	9.00	4.00	2.50	37.50
70	2.91	2.00	2.30	1.50	1.50	2.50	97.90	9.63	7.30	4.00	1.50	37.50
80	1.31	0.90	1.00	0.70	0.70	1.50	99.22	8.53	5.30	4.00	0.70	37.50
90	0.73	0.50	0.50	0.50	0.50	0.50	99.94	7.65	4.00	4.00	0.50	37.50
100	0	0	0	0	0	0.50	100.00	6.88	4.00	0.00 4.00	0	37.50

TABLE 2.8 : Ranking of fishermen by the number of fish caught on the last trip to the Cairns region.

* ABSOLUTE - Shows breakdown of each 10% group, i.e., Top 10%, 2nd 10%... bottom 10%.

** CUMULATIVE - Shows top 10, 20, 30... 100 percent.

TABLE 2.9 : CAIRNS REGION, LAST TRIP TO THE SEA

	Mean	Median	Mode	Range	
				Min	Max
No. of fish caught/boat	16.79 ± 6.38	7.75	1.00	0 (6.9%)	150 (1.7%)
Weight of catch/boat (kgs of whole fish)	44.86 ± 15.36	20.20	20.20	0 (5.3%)	300 (1.8%)
Weight of biggest fish caught/boat (kg)	7.10 ± 1.50	5.50	4.00	0 (5.2%)	30 (1.7%)
No. of fishermen/boat	2.56 ± 0.26	2.37	2.00	1 (11.9%)	5 (3.4%)
No. of hours lines in water/boat	7.56 ± 1.77	5.31	2.00	2 (16.9%)	30 (1.7%)

Time spent with lines in the water during the last trip to sea

The mean number of hours spent fishing during the last trip to the GBR region was 7.6 ± 1.8 hours (median 5.3, mode 2.0). However, the distribution was positively skewed with times ranging from 2 hours (16.9% of boats) to 30 hours (1.7% of boats).

Summary of catch data for the last fishing trip to the sea

Based on catch data for those boats whose last fishing trip was to the GBR region, it is estimated that the "average fisherman" in the Cairns region fished for 7.6 ± 1.8 hours and caught 6.6 fish per person (based on 2.6 fishermen per boat) with a total average catch weight of 17.5kg; the biggest fish on average weighed 7.1 ± 1.5kg. That is the "average fisherman" in the Cairns region can

expect to catch 0.9 fish for every hour spent fishing and this is equivalent to 2.3kg of fish per hour. (These calculations are based on the mean values for the last trip to the GBR region and assumes that all fishermen in a boat fish for the same length of time and have equal ability to catch fish.)

Estimated total annual fish catch by recreational fishermen in the Cairns region (based on last catch data for resident motor boat owners whose last trip was to the sea).

Estimated population of motor boat owners who use their boats for fishing and fish at sea = 3,530 owners.

Estimated total annual fish catch for Cairns region.

Number of fish	=	population of boat fishermen	x	average number of trips	x average number of fish caught/ boat/trip
	=	3,530		14.58	16.793
	=	864,292 fish			
Weight of whole fish	=	population of boat fishermen	x	average number of trips	x average weight of whole fish/ boat/trip
	=	3,530		14.58	44.860
	=	2,308,827 kg.			
Weight of average fish caught	=	2.67 kg.			

TABLE 2.10 : CAIRNS REGION, FISH CATCH PER FISHERMAN PER TRIP

Based on:	Fish catch/ fisherman/trip	Weight of fish catch/fisherman/trip (kg)
Last trip data	6.09	15.02
Last trip to sea data	6.56	17.53

TABLE 2.II : CAIRNS REGION CATCH PER HOUR SPENT WITH LINES IN WATER

Based on:	Fish caught/hr spent with lines in water	Weight of fish caught/ hr spent with lines in water (kg.)
Last trip data	0.85	2.11 kg
Last trip to sea data	0.87	2.32 kg

TABLE 2.12 : ESTIMATED TOTAL ANNUAL FISH CATCH BY RECREATIONAL FISHERMEN IN THE CAIRNS REGION

Based on:	Pop'n	Average no. of trips	Average no. of fish caught/ boat/ trip.	Average weight of whole fish caught/ boat/trip	Pop fish catch	Weight of pop fish catch (kg.)	Weight of average fish (kg.)
Usual trip data	3530	19.14	14.76	29.97	997,367	2,025,140	2.03
Last trip data	3530	19.14	15.35	37.82	1,067,517	2,630,986	2.46
Last trip to sea data	3530	14.58	16.79	44.86	864,292	2,308,827	2.67

2.2.2 Townsville Economic Region Fishing Activity Data

Area Fished

The areas of the Great Barrier Reef region fished by private motor boat owners with an address within the Townsville economic region are shown on Map 2.6, Appendix 1. This map was compiled from mail survey maps where fishermen had marked the destination of their "usual" fishing trip.

The map shows four fishing zones based on the towns where boats were launched. Boats launched from Ingham/Cardwell and Townsville ranged as far as the outer reef while those launched from Ayr/Home Hill and Bowen travelled only to close reefs. The northern extent of fishing was near the mouth of the South Johnstone River, while the southern extent of fishing was just north of Hayman Island. Intensity of use within zones decreased with distance from the coast with 39% of those surveyed travelling no more than 5km from the coast on any fishing trip. For 29% of boats, all trips to the GBR region were made to a destination greater than 5km from the coast. The mean return trip distance travelled by boats on the last trip was 37km (range 0km to 300km).

Number of Trips

The mean number of fishing trips made by respondents over the last 12 months was 20 trips [5] (median 15, mode 20, range 1 to 104). Fishing trips accounted for 100% of all private motor boat trips for the majority of respondents. As fishermen who fish exclusively in inland waters have been excluded from this analysis, only fishermen who do some fishing in the sea are considered here. Nevertheless, the average fisherman made an average (mean) 5.6 trips (median 2.25, mode 0, range 0 to 80) to inland waters and estuaries. The remaining 14.4 trips made to sea represent 72% of all fishing trips by the "average fisherman".

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5. The total mean annual number of trips was 20.6, indicating that a small number of trips made by respondents were not fishing trips. See Table 2.2.

Of the 14.4 trips to sea the mean number of trips to within 5km of the shore was 7.4 trips (median 2.9, mode 0, range 0 to 52) and the mean number of trips made to reefs and islands further than 5km from the shore was 7 trips (median 2.1, mode 0, range 0 to 52).

Length of Boat

The boats owned by respondents ranged in length from 2.5 metres to 11.5 metres. The mean length reported was 5.2 metres while the median was 4.9 metres and the mode was 4 metres.

Horsepower of Motors

The reported range of horsepower of outboard motors was 6 to 300 Hp. The mean was 67 Hp, median was 50 Hp and the mode was 25 Hp.

"USUAL" FISHING TRIP DATA

The following information relates to the "usual" fishing trip by private motor boat owners from the Townsville economic region. On average, 28% of these trips were to inland waters and 72% of trips were to sea (i.e., the GBR region).

Duration of the Usual Trip

It is estimated that the average "usual" fishing trip in the Townsville region lasts 13 hours (mean 13.3 $\pm$ 3.3, median 8.0, mode 8.0). The distribution is positively skewed with a range from 2 hours (2.2% of boats) to 120 hours (1.1% of boats).

Usual Number of Fish Caught

The mean number of fish caught, per boat, on a "usual" fishing trip is 14.3 $\pm$ 2.3 fish (median 10.1, mode 10.0). The distribution is positively skewed with a range of catches from 1 fish (3.4% of boats) to 70 fish (2.3% of boats).

Usual Weight of Fish Caught

This information refers to the total weight of whole fish caught on the "usual" trip. The mean weight of total fish catch, per boat, on the "usual" fishing trip is 24.6 ± 6.2kg. The distribution is positively skewed with a median weight of 14.7kg (mode 15.0kg) and a range from 1kg (4.8% of boats) to 140kg (1.2% of boats).

Summary of catch data for the "usual" fishing trip

From the above it is estimated that the average "usual" fishing trip by fishermen from the Townsville region lasts for 13.3 ± 3.3 hours. The expected fish catch on such a trip is 14.3 fish.

TABLE 2.13 : TOWNSVILLE REGION "USUAL" TRIP DATA

	Mean	Median	Mode	Range	
				Min	Max
Fishing trips	± 20.16 3.74	15.00	20.00	1 (1.1%)	104 (1.1%)
Duration (hrs)	± 13.33 3.3	8.04	8.00	2 (2.2%)	120 (1.1%)
No. of fish caught/boat	± 14.30 2.34	10.08	10.00	1 (3.4%)	70 (2.3%)
Weight of catch/ boat (kgs. of whole fish)	± 24.60 6.17	14.69	15.00	1 (4.8%)	140 (1.2%)

Estimated total annual fish catch by recreational fishermen in the Townsville region (based on usual trip data for resident motor boat owners)

Estimated population of motor boat owners who use their boats for fishing and fish at sea - 4,321 owners.

Estimated total annual fish catch for Townsville region.

Number of fish	=	population of boat owners	x	average number of trips	x average number of fish caught/ boat/trip
	=	4,321		20.056	14.299
	=	1,239,180 fish			
Weight of whole fish	=	population of boat owners	x	average number of trips	x average weight of whole fish/ boat/trip
	=	4,321		20.056	24.602
	=	2,132,058 kg.			
Weight of the average fish	=	1.72 kg.			

LAST FISHING TRIP DATA

The following information relates to fish catch on the last fishing trip by private motor boat owners from the Townsville economic region. 18.5% of these trips were made to inland waters and 81.5% of trips were made to the sea (i.e., the GBR region).

Month of last fishing trip

Of the respondents who had been fishing during the previous twelve months, 27.5% had been fishing during February 1980, the month of the survey and 41.8% had been fishing during the previous two months.

Because such a large proportion of fishing trips occurred during the three months prior to the survey it can be assumed that the data for the last fishing trip is reasonably accurate (i.e., assuming that accuracy diminishes with the length of time over which respondents must recall information).

Number of fish caught on the last trip

The mean number of fish caught, per boat, on the last fishing trip was 12.6 ± 3.2 (median 7.5, mode 2.0). However, the distribution was positively skewed and the range of catches was from 0 fish (8.9% of boats) to 73 fish (1.1% of boats). 75% of boats caught 15 fish or less and 50% caught less than 8 fish.

Weight of fish caught on the last trip

The mean total weight of whole fish caught, per boat, on the last outing was 27.2 ± 7.8kg (median 12.0, mode 0). However, the weight of the total fish catch ranged from 0kg (9.4% of boats) to 180kg (1.2% of boats) and the distribution was positively skewed.

Weight of biggest fish caught on the last trip

The mean weight of the biggest fish caught on the last fishing trip (based on the biggest fish per boat) was 5.4 ± 1.2kg. The distribution was positively skewed with a median of 3.6kg (mode 2.0kg) and a range from 0kg (9.1% of boats) to 31kg (1.1% of boats).

Species of biggest fish caught on the last trip

From Table 2.14 it can be seen that cod and mackerel were most frequently the biggest fish caught on the last trip. Apart from a 25kg shark, the biggest fish overall was a 23kg cod.

SPECIES	FREQUENCY ABSOLUTE	FREQUENCY %	MEAN (kg)	MEDIAN (kg)	MODE (kg)	RANGE (kg) MIN.	RANGE (kg) MAX.
Red Emperor	5	6.3	4.25	4	3.7	3	7
Trevally	3	3.8	6.00	5	1,5,11	1	11
Cod	10	12.5	9.10	6.5	6.7	1	23
Queenfish	2	2.5	7.50	7.5	4,11	4	11
Coral Trout	7	8.8	5.71	4	3,4	1	19
Mackrel	10	12.5	7.80	5	3	2	31
Salmon	1	1.3	2.00	2	2	2	2
Black Bream	2	2.5	2.00	2	2	2	2
Barramundi	3	3.8	6.67	8	2,8,10	2	10
Spangled Emperor	2	2.5	4.00	4	4	4	4
Grunter	4	5.0	2.50	2	2	1	5
Bream	4	5.0	1.75	2	2	1	3
Shark	4	5.0	12.25	12.5	-	1	25
Red Bream	3	3.8	3.67	4	2,4,5	2	5
Javlin Fish	1	1.3	3.00	3	3	3	3
Jewfish	1	1.3	8.00	8	8	8	8
Finger Print Red	1	1.3	2.00	2	2	2	2
Sweetlip	2	2.5	1.50	1.5	1,2	1	2
Dory	1	1.3	4.00	4	4	4	4
Nannygai	1	1.3	3.00	3	3	3	3
Sting Ray	1	1.3	5.00	5	5	5	5
Perch	2	2.5	5.50	5.5	1,10	1	10
Tuna	2	2.5	9.00	9	6,12	6	12
Snapper	2	2.5	1.50	1.5	1,2	1	2
Turrum	1	1.3	4	4	4	4	4
Green Job Fish	1	1.3	10	10	10	10	10
Red Jew	1	1.3	15	15	15	15	15
Wrasse	2	2.5	4	4	2,6	2	6

TABLE 2.14 : Average weight of species for the "biggest" fish caught by fishermen from the Townsville region during their last fishing trip.

NOTE: Table 2.14 refers to the biggest fish for each boat, therefore, it only indicates the number of occasions a particular species was the biggest fish and the average weight for that species when it was the biggest fish.

Number of fishermen per boat on the last trip to the Townsville Region

The distribution of the number of people fishing per boat (including the owner) approaches the normal distribution with a mean of 2.6 ± 0.2 (median 2.3, mode 2.0). The number of people fishing, per boat, ranged from 1 (8.9% of boats) to 5 (3.3% of boats).

Time spent with lines in the water on the last trip to the Townsville Region

The mean length of time spent with lines in the water on the last fishing trip was 6.2 ± 1.2 hours (median 4.4, mode 3.0). However, the distribution was positively skewed with times ranging from 1 hour (2.2% of boats) to 40 hours (1.1% of boats).

Summary of catch data for the last trip

From the catch data for the last fishing trip, it is estimated that the "average fisherman" in the Townsville region fishes for 6.2 ± 1.2 hours and (based on 2.6 people per boat) can expect to catch 4.9 fish with a total weight of 10.6kg. The biggest fish, on the average, weighs 5.4 ± 1.2kg. That is, the average fisherman in the Townsville region can expect to catch 0.79 fish for every hour spent fishing and this is equivalent to 1.71kg of fish per hour. (The above information is based on the mean figures for the last trip by respondents from the Townsville region.)

Ranking of fishermen in the Townsville region

Table 2.15 indicates the catch data for the individual fisherman in the Townsville region.

$$\text{based on: } \frac{\text{number of fish/boat on the last trip}}{\text{number of fishermen/boat on the last trip}}$$

From Table 2.15 it can be seen that the top 10% of fishermen caught 32.7% of the fish and that 40% of fishermen caught approximately 72% of the fish. This means that on an average trip (assuming the last trip to be an average trip) 40% of fishermen catch an average of 11.56 fish each.

	ABSOLUTE*						CUMULATIVE**					
	PERCENT OF TOTAL CATCH %	NUMBER OF FISH CAUGHT			RANGE		PERCENT OF TOTAL CATCH %	NUMBER OF FISH CAUGHT			RANGE	
		Mean	Median	Mode	Min	Max		Mean	Median	Mode	Min	Max
10	32.70	21.00	20.00	20.00	15.00	40.00	32.70	(178.5) 21.00	20.00	20.00	15.00	40.00
20	17.77	11.41	10.00	10.00	10.00	15.00	50.46	(275.5) 16.21	15.00	10.00	10.00	40.00
30	11.70	7.51	7.50	7.50	6.70	8.30	62.15	(339.35) 13.30	10.00	10.00	6.70	40.00
40	9.81	6.30	6.30	6.00	6.00	6.50	71.97	(392.9) 11.56	9.15	10.00	6.00	40.00
50	7.88	5.06	5.00	5.00	5.00	5.50	79.84	(435.9) 10.26	7.50	5.00	5.00	40.00
60	6.63	4.26	4.00	4.00	4.00	5.00	86.47	(472.1) 8.55	6.70	5.00	4.00	40.00
70	5.35	3.44	3.30	3.30	3.00	3.80	91.32	(501.3) 8.43	6.30	5.00	3.00	40.00
80	4.03	2.59	2.50	2.50	2.00	2.20	95.85	(523.3) 7.70	5.75	5.00	2.00	40.00
90	2.81	1.81	1.80	2.00	1.50	2.00	98.66	(538.65) 7.04	5.00	5.00	1.50	40.00
100	1.63	0.89	1.0	1.0	0.20	1.50	100	6.42	5.00	5.00	0.20	40.00

TABLE : 2.15 Ranking of fishermen by the number of fish caught on the last trip to the Townsville region.

* Absolute - shows breakdown of each 10% group, i.e., Top-10%; 2nd-10%....., Bottom-10%.

** Cumulative - shows top 10, 20, 30...., 100 percent.

TABLE 2.16 : TOWNSVILLE REGION, LAST TRIP DATA

	Mean	Median	Mode	Range	
				Min	Max
No. of fish caught/boat	± 12.59 3.16	7.50	2.00	0 (8.9%)	73 (1.1%)
Weight of catch/ boat (kgs. of whole fish).	± 27.20 7.75	12.00	0	0 (9.4%)	180 (1.2%)
Weight of biggest fish/boat	± 5.44 1.22	3.59	2.00	0 (9.1%)	31 (1.1%)
No. of fishermen/ boat	± 2.56 0.20	2.34	2.00	1 (8.9%)	5 (3.3%)
No. of hrs lines were in water/ boat	± 6.21 1.25	4.38	3.00	1 (2.2%)	40 (1.1%)

Estimated total annual fish catch by recreational fishermen in the Townsville region (based on last trip data for resident motor boat owners).

Estimated population of motor boat owners who use their boats for fishing and fish at sea - 4,321 owners.

Estimated total annual fish catch for Townsville region.

Number of fish = population of boat owners x average no. of trips x average number of fish caught/boat/ trip

= 4,321 20.056 12.589

= 1,090,988 fish

Weight of whole fish = population of boat owners x average no. of trips x average weight of whole fish/boat/ trip

= 4,321 20.056 27.2

= 2,357,205.7 kg.

Weight of the average fish = 2.16 kg.

LAST FISHING TRIP TO THE SEA DATA

Last trip data for trips to the sea

Eighty-two percent of fishermen from the Townsville region identified the sea (i.e., the GBR region) as the place where they conducted their last fishing trip. The following provides some information on the fish catch for those fishermen on that trip.

Number of fish caught on the last trip to the sea

The mean number of fish caught, per boat, on the last outing to the GBR region was 13.1 $\pm$ 3.7 (median 7.8, mode 10.0). However, the distribution was positively skewed with a range from a minimum of 0 fish per boat (9.5% of boats) to a maximum of 73 fish per boat (1.4% of boats). Approximately 90% of boats caught 37 fish or less and approximately 50% caught 8 fish or less.

Weight of fish caught on the last trip to the sea

The mean total weight of whole fish caught, per boat, on the last outing to the GBR region was 30.1 $\pm$ 9.2kg (median 12.5kg, mode 0.0kg). However, the weight of fish caught ranged from 0kg (10% of boats) to 180kg (1.4% of boats) and the distribution was positively skewed.

Weight of the biggest fish caught on the last trip to the sea

The mean weight of the biggest fish caught, per boat, on the last fishing trip to the GBR region was 5.6 $\pm$ 1.8kg. The distribution was positively skewed with a median of 3.7kg (mode 4.0kg) and a range from 0kg (9.6% of boats) to 31kg (1.4% of boats).

Number of fishermen per boat on the last trip to the sea

The mean number of fishermen per boat on the last trip to the GBR region was 2.6 ± 0.2 (median 2.4, mode 2.0). The range of people fishing per boat was from 1 (9.5% of boats) to 5 (2.7% of boats).

Ranking of fishermen with last trip to the sea

Table 2.17 indicates the catch data for the individual fishermen in the Townsville region whose last fishing trip was to the sea.

$$\text{based on: } \frac{\text{number of fish/boat on last trip to the sea}}{\text{number of fishermen/boat on last trip to the sea}}$$

From Table 2.17 it can be seen that the top 10% of fishermen in the Townsville region catch 35.06% of the fish and that 40% of fishermen catch more than 75% of the fish. This means that on an average trip to the sea (assuming the last trip to be an average trip) 40% of fishermen catch 10.42 fish each.

	ABSOLUTE*						CUMULATIVE**					
	PERCENT OF TOTAL CATCH %	NUMBER OF FISH CAUGHT			RANGE		PERCENT OF TOTAL CATCH %	NUMBER OF FISH CAUGHT			RANGE	
		Mean	Median	Mode	Min	Max		Mean	Median	Mode	Min	Max
10	35.06	18.40	18.75	15.00	15.00	22.00	35.06	(128.8) 18.40	18.75	15.00	15.00	22.00
20	21.37	11.21	10.00	10.00	9.50	15.00	56.44	(207.3) 14.81	15.00	10.00	9.50	22.00
30	13.68	7.17	7.0	7.0 8.0	6.00	8.00	70.11	(257.5) 12.26	10.00	10.00	6.00	22.00
40	9.34	4.90	5.00	5.00	4.70	5.00	79.45	(291.8) 10.42	8.75	5.00	4.70	22.00
50	6.84	3.59	3.50	4.00	3.00	4.00	86.28	(316.9) 9.05	5.00	5.00	3.00	22.00
60	5.58	2.93	3.00	3.00	2.50	3.00	91.86	(337.4) 8.03	5.50	5.00 3.00	2.5	22.00
70	3.95	2.07	2.00	2.00	2.00	2.50	95.81	(351.9) 7.18	5.00	5.00 3.00 2.00	2.00	22.00
80	7.40	1.26	1.30	1.00	1.00	1.70	98.21	(360.7) 6.44	4.35	5.00 3.00 2.00	1.00	22.00
90	1.63	0.86	1.00	1.00	0.50	1.00	99.83	(366.7) 5.82	3.75	5.00 3.00 2.00	0.50	22.00
100	0	0	0	0	0	0.3	100	5.24	3.03	1.00	0	22.00

TABLE : 2.17 Ranking of fishermen by the number of fish caught on the last trip to the Townsville section.

* Absolute - shows breakdown of each 10% group, i.e., Top-10%, 2nd-10%...., Bottom-10%.

** Cumulative - shows top 10, 20, 30...., 100 percent.

TABLE 2.18 : TOWNSVILLE REGION, LAST TRIP TO THE SEA DATA

	Mean	Median	Mode	Range	
				Min	Max
No. of fish caught/boat	± 13.10 — 3.69	7.75	10.00	0 (9.5%)	73 (1.4%)
Weight of catch/boat (kg. of whole fish)	± 30.09 — 9.20	12.50	0.00	0 (10%)	180 (1.4%)
Weight of biggest fish caught/boat (kg.)	± 5.62 — 0.08	3.73	4.00	0 (9.6%)	31 (1.4%)
No. of fishermen/boat	± 2.55 — 0.22	2.38	2.00	1 (9.5%)	5 (2.7%)
No. of hours lines in water/boat	± 5.70 — 1.22	4.25	3.00	1 (2.7%)	40 (1.4%)

Time spent with lines in the water during the last trip to sea

The mean number of hours spent fishing during the last trip to the GBR region was 5.7 ± 1.2 hours (median 4.3, mode 3.0). However, the distribution was positively skewed with times ranging from 1 hour (2.7% of boats) to 40 hours (1.4% of boats).

Summary of catch data for the last fishing trip to the sea

Based on catch data for those boats whose last fishing trip was to the GBR region, it is estimated that the "average fisherman" in the Townsville region fished for 5.7 ± 1.2 hours and can expect to catch 5.1 fish per person (based on 2.6 fishermen per boat) with a total average weight of 12.1kg; the biggest fish on average weighs 5.6 ± 1.4kg. That is, the "average fisherman" in the Townsville region can expect to catch 0.9 fish for every hour spent fishing and this is equivalent to 2.1kg of fish per hour. (These calculations

are based on the mean values for the last trip to the GBR region and assumes that all fishermen in a boat fish for the same length of time and have equal ability to catch fish.)

Estimated total annual fish catch by recreational fishermen in the Townsville region (based on last catch data for resident motor boat owners whose last trip was to the sea)

Estimated population of motor boat owners who use their boats for fishing and fish at sea = 4,321 owners.

Estimated total annual fish catch for Townsville region.

Number of fish	=	population of boat fishermen	x	average no. of trips	x	average number of fish caught/boat/ trip
	=	4,321		14.472		13.095
	=	818,876 fish				
Weight of whole fish	=	population of boat fishermen	x	average no. of trips	x	average weight of whole fish/boat/ trip
	=	4,321		14.472		30.086
	=	1,881,383 kg.				
Weight of average fish caught	=	2.30 kg.				

TABLE 2.19 : TOWNSVILLE REGION, FISH CATCH PER FISHERMAN PER TRIP

Based on:	Fish catch/ fisherman/ trip	Weight of fish catch/fisherman/ trip (kg.)
Last trip data	4.93	10.64
Last trip to sea data	5.13	12.06

TABLE 2.20 : TOWNSVILLE REGION, CATCH PER HOUR SPENT WITH LINES IN WATER

Based on:	Fish caught/hr spent with lines in water	Weight of fish caught/ hr spent with lines in water (kg.)
Last trip data	0.79	1.72 kg.
Last trip to sea data	0.90	2.12 kg.

TABLE 2.21 : ESTIMATED TOTAL ANNUAL FISH CATCH BY RECREATIONAL FISHERMEN IN THE TOWNSVILLE REGION

Based on:	Pop-ulation	Av. no. of trips	Av. no. of fish caught/ boat/ trip	Av. weight of whole fish caught/ boat/trip	Pop. fish catch	Weight of pop. fish catch (kg.)	Weight of av. fish (kg)
Usual trip data	4,321	20.06	14.30	24.60	1,239,180	2,132,058	1.72
Last trip data	4,321	20.06	12.59	27.2	1,090,988	2,357,206	2.16
Last trip to sea data	4,321	14.47	13.10	30.09	818,876	1,881,383	2.30

2.2.3 Mackay Region : Fishing Activity Data

Area Fished

The areas of the Great Barrier Reef region fished by private motor boat owners with an address within the Mackay economic region are shown on Map 2.7, Appendix I. This map was compiled from mail survey maps where fishermen had marked the destination of their "usual" fishing trip.

The map shows two fishing zones based on the towns where boats were launched. No boats surveyed ventured to the outer reef from Proserpine or Mackay. The northern extent of fishing was Gloucester Island while the southern extent of fishing was South Island.

Intensity of use within zones decreased with increasing distance from the coast with 37% of those surveyed travelling no more than 5km from the coast on any fishing trip. For 27% of boats, all trips to the GBR region were made to a destination greater than 5km from the coast. The mean return trip distance travelled by boats on the last trip was 31km (range 0km to 290km).

Number of trips

The mean number of fishing trips made by respondents over the last 12 months was 17.7 trips [6] (median 12.3, mode 6, range 1 to 108). Fishing trips accounted for 100% of all private motor boat trips for the majority of respondents. As fishermen who fish exclusively in inland waters have been excluded from this analysis, only fishermen who do some fishing in the sea are considered here. Nevertheless, the average fisherman made an average (mean) 7.2 trips (median 4.1, mode, 0, range 0 to 36) to inland waters and estuaries. The remaining 10.5 trips made to sea represent 60% of all fishing trips by the "average fisherman".

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6. The total mean annual number of trips made was 17.7, indicating that all trips made by respondents were fishing trips. See Table 2.2.

Of the 10.5 trips to sea the mean number of trips to within 5km of the shore was 4.8 trips (median 1.9, mode 0, range 0 to 36) and the mean number of trips made to reefs and islands further than 5km from the shore was 5.7 trips (median 2.8, mode 0, range 0 to 36).

Length of boat

The boats owned by respondents ranged in length from 3.0 metres to 11.7 metres. The mean length reported was 4.8 metres while the median was 4.2 metres and the mode was 3.6 metres.

Horsepower of motors

The reported range of horsepower of outboard motors was 3 to 315 Hp. The mean was 59 Hp, median was 25.4 Hp and the mode was 10 Hp.

USUAL FISHING TRIP DATA

"Usual" fishing trip data

The following information relates to the "usual" fishing trip by private motor boat owners from the Mackay economic region. On average, 41% of these trips were to inland waters and 59% of trips were to sea (i.e., the GBR region).

Duration of the usual trip

It is estimated that the average "usual" fishing trip in the Mackay region lasts 14 hours (mean 14.0 $\pm$ 5.3, median 7.6, mode 6.0). The distribution is positively skewed with a range from 1 hour (2.0% of boats) to 100 hours (2.0% of boats).

Usual number of fish caught

The mean number of fish caught, per boat, on a "usual" fishing trip is 18.8 $\pm$ 5.4 fish (median 14.6, mode 10.0). The distribution is positively skewed with a range of catches from 2 fish (2.2% of boats) to 120 fish (2.2% of boats).

Usual weight of fish caught

This information refers to the total weight of whole fish caught on the "usual" trip. The mean weight of total fish catch, per boat, on the "usual" fishing trip is 40.6 ± 19.4kg. The distribution is positively skewed with a median weight of 15.8kg (mode 10.0kg) and a range from 2kg (4.3% of boats) to 300kg (4.3% of boats).

Summary of catch data for the "usual" fishing trip

From the above it is estimated that the average "usual" fishing trip by fishermen from the Mackay region lasts for 14 ± 5.4 hours. The expected fish catch on such a trip is 18.8 fish per boat.

TABLE 2.22 : MACKAY REGION, "USUAL" TRIP DATA

	Mean	Median	Mode	Range	
				Min	Max
Fishing trips	17.71 ± 4.90	12.33	6.00	1 (2.0%)	108 (2.0%)
Duration (hrs)	13.96 ± 5.39	7.60	6.00	1 (2.0%)	100 (2.0%)
No. of fish caught/boat	18.80 ± 5.36	14.60	10.00	2 (2.2%)	120 (2.2%)
Weight of catch/ boat (kgs. of whole fish)	40.55 ± 19.44	15.75	10.00	2 (4.3%)	300 (4.3%)

Estimated total annual fish catch by recreational fishermen in the Mackay region (based on usual trip data for resident motor boat owners).

Estimated population of motor boat owners who use their boats for fishing and fish at sea = 2,597 owners.

Estimated total annual fish catch for Mackay region.

Number of fish	=	population of boat owners	x	average number of trips	x average number of fish caught/boat/ trip
	=	2,597		17.714	18.800
	=	864,861 fish			
Weight of whole fish	=	population of boat owners	x	average number of trips	x average weight of whole fish/boat/ trip
	=	2,597		17.714	40.552
	=	1,865,570 kg.			
Weight of the average fish	=	2.16 kg.			

Last fishing trip data

The following information relates to fish catch on the last fishing trip by private motor boat owners from the Mackay economic region. 24.4% of these trips were made to inland waters and 75.6% of trips were made to the sea (i.e., the GBR region).

Month of last fishing trip

Of the respondents who had been fishing during the previous twelve months, 20.4% had been fishing during February 1981, the month of the survey, and 46.9% had been fishing during the previous two months.

Because such a large proportion of fishing trips occurred during the three months prior to the survey it can be assumed that the data for the last fishing trip is reasonably accurate (i.e., assuming that accuracy diminishes with the length of time over which respondents must recall information).

Number of fish caught on the last trip

The mean number of fish caught, per boat, on the last fishing trip was 18.7 ± 6.8 (median 11.8, mode 6.0). However, the distribution was positively skewed and the range of catches was from 0 fish (6.3% of boats) to 100 fish (4.2% of boats). 75% of boats caught 20 fish or less and 50% caught less than 10 fish.

Weight of fish caught on the last trip

The mean total weight of whole fish caught, per boat, on the last outing was 36.4 ± 17.1kg (median 15.2, mode 10). However, the weight of the total fish catch ranged from 0kg (6.1% of boats) to 320kg (2% of boats) and the distribution was positively skewed.

Weight of biggest fish caught on the last trip

The mean weight of the biggest fish caught on the last fishing trip (based on the biggest fish per boat) was 5.15 ± 1.91kg. The distribution was positively skewed with a median of 3.28kg (mode 3.0kg) and a range from 0kg (6.1% of boats) to 40kg (2% of boats).

Species of biggest fish caught on the last trip

From Table 2.23 it can be seen that cod was most frequently the biggest fish caught on the last trip. The biggest fish overall was a 40kg jewfish.

Number of fishermen per boat on the last trip to the Mackay region

The distribution of the number of people fishing per boat (including the owner) approaches the normal distribution with a mean of 2.6 ± 0.2 (median 2.4, mode 2.0). The number of people fishing, per boat, ranged from 1 (2.0% of boats) to 4 (16.3% of boats).

Species	Frequency		Mean	Median	Mode	Range (kg)	
	Absolute	%	(kg)	(kg)	(kg)	Min	Max
Red Emperor	1	2.3	2.00	2	2	2	2
Trevally	1	2.3	1.00	1	1	1	1
Cod	11	15.6	8.64	8	4	3	20
Coral Trout	5	11.6	3.60	3	-	1	8
Mackerel	2	4.7	2.50	2.5	2,3	2	3
Catfish	1	2.3	4.00	4	4	4	4
Salmon	5	11.6	3.6	4	2,4	2	6
Grunter	6	14	2.50	2.5	2,3	1	4
Bream	3	7.0	3.33	3	1,3,6	1	6
Jewfish	2	4.7	26.50	26.5	13,40	13	40
Sweetlip	3	7.0	2	1	1	1	3
Blue Groper	2	4.7	4.5	4.5	3,5	3	5
Snapper	1	2.3	3	3	3	3	3

TABLE 2.23 : Average weight by species for the "biggest" fish caught by fishermen from the Mackay region during this last fishing trip.

Note: Table 2.23 refers to the biggest fish for each boat, therefore, it only indicates the number of occasions a particular species was the biggest fish and the average weight for that species when it was the biggest fish.

Time spent with lines in the water on the last trip to the Mackay region.

The mean length of time spent with lines in the water on the last fishing trip was 6.4 ± 2.1 hours (median 4.8, mode 3.0). However, the distribution was positively skewed with times ranging from 1 hour (2.1% of boats) to 48 hours (2.1% of boats).

Summary of catch data for the last trip

From the catch data for the last fishing trip, it is estimated that the "average fisherman" in the Mackay region fishes for 6.4 ± 2.1 hours and (based on 2.6 people per boat) can expect to catch 7.3 fish with a total weight of 14kg. The biggest fish, on the average weighs 5.15 ± 1.91kg. That is, the average fisherman in the Mackay region can expect to catch 1.1 fish for every hour spent fishing and this is equivalent to 2.2kg of fish per hour. (The above information is based on the mean figures for the last trip by respondents from the Mackay region.)

Percent of total catch		ABSOLUTE *					Percent of total catch	CUMULATIVE **				
		Number of fish caught						Number of fish caught				
		Mean	Median	Mode	Range Min	Range Max		Mean	Median	Mode	Range Min	Range Max
10	42.70	32.22	25.00	15.00	15.00	50.00	42.70	32.22	25.00	15.00	15.00	50.00
20	15.55	11.73	12.00	12.00	10.00	15.00	58.25	21.98	15.00	15.00 12.00	10.00	50.00
30	10.71	8.07	8.00	7.50 8.00 8.30 9.00	7.00	9.00	68.96	17.34	12.00	15.00 12.00	7.00	50.00
40	8.70	6.55	6.70	7.00	6.00	7.00	77.66	14.64	9.50	15.00 12.00 5.00	6.00	50.00
50	6.65	5.01	5.00	5.00	4.70	5.50	84.31	12.72	8.00	15.00 12.00 5.00 4.70	4.70	50.00
60	5.06	3.81	3.80	3.50	3.50	4.70	89.37	11.23	7.00	15.00 12.00 5.00 4.70 3.50	3.50	50.00
70	3.98	3.00	3.00	3.00	3.00	3.00	93.36	10.06	6.70	3.00	3.00	50.00
80	3.84	2.89	3.00	3.00	2.50	3.00	97.19	9.16	5.75	3.00	2.50	50.00
90	2.60	1.96	2.00	2.00	1.00	2.30	99.79	8.36	5.00	3.00	1.00	50.00
100	0.30	0.022	0	0	0	1.00	100	7.55	4.70	3.00	0	50.00

TABLE 2.24 : Ranking of fishermen by the number of fish caught on the last trip to the Mackay region.

* ABSOLUTE - shows breakdown of each 10% group, i.e., top 10%, 2nd 10%... bottom 10%.

** CUMULATIVE - shows top 10, 20, 30... 100 percent.

Ranking of fishermen in the Mackay region

Table 2.24 indicates the catch data for the individual fisherman in the Mackay region.

$$\text{Based on: } \frac{\text{number of fish/boat on the last trip}}{\text{number of fishermen/boat on the last trip}}$$

From Table 2.24 it can be seen that the top 10% of fishermen caught 42.7% of the fish and that 40% of fishermen caught approximately 77% of the fish. This means that on an average trip (assuming the last trip to be an average trip) 40% of fishermen catch an average of 14.64 fish each.

TABLE 2.26 : MACKAY REGION, LAST TRIP DATA

	Mean	Median	Mode	Range	
				Min	Max
No. of fish caught/ boat	18.73 ± 6.77	11.75	6.00	0 (6.3%)	100 (4.2%)
Weight of catch/ boat (kgs of whole fish)	36.40 ± 17.10	15.20	10.00	0 (6.1%)	320 (2.0%)
Weight of biggest fish/boat	5.15 ± 1.91	3.28	3.00	0 (6.1%)	40 (2.0%)
No. of fishermen/ boat	2.57 ± 0.22	2.37	2.00	1 (2.0%)	4 (16.3%)
No. of hours lines were in water/boat	6.42 ± 2.14	4.83	3.00	1 (2.1%)	48 (2.1%)

Estimated total annual fish catch by recreational fishermen in the Mackay region (based on last trip data for resident motor boat owners).

Estimated population of motor boat owners who use their boats for fishing and fish at sea - 2,597 owners.

Estimated total annual fish catch for Mackay region.

Number of fish	=	population of boat owners	x	average number of trips	x average number of fish caught/ boat/trip
	=	2,597		17.714	18.729
	=	861,595 fish.			
Weight of whole fish	=	population of boat owners	x	average number of trips	x average weight of whole fish/ boat/trip
	=	2,597		17.714	36.4
	=	1,674,519 kg.			
Weight of the average fish	=	1.94 kg.			

LAST FISHING TRIP TO THE SEA DATA

Last trip data for trips to the sea

Seventy five percent of fishermen from the Mackay region identified the sea (i.e., the GBR region) as the place where they conducted their last fishing trip. The following provides some information on the fish catch for those fishermen on that trip.

Number of fish caught on the last trip to the sea

The mean number of fish caught, per boat, on the last outing to the GBR region was 18.2 ± 7.7 (median 10.5, mode 6.0). However, the distribution was positively skewed with a range from a minimum of 0 fish per boat (5.6% of boats) to a maximum of 100 fish per boat (5.6% of boats). Approximately 90% of boats caught 45 fish or less and approximately 50% caught 10 fish or less.

Weight of fish caught on the last trip to the sea

The mean total weight of whole fish caught, per boat, on the last outing to the GBR region was 40.3 ± 21.8 kg (median 15.2kg, mode 10.0kg). However, the weight of fish caught ranged from 0kg (5.4% of boats) to 300kg (2.7% of boats) and the distribution was positively skewed.

Weight of the biggest fish caught on the last trip to the sea

The mean weight of the biggest fish caught, per boat, on the last fishing trip to the GBR region was 5.9 ± 2.53kg. The distribution was positively skewed with a median of 3.5kg (mode 1.0kg) and a range from 0kg (5.4% of boats) to 40kg (2.7% of boats).

Number of fishermen per boat on the last trip to the sea

The mean number of fishermen per boat on the last trip to the GBR region was 2.6 ± 0.3 (median 2.3, mode 2.0). The range of people fishing per boat was from 1 (2.7% of boats) to 4 (18.9% of boats).

Ranking of fishermen with last trip to the sea

Table 2.27 indicates the catch data for the individual fishermen in the Mackay region whose last fishing trip was to the sea.

$$\text{based on: } \frac{\text{number of fish/boat on last trip to the sea}}{\text{number of fishermen/boat on last trip to the sea}}$$

From Table 2.27 it can be seen that the top 10% of fishermen in the Mackay region catch 40.32% of the fish and that 40% of fishermen catch approximately 77% of the fish. This means that on an average trip to the sea (assuming the last trip to be an average trip) 40% of fishermen catch 13.3 fish each.

	Percent of Total Catch %	ABSOLUTE * Number Of Fish Caught					Percent of Total Catch %	CUMULATIVE ** Number of Fish Caught				
		Mean	Median	Mode	Range Min	Range Max		Mean	Median	Mode	Range Min	Range Max
10	40.32	27.86	25.00	15.00	15.00	50.00	40.32	27.86	15.00	15.00	15.00	50.00
20	16.46	11.37	11.30	-	9.00	15.00	56.77	19.61	15.00	15.00	9.00	50.00
30	11.29	7.80	8.00	-	7.00	8.30	68.06	15.68	11.30	15.00	7.00	50.00
40	8.97	6.20	6.00	-	5.50	7.00	77.04	13.30	8.65	15.00	5.50	50.00
50	6.45	4.46	4.00	-	3.80	5.00	83.49	11.54	8.00	15.00	3.80	50.00
60	4.92	3.40	3.50	3.50	3.00	3.80	88.41	10.18	7.00	15.00 3.50	3.00	50.00
70	4.34	3.00	3.00	3.00	3.00	3.00	92.75	9.16	6.00	3.00	3.00	50.00
80	4.14	2.86	3.00	3.00	2.50	3.00	96.88	8.37	5.25	3.00	2.50	50.00
90	2.69	1.86	2.00	2.00	1.00	2.00	99.57	7.64	4.70	3.00	1.00	50.00
100	0.41	2.86	0	0	0	1.00	100.00	6.91	3.80	3.00	0	50.00

TABLE 2.27 Ranking of fishermen by the number of fish caught on the last trip to the Mackay Section.

* ABSOLUTE - Shows breakdown of each 10% group, i.e., top 10%, 2nd 10%... bottom 10%.

** CUMULATIVE - Shows top, 10, 20, 30... 100 percent.

TABLE 2.28 : MACKAY REGION, LAST TRIP TO THE SEA DATA

	Mean	Median	Mode	Range	
				Min	Max
No. of fish caught/ boat.	18.17 ± 7.72	10.50	6.00	0 (5.6%)	100 (5.6%)
Weight of catch/ boat (kg of whole fish).	40.30 ±21.80	15.20	10.00	0 (5.4%)	300 (2.7%)
Weight of biggest fish caught/boat (kg).	5.90 ± 2.53	3.50	1.00	0 (5.0%)	40 (2.7%)
No. of fishermen/ boat	2.57 ± 0.27	2.33	2.00	1 (2.7%)	4 (18.9%)
No. of hours lines in water/boat	6.64 ± 2.82	4.50	3.00	1 (2.8%)	48 (2.8%)

Time spent with lines in the water during the last trip to sea

The mean number of hours spent fishing during the last trip to the GBR region was 6.6 ± 2.8 hours (median 4.5, mode 3.0). However, the distribution was positively skewed with times ranging from 1 hour (2.8% of boats) to 48 hours (2.8% of boats).

Summary of catch data for the last fishing trip to the sea

Based on catch data for those boats whose last fishing trip was to the GBR region, it is estimated that the "average fisherman" in the Mackay region fished for 6.6 ± 2.8 hours and can expect to catch 7.1 fish per person (based on 2.6 fishermen per boat) with a total average weight of 15.5kg; the biggest fish on average weighs 5.9 ± 2.53kg. That is, the "average fisherman" in the Mackay region can expect to catch 1.1 fish for every hour spent fishing and this is equivalent to 2.3kg of fish per hour. (These calculations are based on the mean values for the last trip to the GBR region and assumes that all fishermen in a boat fish for the same length of time and have equal ability to catch fish.)

Estimated total annual fish catch by recreational fishermen in the Mackay region (based on last catch data for resident motor boat owners whose last trip was to the sea).

Estimated population of motor boat owners who use their boats for fishing and fish at sea - 2,597 owners.

Estimated total annual fish catch for Mackay region.

Number of fish	=	population of boat fishermen	x	average number of trips	x average number of fish caught/ boat/trip
	=	2,597		10.551	18.167
	=	497,793 fish.			
Weight of whole fish	=	population of boat fishermen	x	average number of trips	x average weight of whole fish/ boat/trip/
	=	2,597		10.551	40.278
	=	1,103,655 kg.			
Weight of average fish caught	=	2.2 kg.			

TABLE 2.29 : MACKAY REGION, FISH CATCH PER FISHERMAN PER TRIP

Based on:	Number of fish caught/fishermen/ trip	Weight of fish catch/fishermen/ trip (kg)
Last trip data	7.29	14
Last trip to sea data	7.07	15.5

TABLE 2.30 : MACKAY REGION, CATCH PER HOUR SPENT WITH LINES IN WATER

Based on:	Fish caught/hr spent with lines in water	Weight of fish caught/hr spent with lines in water (kg)
Last trip data	1.14	2.2
Last trip to sea data	1.07	2.3

TABLE 2.31 : ESTIMATED TOTAL ANNUAL FISH CATCH BY RECREATIONAL FISHERMEN IN THE MACKAY REGION

Based on:	Pop'n	Average number of trips	Average number of fish caught/ boat/ trip	Average weight of whole fish caught/ boat/ trip	Pop'n fish catch	Weight of pop'n fish catch (kg)	Weight of average fish (kg)
Usual trip data	2,597	17.71	18.80	40.55	864,861	1,865,570	2.16
Last trip data	2,597	17.71	18.73	36.40	861,595	1,674,519	1.94
Last trip to sea data	2,597	10.55	18.17	40.30	497,793	1,103,655	2.22

2.2.4. Rockhampton Economic Region : Fishing Activity Data

Area Fished

The area of the Great Barrier Reef region fished by private motor boat owners with an address within the Rockhampton economic region are shown on Map 2.8, Appendix I. This map was compiled from mail survey maps where fishermen had marked the destination of their "usual" fishing trip.

The map shows three fishing zones based on the towns where boats were launched. No boats surveyed went to the outer reef (i.e., Swain Reefs) from Rockhampton, Gladstone or Bundaberg. The northern extent of fishing was Middle Island and the southern extent of fishing was Fraser Island (out of the GBR region).

Intensity of use within zones decreased with increasing distance from the coast with 38% of those surveyed travelling no more than 5km from the coast on any fishing trip. For 27% of boats, all trips to the GBR region were made to a destination greater than 5km from the coast. The mean return trip distance travelled by boats on the last trip was 27km (range 0km to 300km).

Number of Trips

The mean number of fishing trips made by respondents over the last 12 months was 24 trips [7] (median 15, mode 20, range 2 to 272). Fishing trips accounted for 100% of all private motor boat trips for the majority of respondents. As fishermen who fish exclusively in inland waters have been excluded from this analysis, only fishermen who do some fishing in the sea are considered here. Nevertheless, the "average fisherman" made an average (mean) 11 trips (median 4, mode 0, range 0 to 210) to inland waters and estuaries. The remaining 13 trips made to sea represent 54% of all fishing trips by the "average fisherman".

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7. The total mean annual number of trips made was 24.4, indicating that a small number of trips made by respondents were not fishing trips. See Table 2.2.

Of the 13 trips to sea the mean number of trips to within 5km of the shore was 7.4 trips (median 2.4, mode 0, range 0 to 62) and the mean number of trips made to reefs and islands further than 5km from the shore was 5.6 trips (median 2.3, mode 0, range 0 to 48).

Length of Boat

The boats owned by respondents ranged in length from 2.8 metres to 9.4 metres. The mean length reported was 4.6 metres while the median was 4.5 metres and the mode was 4 metres.

Horsepower of Motors

The reported range of horsepower of outboard motors was 5 to 230 Hp. The mean was 65.9 Hp, median was 54.7 Hp and the mode was 50.0 Hp.

"USUAL" FISHING TRIP DATA

The following information relates to the "usual" fishing trip by private motor boat owners from the Rockhampton economic region. On average, 46% of these trips were to inland waters and 54% of trips were to sea (i.e., the GBR region).

Duration of the Usual Trip

It is estimated that the average "usual" fishing trip in the Rockhampton region lasts 8 hours (mean 8.4 $\pm$ 1.9, median 6.2, mode 4.0). The distribution is positively skewed with a range from 2 hours (1.8% of boats) to 48 hours (1.8% of boats).

Usual Number of Fish Caught

The mean number of fish caught, per boat, on a "usual" fishing trip is 16.3 $\pm$ 4.4 fish (median 12.1, mode 12.0). The distribution is positively skewed with a range of catches from 3 fish (1.8% of boats) to 125 fish (1.8% of boats).

Usual Weight of Fish Caught

This information refers to the total weight of whole fish caught on the "usual" trip. The mean weight of total fish catch, per boat, on the "usual" fishing trip is 25.4 ± 6.9kg. The distribution is positively skewed with a median weight of 17.5kg (mode 10.0kg) and a range from 1kg (3.7% of boats) to 150kg (1.9% of boats).

Summary of catch data for the "usual" fishing trip

From the above it is estimated that the average "usual" fishing trip by fishermen from the Rockhampton region lasts for 8.4 ± 2.0 hours. The expected fish catch on such a trip is 16.3 fish per boat.

TABLE 2.32 : ROCKHAMPTON REGION, "USUAL" TRIP DATA

	Mean	Median	Mode	Range	
				Min	Max
Fishing trips	± 24.41 9.79	15.33	20.00	2 (1.8%)	80 (3.6%)
Duration (hrs)	± 8.45 1.92	6.17	4.00	2 (1.8%)	48 (1.8%)
No. of fish caught/boat	± 16.29 4.41	12.1	12.00	3 (1.8%)	125 (1.8%)
Weight of catch/ boat (kgs. of whole fish)	± 25.39 6.86	17.50	10.00	1 (3.7%)	150 (1.9%)

Estimated total annual fish catch by recreational fishermen in the Rockhampton region (based on usual trip data for resident motor boat owners).

Estimated population of motor boat owners who use their boats for fishing and fish at sea - 4,440 owners.

Estimated total annual fish catch for Townsville region.

Number of fish	=	population of boat owners	x	average number of trips	x average number of fish caught/ boat/trip
	=	4,440		24.11	16.286
	=	1,743,390 fish			
Weight of whole fish	=	population of boat owners	x	average number of trips	x average weight of whole fish/ boat/trip.
	=	4,440		24.11	25.389
	=	2,717,851 kg.			
Weight of the average fish	=	1.56 kg.			

LAST FISHING TRIP DATA

The following information relates to fish catch on the last fishing trip by private motor boat owners from the Rockhampton economic region. 21.4% of these trips were made to inland waters and 78.6% of trips were made to the sea (i.e., the GBR region).

Month of last fishing trip

Of the respondents who had been fishing during the previous twelve months, 31.1% had been fishing during May 1981, the month of the survey and 42.9% had been fishing during the previous two months. Because such a large proportion of fishing trips occurred during the

three months prior to the survey it can be assumed that the data for the last fishing trip is reasonably accurate (i.e., assuming that accuracy diminishes with the length of time over which respondents must recall information).

Number of fish caught on the last trip

The mean number of fish caught, per boat, on the last fishing trip was 16.2 ± 6.4 (median 7.7, mode 3.0). However, the distribution was positively skewed and the range of catches was from 0 fish (7.3% of boats) to 150 fish (1.8% of boats). 75% of boats caught 16 fish or less and 50% caught less than 7 fish.

Weight of fish caught on the last trip

The mean total weight of whole fish caught, per boat, on the last outing was 19.4 ± 5.3kg (median 13.5, mode 3). However, the weight of the total fish catch ranged from 0kg (7.4% of boats) to 183kg (1.9% of boats) and the distribution was positively skewed.

Weight of biggest fish caught on the last trip

The mean weight of the biggest fish caught on the last fishing trip (based on the biggest fish per boat) was 6.1 ± 1.8kg. The distribution was positively skewed with a median of 2.8kg (mode 1.0kg) and a range from 0kg (1.9% of boats) to 29kg (1.9% of boats).

Species of biggest fish caught on the last trip

From Table 2.33 it can be seen that cod was most frequently the biggest fish caught on the last trip. The biggest fish overall was a 26kg mackerel.

Number of fishermen per boat on the last trip to the Rockhampton region

The distribution of the number of people fishing per boat (including the owner) approaches the normal distribution with a mean of 2.5 ± 0.2 (median 2.5, mode 2.0). The number of people fishing, per boat, ranged from 1 (7.1% of boats) to 4 (14.3% of boats).

Time spent with lines in the water on the last trip to the Rockhampton region

The mean length of time spent with lines in the water on the last fishing trip was 5.2 ± 2.2 hours (median 4.3, mode 2.0). However, the distribution was positively skewed with times ranging from 2 hours (19.6% of boats) to 24 hours (3.6% of boats).

	Frequency		Mean (kg)	Median (kg)	Mode (kg)	Range	
	Absolute	%				Min	Max
Red Emperor	5	9.8	6.00	3	2	2	12
Trevally	3	5.9	9.67	10	5,10,14	5	14
Cod	11	21.6	4.09	3	1	1	13
Queenfish	1	2.0	10.00	10	10	10	10
Mackerel	7	13.7	7.71	2.5	2	1	26
Catfish	1	2.0	3.00	3	3	3	3
Salmon	4	7.8	2.00	2	2	1	3
Grunter	2	3.9	1.50	1.5	1,2	1	2
Jewfish	3	5.9	21.33	20	15,20,29	15	29
Sweetlip	1	2.0	2.00	2	2	2	2
Tuna	2	3.9	15.00	15.00	12,18	12	18
Whiting	3	5.9	1.00	1	1	1	1
Flathead	4	7.8	3.50	3.5	2,3,4,5	2	5
Cobia	1	2.0	17.00	17	17	17	17
Moko	1	2.0	14.00	14	14	14	14
Parrot	2	3.9	1	1	1	1	1

TABLE 2.33 : Average weight by species for the "biggest" fish caught by fishermen from the Rockhampton region during their last fishing trip.

NOTE : Table 2.33 refers to the biggest fish for each boat; therefore, it only indicates the number of occasions a particular species was the biggest fish and the average weight for that species when it was the biggest fish.

Summary of catch data for the last trip

From the catch data for the last fishing trip, it is estimated that the "average fisherman" in the Rockhampton region fishes for 5.2 ± 2.2 hours and (based on 2.5 people per boat) can expect to catch 6.4 fish with a total weight of 7.6kg. The biggest fish, on the average weighs 6.1 ± 1.8kg. That is, the average fisherman in the Rockhampton region can expect to catch 1.2 fish for every hour spent fishing and this is equivalent to 1.5kg of fish per hour. (The above information is based on the mean figures for the last trip by respondents from the Rockhampton region.)

Ranking of fishermen in the Rockhampton region

Table 2.34 indicates the catch data for the individual fishermen in the Rockhampton region.

$$\text{based on: } \frac{\text{number of fish/boat on the last trip}}{\text{number of fishermen/boat on the last trip.}}$$

From Table 2.34 it can be seen that the top 10% of fishermen caught 50.4% of the fish and that 30% of fishermen caught approximately 78% of the fish. This means that on an average trip (assuming the last trip to be an average trip) 30% of fishermen catch an average of 18.6 fish each.

	Percent of total catch (%)	A B S O L U T E *					Percent of total catch (%)	C U M U L A T I V E **				
		Percent of fish caught						Number of fish caught				
		Mean	Median	Mode	Range Min	Range Max		Mean	Median	Mode	Range Min	Range Max
10	50.37	36.99	26.70	75.0 48.0 18.0 26.7 23.0	16.70	75.00	50.37	36.99	26.70	X	16.70	75.00
20	17.30	12.43	11.00	X	10.00	16.70	67.67	24.31	16.7	X	10.00	"
30	10.00	7.18	7.00	7.00	6.00	9.00	77.66	18.60	11.00	7.00	6.00	"
40	7.36	5.29	5.00	5.00	5.00	6.00	85.03	15.27	9.5	5.00	5.00	"
50	5.57	4.00	4.00	4.00	3.00	4.50	90.59	13.02	7.00	4.00	3.00	"
60	3.24	2.33	2.00	2.00	2.00	3.00	93.83	11.24	4.75	2.00	2.00	"
70	2.76	1.98	2.00	2.00	1.80	2.00	96.59	9.91	4.00	2.00	1.80	"
80	2.18	1.56	1.50	1.50	1.50	1.80	98.77	8.87	3.00	2.00	1.50	"
90	1.15	0.82	1.00	1.00	0.30	1.30	99.91	7.98	2.00	2.00	0.30	"
100	0.10	0.07	0	0	0	0.30	100	7.19	2.00	2.00	0	"

TABLE 2.34 : Ranking of fishermen by the number of fish caught on the last trip to the Rockhampton region.

* ABSOLUTE - shows breakdown of each 10% group, i.e., top 10%, 2nd 10%... bottom 10%.

** CUMULATIVE - shows top 10, 20, 30... 100 percent.

TABLE 2.35 : ROCKHAMPTON REGION, LAST TRIP DATA

	Mean	Median	Mode	Range	
				Min	Max
No. of fish caught/boat	16.22 ± 6.44	7.65	3.00	0 (7.3%)	150 (1.8%)
Weight of catch/ boat (kgs of whole fish)	19.44 ± 5.29	13.50	3.00	0 (7.4%)	83 (1.9%)
Weight of biggest fish/boat	6.08 ± 1.85	2.75	1.00	0 (1.9%)	29 (1.9%)
No. of fishermen /boat	2.55 ± 0.22	2.46	2.00	1 (7.1%)	4 (14.3%)
No. of hrs lines were in water/ boat	5.23 ± 2.24	4.28	2.00	2 (19.6%)	24 (3.6%)

Estimated total annual fish catch by recreational fishermen in the Rockhampton region (based on last trip data for resident motor boat owners).

Estimated population of motor boat owners who use their boats for fishing and fish at sea - 4,440

Estimated total annual fish catch for Rockhampton region.

Number of fish = population of boat owners x average number of trips x average number of fish caught/ boat/trip

= 4,440 24.41 16.218

= 1,736,111 fish

Weight of whole fish = population of boat owners x average number of trips x average weight of whole fish/ boat/trip

= 4,440 24.11 19.444

= 2,081,449 kg.

Weight of the average fish = 1.20 kg.

LAST FISHING TRIP TO THE SEA DATA

Last trip data for trips to the sea

Seventy-nine percent of fishermen from the Rockhampton region identified the sea (i.e., the GBR region) as the place where they conducted their last fishing trip. The following provides some information on the fish catch for those fishermen on that trip.

Number of fish caught on the last trip to the sea

The mean number of fish caught, per boat, on the last outing to the GBR region was 16.2 $\pm$ 6.9 (median 78, mode 6.0). However, the distribution was positively skewed with a range from a minimum of 0 fish per boat (2.1% of boats) to a maximum of 150 fish per boat (2.1% of boats). Approximately 90% of boats caught 36 fish or less and approximately 50% caught 7 fish or less.

Weight of fish caught on the last trip to the sea

The mean total weight of whole fish caught, per boat, on the last outing to the GBR region was 21.8 $\pm$ 6.1 kg (median 15.8kg, mode 3.0kg). However, the weight of fish caught ranged from 0kg (2.2% of boats) to 83kg (2.2% of boats) and the distribution was positively skewed.

Weight of the biggest fish caught on the last trip to the sea

The mean weight of the biggest fish caught, per boat, on the last fishing trip to the GBR region was 6.7 $\pm$ 2.0kg. The distribution was positively skewed with a median of 3.0kg (mode 2.0kg) and a range from 1kg (19.6% of boats) to 29kg (2.2% of boats).

Number of fishermen per boat on the last trip to the sea

The mean number of fishermen per boat on the last trip to the GBR region was 2.6 $\pm$ 0.2 (median 2.6, mode 2.0). The range of people fishing per boat was from 1 (8.3% of boats) to 4 (16.7% of boats).

Ranking of fishermen with last trip to the sea

Table 2.36 indicates the catch data for the individual fishermen in the Rockhampton region whose last fishing trip was to the sea,

$$\text{based on: } \frac{\text{number of fish/boat on last trip to the sea}}{\text{number of fishermen/boat on last trip to the sea}}$$

From Table 2.36 it can be seen that the top 10% of fishermen in the Rockhampton region catch 51.1% of the fish and that 30% of fishermen catch more than 76% of the fish. This means that on an average trip to the sea (assuming the last trip to be an average trip) 30% of fishermen catch 18.6 fish each.

	Percent of total catch (%)	A B S O L U T E *					Percent of total catch (%)	C U M U L A T I V E **				
		Number of fish caught						Number of fish caught				
		Mean	Median	Mode	Range Min	Range Max		Mean	Median	Mode	Range Min	Range Max
10	51.07	37.38	23.00	X	16.70	75.00	51.07	37.38	23.00	X	16.70	75.00
20	15.58	11.41	11.0	X	9.00	16.70	66.66	24.39	16.70	X	9.00	75.00
30	9.74	7.13	7.00	7.00	6.00	9.00	76.40	18.64	11.00	7.00	6.00	75.00
40	7.41	5.43	5.30	5.00	5.00	6.00	83.81	15.34	9.00	7.00 6.00	5.00	75.00
50	5.81	4.26	4.00	4.00	3.00	5.00	89.62	13.12	7.00	5.00	3.00	75.00
60	3.26	2.38	2.30	2.00	2.00	3.00	92.88	11.33	6.00	5.00	2.00	75.00
70	2.73	2.00	2.00	2.00	2.00	2.00	95.61	10.00	5.30	8.00	2.00	75.00
80	2.35	1.72	1.70	1.50	1.50	1.80	97.98	8.96	5.00	8.00	1.50	75.00
90	1.64	1.20	1.30	1.00	0.80	1.50	99.61	8.10	4.00	8.00	0.80	75.00
100	0.42	0.31	0.30	0.30	0	0.80	100	7.32	3.00	8.00	0	75.00

TABLE 2.36 : Ranking of Fishermen by the number of fish caught on the last trip to the Rockhampton region.

* ABSOLUTE - shows breakdown of each 10% group, i.e., top 10%, 2nd 10%... bottom 10%.

** CUMULATIVE - shows top 10,20,30.... 100 percent.

TABLE 2.37 : ROCKHAMPTON REGION, LAST TRIP TO THE SEA DATA

	Mean	Median	Mode	Range	
				Min	Max
No. of fish caught/boat	16.23 ± 6.89	7.75	6.00	0 (2.1%)	150 (2.1%)
Weight of catch/ boat (kg of whole fish)	21.80 ± 6.08	15.83	3.00	0 (2.2%)	83 (2.2%)
Weight of biggest fish caught/boat (kg)	6.67 ± 2.03	3.00	2.00	1 (19.6%)	29 (2.2%)
No. of fish-ermen/boat	2.63 ± 0.25	2.61	2.00	1 (8.3%)	4 (16.7%)
No. of hours lines in water/ boat	5.52 ± 1.31	4.50	3.00	2 (16.7%)	24 (4.2%)

Time spent with lines in the water during the last trip to sea.
The mean number of hours spent fishing during the last trip to the GBR region was 5.5 ± 1.3 hours (median 4.5, mode 3.0). However, the distribution was positively skewed with times ranging from 2 hours (16.7% of boats) to 24 hours (4.2% of boats).

Summary of catch data for the last fishing trip to the sea.
Based on catch data for those boats whose last fishing trip was to the GBR region, it is estimated that the "average fisherman" in the Rockhampton region fished for 5.5 ± 1.3 hours and can expect to catch 6.2 fish per person (based on 2.6 fishermen per boat) with a total average weight of 8.3kg; the biggest fish on average weighed 6.1 ± 2.0kg. That is, the "average fisherman" in the Rockhampton region can expect to catch 1.1 fish for every hour spent fishing and this is equivalent to 1.5kg of fish per hour.

(These calculations are based on the mean values for the last trip to the GBR region and assumes that all fishermen in a boat fish for the same length of time and have equal ability to catch fish.)

Estimated total annual fish catch by recreational fishermen in the Rockhampton region (based on last catch data for resident motor boat owners whose last trip was to the sea).

Estimated population of motor boat owners who use their boats for fishing and fish at sea = 4,440 owners.

Estimated total annual fish catch for Rockhampton region.

Number of fish	=	population of boat fishermen	x	average number of trips	x average number of fish caught/ boat/trip
	=	4,440		13.2	16.234
	=	951,442 fish.			
Weight of whole fish	=	population of boat fishermen	x	average number of trips	x average weight of whole fish/ boat/trip
	=	4,440		13.2	21.804
	=	1,277,889 kg.			
Weight of average fish caught	=	1.34 kg.			

TABLE 2.38 : ROCKHAMPTON REGION, FISH CATCH PER FISHERMAN PER TRIP

Based on:	Fish catch/fisher-men/trip	Weight of fish catch/ fishermen/trip (kg)
Last trip data	6.35	7.61
Last trip to sea data	6.18	8.31

TABLE 2.39 : ROCKHAMPTON REGION, CATCH PER HOUR SPENT WITH LINES IN WATER

Based on:	Fish caught/hr spent with lines in water	Weight of fish caught/ hr spent with lines in water (kg).
Last trip data	1.21	1.46
Last trip to sea data	1.12	1.50

TABLE 2.40 : ESTIMATED TOTAL ANNUAL FISH CATCH BY RECREATIONAL FISHERMEN IN THE ROCKHAMPTON REGION

Based on:	Pop-ula tion	Av. no. of trips	Av. no. of fish caught/ boat/ trip	Av. weight of whole fish caught/ boat/ trip	Pop. fish catch	Weight of pop. fish catch (kg)	Weight of average fish
Usual trip data	4,440	24.11	16.29	25.39	1,765,156	2,751,783	1.56
Last trip data	4,440	24.11	16.22	19.44	1,757,785	2,107,435	1.20
Last trip to sea data	4,440	13.20	16.23	21.80	951,442	1,277,889	1.34

2.3 ECONOMIC ANALYSIS

As recreational fishing is in essence amateur fishing, the emphasis in collecting economic data was on expenditure incurred in relation to fishing from private motor boats. This expenditure is comprised of "capital" items such as boats and motors as well as variable items such as fuel and bait. The list of possible expenditure items developed for the mail survey questionnaire was based on field studies of recreational fishing activities.

In addition to questions on the amount of expenditure, questions were asked on the location of expenditure in order to determine the regional economic impact of such expenditure. This information on location may be used in input-output analysis of the impact of recreational fishing in the four economic regions.

The following is a description of the amount and location of expenditure on the list of expenditure items for each economic region. The data is presented in terms of the "average boat" (the mean of the sample) and in terms of total expenditure by the population of private motor boat owners in the region who fish at sea.

2.3.1 CAIRNS REGION

CAPITAL ITEMS

The "capital" items usually involved in recreational fishing from private motor boats are the boat itself along with motor(s) and trailer, fishing gear and in some cases, electrical equipment (radios, sounders). Fish storage equipment used ranges from inexpensive eskys to motor-driven refrigeration. The values reported are based on purchase price (price paid in the year of purchase).

Boat, Motor, Trailer

The reported purchase price of boat, motor(s) and trailer ranged from $500 to $41,000. The mean purchase price was $5,279 (median $2,700, mode $2,500). Based on the mean purchase price, the total

value of boats owned by the population of fishermen who fish at sea can be put at $18,634,870. Fifty percent of boats have been bought since 1976-77. The total amount spent on boats in 1979 was approximately $4,917,290 (in 1980 dollars). 1979 data were used because the 1980 data collected only included replacement boats - not boats new to the fishery. Of the expenditure on boats, 81% was made within the Cairns region.

Electrical equipment

The reported purchase price of electrical equipment including radios and sounders ranged from $0 to $1,800. Only 49% of respondents had any such equipment so the overall modal expenditure was $0. The mean expenditure by all boat owners was $363, making a total expenditure by the population of $1,281,390 (based on purchase price). The majority (51%) of this equipment has been bought since 1977. The expenditure by the population on electrical equipment in 1980 was around $64,500. Ninety-eight percent of the equipment was purchased in the Cairns region.

Fish storage equipment

The reported purchase price of fish storage equipment (refrigeration, eskys) ranged from $0 to $800. Seventy percent of respondents had purchased some such equipment. The modal expenditure was $0. The mean expenditure for the "average boat" was $227. The total expenditure by the population was $801,310. Over fifty percent of storage equipment was bought since 1975. In 1980, $89,600 was spent by the population on fish storage equipment. All expenditure was made within the Cairns region.

Fishing gear

Fishing gear includes rods, nets, pots and smaller items including tackle, knives, etc. The value of gear owned by respondents ranged from $20 to $3,000. The mean value was $378 (median $250, mode $300). As fishing gear is generally added to or replaced annually, gear is treated also as an annual expenditure item (care has been taken not to double count).

"Capital" equipment

The value of "capital" equipment - boat, motor, trailer, electrical equipment and fish storage equipment - making up the "average boat" is $6,247 (based on purchase price). The total investment in "capital" equipment for motor boat fishing within the Cairns region is $22,051,910 (based on purchase price).

ANNUAL EXPENDITURE ITEMS

The items for which annual expenditure has been calculated are: repairs and maintenance to boats and equipment, fishing gear purchase, insurance, boat, trailer and radio fees, fishing club fees, fishing magazines, boat fuel, vehicle fuel, bait, ice and food. Information on expenditure, on boat fuel, vehicle fuel, bait, ice and food was gathered for the last trip made and converted to an annual figure. This method was used to minimise recall error. For all other variables, expenditure is recorded for the 12 months prior to the survey. This is closely equivalent to the year 1980.

Maintenance of capital equipment

This category covers repairs and maintenance to boats, motors, trailers, radios and sounders.

Ninety-two percent of respondents spent money on repairs and maintenance in the previous 12 months. The amount paid ranged from $0 to $9,900 with a mean of $414 (median $150, mode $200). The annual expenditure by the population was $1,461,420.

Replacement of Fishing Gear

Ninety percent of respondents bought some fishing gear in the previous 12 months. Expenditure ranged from $0 to $850, with a mean of $74 (median $40, mode $50). The annual expenditure by the population was $261,220.

Insurance

Only 41% of respondents' boats were insured. The annual insurance premiums paid by those respondents ranged from $20 to $600. For all respondents the mean insurance payment was $46 (median $0.35, mode $0). Annual insurance payments by the population amounted to $162,380.

Motor Boat Licence Fees

All respondents reported paying boat fees. The amount paid ranged from $14 to $54 with a mean of $22 (median $19.80, mode $18). The boat licence fees collected from the population amounted to $77,660 in 1980.

Trailer Licence Fees

Ninety percent of respondents paid trailer licence fees. For all respondents the reported trailer licence fees paid ranged from $0 to $31 with a mean of $17 (median $17, mode $17). The trailer licence fees collected from the population amounted to $60,010 in 1980.

Radio Licence Fees

Only 41% of respondents reported having paid radio licence fees. For all respondents, the reported radio licence fees ranged from $0 to $50, with a mean of $14 (median $0.68, mode $0). The radio licence fees collected from the population amounted to $49,420 in 1980.

Fishing Club Membership Fees

Nineteen percent of respondents, or 670 persons out of a population of 3,530 reported being members of fishing clubs. The mean fee paid by those who were members of fishing clubs was $28. The reported fees paid by all respondents ranged from $0 to $130, with a mean of $5.38 (median $0.12, mode $0). The population paid a total of $18,991 fishing club membership fees in 1980.

Fishing Magazines

Fishing magazines were purchased by 52% of the population. For all respondents, expenditure on fishing magazines ranged from $0 to $100, with a mean of $18 (median $4, mode $0). The annual expenditure by the population was $63,540.

LAST TRIP DATA

Motor Vehicle Fuel

The distance travelled by road on the last fishing trip ranged from 0km to 240km, with a mean of 28km (median 10km, mode 10km). Associated fuel costs ranged from $0 to $30, with a mean of $4.26 (median $1.94, mode $1.00). The annual vehicle fuel costs for the "average boat" owner was therefore approximately $80.94*. The annual payment in vehicle fuel costs by the population was $285,718.

Boat Fuel Costs

The distance travelled by sea on the last fishing trip ranged from 0km to 560km, with a mean of 51km (median 24.5km, mode 20km). Boat fuel costs associated with the last trip ranged from $0 to $150, with a mean of $18.51 (median $12.50, mode $2). The annual boat fuel costs for the "average boat" was therefore approximately $352*. The annual expenditure on boat fuel by the population was $1,242,560.

Bait

Sixty-four percent of all respondents reported purchasing bait for their last fishing trip. For all respondents, expenditure on bait ranged from $0 to $75, with a mean of $5.25 (median $2.06, mode $0). The annual expenditure on bait by the "average boat" was $100. The annual expenditure by the population was $353,000.

Ice

Ice was bought by only 39% of the respondents on the last fishing trip. For all respondents expenditure on ice ranged from $0 to $10, with a mean of $1.62, (median $0.33, mode $0). The annual expenditure on ice by the "average boat" was $31. The annual expenditure by the population was $109,430.

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* Based on 19 fishing trips per annum for the "average boat".

Food

Eighty-two percent of the respondents reported buying food for their last fishing trip. For all respondents expenditure on food ranged from $0 to $100, with a mean of $11 (median $7.75, mode $0). The annual expenditure on food by the "average boat" was $209. The expenditure on food for fishing trips by the population was $737,770.

Location of Expenditure

For each annual expenditure item, approximately 97% of expenditure was made within the Cairns region. It must be noted that payments for insurance and licence fees made within the region are usually transferred to capital city offices.

TABLE 2.41 : CAIRNS REGION, VALUE OF CAPITAL EQUIPMENT

Equipment Item	Value of Capital Equipment held by:	
	Average Boat ($)	Population ($)
Boat, motor(s), trailer	5,279	18,634,870
Electrical equipment	363	1,281,390
Fish storage equipment	227	801,310
Fishing gear	378	1,334,340
T O T A L	6,247	22,051,910

TABLE 2.42 : CAIRNS REGION, EXPENDITURE IN 1980 *

Expenditure Item	Expenditure in 1980 by : Average Boat ($)	Population ($)
Capital Equipment		
Boat, motor(s), trailer **	1,393.00	4,917,290
Electrical equipment	18.30	64,500
Fish storage equipment	25.40	89,600
TOTAL	1,436.70	5,071,390
Annual Expenditure Items		
Maintenance	414.00	1,461,420
Fishing gear	74.00	261,220
Insurance	46.00	162,380
Licence fees	53.00	187,090
Fishing club fees	5.38	18,991
Fishing magazines	18.00	63,540
Vehicle fuel	80.94	285,718
Boat fuel	352.00	1,242,560
Bait	100.00	353,000
Ice	31.00	109,430
Food	209.00	737,770
TOTAL	1,383.32	4,883,119
TOTAL EXPENDITURE IN 1980	$ 2,820.02	$ 9,954,509

* In comparison with the report entitled, Proposed Cairns Section of the Great Barrier Reef Marine Park: Some Economic Characteristics and Multipliers there are some differences in the data due to roundoff.

** 1979 data inflated to 1980 dollars used for this category.

2.3.2 TOWNSVILLE REGION

CAPITAL ITEMS

The "capital" items usually involved in recreational fishing from private motor boats are the boat itself along with motor(s) and trailer, fishing gear and in some cases, electrical equipment (radios, sounders). Fish storage equipment used ranges from inexpensive eskys to motor-driven refrigeration. The values reported are based on purchase price (price paid in the year of purchase).

Boat, Motor, Trailer

The reported purchase price of boat, motor(s) and trailer ranged from $400 to $28,000. The mean purchase price was $5,730 (median $3,800, mode $2,200). Based on the mean purchase price, the total value of boats owned by the population of fishermen who fish at sea can be put at $24,753,600. Fifty percent of boats have been bought since 1977. The total amount spent on boats in 1979 was approximately $7,136,640 (in 1980 dollars). 1979 data were used because the 1980 data collected included only replacement boats not boats new to the fishery. Of the expenditure on boats, 83% was made within the Townsville region.

Electrical Equipment

The reported purchase price of electrical equipment including radios and sounders ranged from $0 to $2,760. Only 49% of respondents had any such equipment so the overall modal expenditure was $0. The mean expenditure by all boat owners was $219, making a total expenditure by the population of $946,080 (based on purchase price). The majority (54%) of this equipment has been bought since 1978. The expenditure by the population on electrical equipment in 1980 was around $146,642. Virtually 100% of the equipment was purchased in the Townsville region.

Fish Storage Equipment

The reported purchase price of fish storage equipment (refrigeration, eskys) ranged from $0 to $990. 52% of respondents had purchased some such equipment. The modal expenditure was $0. The mean expenditure for the "average boat" was $173. The total expenditure

by the population was $747,360. Fifty-four percent of storage equipment was bought since 1977. In 1980, $150,966 was spent by the population on fish storage equipment. All expenditure was made within the Townsville region.

Fishing Gear

Fishing gear includes rods, nets, pots and smaller items including tackle, knives, etc. The value of gear owned by respondents ranged from $20 to $3,000. The mean value was $350 (median $201, mode $200). As fishing gear is generally added to or replaced annually, gear is treated also as an annual expenditure item (care has been taken not to double count).

"Capital" Equipment

The value of "capital" equipment - boat, motor(s), trailer, electrical equipment and fish storage equipment and fishing gear - making up the "average boat" is $6,472 (based on purchase price). The total investment in "capital" equipment for motor boat fishing within the Townsville region is $27,959,040 (based on purchase price).

ANNUAL EXPENDITURE ITEMS

The items for which annual expenditure has been calculated are: repairs and maintenance to boats and equipment, fishing gear purchase, insurance, boat, trailer and radio fees, fishing club fees, fishing magazines, boat fuel, vehicle fuel, bait, ice and food. Information on expenditure on boat fuel, vehicle fuel, bait, ice and food was gathered for the last trip made and converted to an annual figure. This method was used to minimize recall error. For all other variables, expenditure is recorded for the 12 months prior to the survey. This is closely equivalent to the year 1980.

Maintenance of Capital Equipment

This category covers repairs and maintenance to boats, motors, trailers, radios and sounders.

Eighty-six percent of respondents spent money on repairs and maintenance in the previous 12 months. The amount paid ranged from $0 to $1,500 with a mean of $244 (median $100, mode $0). The annual expenditure by the population was $1,054,080.

Replacement of Fishing Gear

Seventy-seven percent of respondents bought some fishing gear in the previous 12 months. Expenditure ranged from $0 to $500 with a mean of $53 (median $25, mode $0). The annual expenditure by the population was $228,960.

Insurance

Only 49% of respondents' boats were insured. The annual insurance premiums paid by those respondents ranged from $4 to $900. For all respondents the mean insurance payment was $85 (median 0.4, mode $0). Annual insurance payments by the population amounted to $367,200.

Motor Boat Licence Fees

All respondents reported paying boat fees. The amount paid ranged from $10 to $150 with a mean of $25 (median $22.80, mode $25). The boat licence fees collected from the population amounted to $108,000 in 1980.

Trailer Licence Fees

Eighty-nine percent of respondents paid trailer licence fees. For all respondents, the reported trailer licence fees paid ranged from $0 to $60 with a mean of $17 (median $17, mode $17). The trailer licence fees collected from the population amounted to $73,440 in 1980.

Radio Licence Fees

Only 20% of respondents reported having paid radio licence fees. For all respondents, the reported radio licence fees ranged from $0 to $70, with a mean of $7 (median $0.9, mode $0). The radio licence fees collected from the population amounted to $30,240 in 1980.

Fishing Club Membership Fees

Twenty percent of respondents, or 900 persons out of a population of 4,320 reported being members of fishing clubs. The mean was $17. The reported fees paid by all respondents ranged from $0 to $12, with a mean of $3.50 (median $0.13, mode $0). The population paid a total of $15,120 fishing club membership fees in 1980.

Fishing Magazines

Fishing magazines were purchased by 38% of the population. For all respondents, expenditure on fishing magazines ranged from $0 to $156, with a mean of $12 (median $0.3, mode $0). The annual expenditure by the population was $51,840.

LAST TRIP DATA

Motor Vehicle Fuel

The distance travelled by road on the last fishing trip ranged from 0km to 210km, with a mean of 35km (median 15km, mode 0km). Associated fuel costs ranged from $0 to $30, with a mean of $5.20 (median $2.70, mode $1.00). The annual vehicle fuel costs for the "average boat" was therefore approximately $104*. The annual payment in vehicle fuel costs by the population was $449,280.

Boat Fuel Costs

The distance travelled by sea on the last fishing trip ranged from 0km to 300km, with a mean of 37km (median 15, mode 10). Boat fuel costs associated with the last trip ranged from $0 to $128, with a mean of $15.50 (median $8.25, mode $5). The annual boat fuel costs for the "average boat" was therefore approximately $310*. The annual expenditure on boat fuel by the population was $1,339,200.

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* Based on 20 fishing trips per annum for the average boat.

Bait

Fifty-five percent of all respondents reported purchasing bait for their last fishing trip. For all respondents, expenditure on bait ranged from $0 to $32, with a mean of $2.80 (median $1.40, mode $0). The annual expenditure on bait by the "average boat" was $56. The annual expenditure by the population was $241,920.

Ice

Ice was bought by only 47% of the respondents on the last fishing trip. For all respondents expenditure on ice ranged from $0 to $18, with a mean of $1.55 (median $0.42, mode $0). The annual expenditure on ice by the "average boat" was $31. The annual expenditure by the population was $133,920.

Food

Eighty-two percent of the respondents reported buying food for their last fishing trip. For all respondents, expenditure on food ranged from $0 to $100, with a mean of $9.40 (median $6, mode $0). The annual expenditure on food by the "average boat" was $188. The expenditure on food for fishing trips by the population was $812,160.

Location of Expenditure: Annual Expenditure Items

Ninety-five percent of expenditure on maintenance of capital equipment, replacement of fishing gear, vehicle fuel, boat fuel and food was made within the Townsville region. For the remaining annual expenditure items, 100% of expenditure was made within the Townsville region. It must be noted that payments for insurance and licence fees made within the region are usually transferred to capital city offices.

TABLE 2.43 : TOWNSVILLE REGION, VALUE OF CAPITAL EQUIPMENT

Equipment Item	Value of Capital Equipment held by: Average Boat ($)	Population ($)
Boat, motor(s), trailer	5,730	24,753,600
Electrical equipment	219	946,080
Fish storage equipment	173	747,360
Fishing gear	350	1,512,000
T O T A L	6,472	27,959,040

TABLE 2.44 : TOWNSVILLE REGION, EXPENDITURE IN 1980

Expenditure Item	Expenditure in 1980 by: Average Boat ($)	Population ($)
Capital Equipment		
Boat, motor(s), trailer	1,652.00	7,136,640
Electrical equipment	33.90	146,642
Fish storage equipment	34.90	150,966
TOTAL	1,720.80	7,434,248
Annual Expenditure Items		
Maintenance	244.00	1,054,080
Fishing gear	53.00	228,960
Insurance	85.00	367,200
Licence fees	49.00	211,680
Fishing club fees	3.50	15,120
Fishing magazines	12.00	51,840
Vehicle fuel	104.00	449,280
Boat fuel	310.00	1,339,200
Bait	56.00	241,920
Ice	31.00	133,920
Food	188.00	812,160
TOTAL	1,135.50	4,905,360
TOTAL EXPENDITURE IN 1980	$ 2,856.30	$ 12,339,608

2.3.3 MACKAY REGION

CAPITAL ITEMS

The "capital" items usually involved in recreational fishing from private motor boats are the boat itself along with motor(s) and trailer, fishing gear and in some cases, electrical equipment (radios, sounders). Fish storage equipment used ranges from inexpensive eskys to motor-driven refrigeration. The values reported are based on purchase price (price paid in the year of purchase).

Boat, Motor, Trailer

The reported purchase price of boat motor(s) and trailer ranged from $500 to $44,000. The mean purchase price was $4,658 (median $2,196, mode $1,000). Based on the mean purchase price, the total value of boats owned by the population of fishermen who fish at sea can be put at $12,096,826 (based on purchase price). Sixty-two percent of boats have been bought since 1977. The total amount spent on boats in 1979 was approximately $2,023,063 (in 1980 dollars). 1979 data were used because the 1980 data collected only included replacement boats - not boats new to the fishery. Of the expenditure on boats, ninety-two percent was made within the Mackay region.

Electrical Equipment

The reported purchase price of electrical equipment including radios and sounders ranged from $0 to $970. Only 31% of respondents had any such equipment so the overall modal expenditure was $0. The mean expenditure by all boat owners was $141, making a total expenditure by the population of $366,177 (based on purchase price). The majority (51%) of this equipment has been bought since 1978. The expenditure by the population on electrical equipment in 1980 was around $97,255. Virtually 100% of the equipment was purchased in the Mackay region.

Fish Storage Equipment

The reported purchase price of fish storage equipment (refrigeration, eskys) ranged from $0 to $990. Fifty-six percent of respondents had purchased some such equipment. The modal expenditure was $0. The mean expenditure for the "average boat" was $128. The total

expenditure by the population was $332,416. Forty-five percent of storage equipment was bought since 1977. In 1980, $71,709 was spent by the population on fish storage equipment. Ninety-five percent of all expenditure was made within the Mackay region.

Fishing Gear

Fishing gear includes rods, nets, pots and smaller items including tackle and knives, etc. The value of gear owned by respondents ranged from $5 to $3,000. The mean value was $315 (median $150, mode $100). As fishing gear is added to or replaced annually, gear is treated also as an annual expenditure item (care has been taken not to double count).

"Capital" Equipment

The value of "capital" equipment - boat, motor, trailer, electrical equipment and fish storage equipment and fishing gear - making up the "average boat" is $5,242 (based on purchase price). The total investment in "capital" equipment for motor boat fishing within the Mackay region is $13,613,474 (based on purchase price).

ANNUAL EXPENDITURE ITEMS

The items for which annual expenditure has been calculated are: repairs and maintenance to boats and equipment, fishing gear purchase, insurance, boat, trailer and radio fees, fishing club fees, fishing magazines, boat fuel, vehicle fuel, bait, ice and food. Information on expenditure, on boat fuel, vehicle fuel, bait, ice and food was gathered for the last trip made and converted to an annual figure. This method was used to minimize recall error. For all other variables, expenditure is recorded for the 12 months prior to the survey. This is closely equivalent to the year 1980.

Maintenance of Capital Equipment

This category covers repairs and maintenance to boats, motors, trailers, radios and sounders.

Seventy-five percent of respondents spent money on repairs and maintenance in the previous 12 months. The amount paid ranged from $0 to $900 with a mean of $114 (median $56, mode $0). The annual expenditure by the population was $296,058.

Replacement of Fishing Gear

Eighty-five percent of respondents bought some fishing gear in the previous 12 months. Expenditure ranged from $0 to $600 with a mean of $61 (median $26, mode $20). The annual expenditure by the population was $158,417.

Insurance

Fifty-six percent of respondents' boats were insured. The annual insurance premiums paid by those respondents ranged from $0 to $300. For all respondents the mean insurance payment was $30 (median $0.33, mode $0). Annual insurance payments by the population amounted to $77,910.

Motor Boat Licence Fees

Ninety-six percent of respondents reported paying boat fees. The amount paid ranged from $0 to $122 with a mean of $24 (median $18, mode $18). The boat licence fees collected from the population amounted to $62,328 in 1980.

Trailer Licence Fees

Seventy-nine percent of respondents paid trailer licence fees. For all respondents the reported trailer licence fees paid ranged from $0 to $48 with a mean of $16 (median $17, mode $17). The trailer licence fees collected from the population amounted to $41,552 in 1980.

Radio Licence Fees

Only twenty-two percent of respondents reported having paid radio licence fees. For all respondents, the reported radio licence fees ranged from $0 to $50, with a mean of $6 (median $0.30, mode $0). The radio licence fees collected from the population amounted to $15,582 in 1980.

Fishing Club Membership Fees

Twenty percent of respondents, or 519 persons out of a population of 2,597, reported being members of fishing clubs. The mean fee paid by those who were members of fishing clubs was $12. The reported fees paid by all respondents ranged from $0 to $22, making the mean for the average fisherman $2 (median $0.13, mode $0). The population paid a total of $5,194 fishing club membership fees in 1980.

Fishing Magazines

Fishing magazines were purchased by twenty-four percent of the population. For all respondents, expenditure on fishing magazines ranged from $0 to $110, with a mean of $6 (median $0.16, mode $0). The annual expenditure by the population was $15,582.

LAST TRIP DATA

Motor Vehicle Fuel

The distance travelled by road on the last fishing trip ranged from 0km to 440km, with a mean of 72km (median 32km, mode 5km). Associated fuel costs ranged from $0 to $50, with a mean of $8 (median $5.00, mode $1,00). The annual vehicle fuel costs for the "average boat" was therefore approximately $142*. The annual payment in vehicle fuel costs by the population was $368,774.

Boat Fuel Costs

The distance travelled by sea on the last fishing trip ranged from 0km to 290km, with a mean of 31km (median 10km, mode 3km). Boat fuel costs associated with the last trip ranged from $1 to $100, with a mean of $16 (median $9.50, mode $2). The annual boat fuel costs for the "average boat" was therefore approximately $283. The annual expenditure on boat fuel by the population was $734,951.

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* Based on 17.7 fishing trips per annum for the "average boat".

Bait

Sixty-three percent of all respondents reported purchasing bait for their last fishing trip. For all respondents, expenditure on bait ranged from $0 to $30, with a mean of $3 (median $1.90, mode $0). The annual expenditure on bait by the "average boat" was $53. The annual expenditure by the population was $137,641.

Ice

Ice was bought by only thirty-one percent of the respondents on the last fishing trip. For all respondents expenditure on ice ranged from $0 to $20, with a mean of $1.18 (median $0.22, mode $0). The annual expenditure on ice by the "average boat" was $21. The annual expenditure by the population was $54,537.

Food

Seventy-one percent of the respondents reported buying food for their last fishing trip. For all respondents expenditure on food ranged from $0 to $70, with a mean of $8.13 (median $4.64, mode $0). The annual expenditure on food by the "average boat" was $144. The expenditure on food for fishing trips by the population was $373,968.

Location of Expenditure

Ninety-five percent of expenditure on maintenance of capital equipment, replacement of fishing gear, vehicle fuel, boat fuel and food was made within the Mackay region. For the remaining annual expenditure items, 100% of expenditure was made within the Mackay region. It must be noted that payments for insurance and licence fees made within the region are usually transferred to capital city offices.

TABLE 2.45 : MACKAY REGION, VALUE OF CAPITAL EQUIPMENT

Equipment Item	Value of Capital Equipment held by: Average boat ($)	Population (4)
Boat, motor(s), trailer	4,658	12,096,826
Electrical equipment	141	366,177
Fish storage equipment	128	332,416
Fishing gear	315	818,055
T O T A L	5,242	13,613,474

TABLE 2.46 : MACKAY REGION, EXPENDITURE IN 1980

Expenditure Item	Expenditure in 1980 by: Average boat ($)	Population ($)
Capital Equipment		
Boat, motor(s), trailer	779.00	2,023,063
Electrical equipment	37.44	97,255
Fish storage equipment	27.61	71,709
TOTAL	844.05	2,192,027
Annual Expenditure Items		
Maintenance	114.00	296,058
Fishing gear	61.00	158,417
Insurance	30.00	77,910
Licence fees	46.00	119,462
Fishing club fees	2.00	5,194
Fishing magazines	6.00	15,582
Vehicle fuel	142.00	368,774
Boat fuel	283.00	734,951
Bait	53.00	137,641
Ice	21.00	54,537
Food	144.00	373,968
TOTAL	902.00	2,342,494
TOTAL EXPENDITURE IN 1980	$1,746.05	$4,534,521

2.3.4 ROCKHAMPTON REGION

CAPITAL ITEMS

The "capital" items usually involved in recreational fishing from private motor boats are the boat itself along with motor(s) and trailer, fishing gear and in some cases, electrical equipment (radios, sounders). Fish storage equipment used ranges from inexpensive eskys to motor-driven refrigeration. The values reported are based on purchase price (price paid in the year of purchase).

Boat, Motor, Trailer

The reported purchase price of boat motor(s) and trailer ranged from $600 to $14,000. The mean purchase price was $4,147 (median $3,496, mode $4,000). Based on the mean purchase price, the total value of boats owned by the population of fishermen who fish at sea can be put at $18,412,680 (based on purchase price). Fifty-two percent of boats have been bought since 1977. The total amount spent on boats in 1979 was approximately $3,423,240 (in 1980 dollars). 1979 data were used because the 1980 data collected only included replacement boats - not boats new to the fishery. Of the expenditure on boats, ninety-two percent was made within the Rockhampton region.

Electrical Equipment

The reported purchase price of electrical equipment including radios and sounders ranged from $0 to $750. Only forty-one percent of respondents had any such equipment so the overall modal expenditure was $0. The mean expenditure by all boat owners was $160, making a total expenditure by the population of $710,400 (based on purchase price). The majority (87%) of this equipment has been bought since 1977. The expenditure by the population on electrical equipment in 1980 was around $87,200. Eighty-three percent of the equipment was purchased in the Rockhampton region.

Fish Storage Equipment

The reported purchase price of fish storage equipment (refrigeration, eskys) ranged from $0 to $998. Fifty-nine percent of respondents had purchased some such equipment. The modal expenditure was $0.

The mean expenditure for the "average boat" was $153. The total expenditure by the population was $679,320. Forty-eight percent of storage equipment was bought since 1977. In 1980, $40,990 was spent by the population on fish storage equipment. Ninety-eight percent of purchases were made within the Rockhampton region.

Fishing Gear

Fishing gear includes rods, nets, pots and smaller items including tackle, knives, etc. The value of gear owned by respondents ranged from $12 to $3,000. The mean value was $243 (median $275, mode $200). As fishing gear is added to or replaced annually, gear is treated also as an annual expenditure item (care has been taken not to double count).

"Capital" Equipment

The value of "capital" equipment - boat, motor, trailer, electrical equipment and fish storage equipment and fishing gear - making up the "average boat" is $4,703 (based on purchase price). The total investment in "capital" equipment for motor boat fishing within the Rockhampton region is $20,881,320 (based on purchase price).

ANNUAL EXPENDITURE ITEMS

The items for which annual expenditure has been calculated are: repairs and maintenance to boats and equipment, fishing gear purchase, insurance, boat, trailer and radio fees, fishing club fees, fishing magazines, boat fuel, vehicle fuel, bait, ice and food. Information on expenditure on boat fuel, vehicle fuel, bait, ice and food was gathered for the last trip made and converted to an annual figure. This method was used to minimize recall error. For all other variables, expenditure is recorded for the 12 months prior to the survey. This is closely equivalent to the year 1980.

Maintenance of Capital Equipment

This category covers repairs and maintenance to boats, motors, trailers, radios and sounders.

Eighty-four percent of respondents spent money on repairs and maintenance in the previous 12 months. The amount paid ranged from $0 to $5,800 with a mean of $269 (median $100, mode $109). The annual expenditure by the population was $1,194,360.

Replacement of Fishing Gear

Ninety-three percent of respondents bought some fishing gear in the previous 12 months. Expenditure ranged from $0 to $700 with a mean of $76 (median $50, mode $50). The annual expenditure by the population was $337,440.

Insurance

Only 52% of respondents were insured. The annual insurance premiums paid by those respondents ranged from $8 to $350. For all respondents the mean insurance payment was $68 (median $10 , mode $0). Annual insurance payments by the population amounted to $301,920.

Motor Boat Licence Fees

Ninety-eight percent of respondents reported paying boat fees. The amount paid by all respondents ranged from $0 to $50 with a mean of $23 (median $20 , mode $18). The boat licence fees collected from the population amounted to $102,120 in 1980.

Trailer Licence Fees

Ninety-three percent of respondents paid trailer licence fees. For all respondents the reported trailer licence fees paid ranged from $0 to $35, with a mean of $17.55 (median $17, mode $17). The trailer licence fees collected from the population amounted to $77,922 in 1980.

Radio Licence Fees

Only thirty-two percent of respondents reported having paid radio licence fees. For all respondents, the reported radio licence fees ranged from $0 to $43, with a mean of $10 (median $0.24, mode $0). The radio licence fees collected from the population amounted to $44,400 in 1980.

Fishing Club Membership Fees

Twenty-three percent of respondents, or 1,021 persons out of a population of 4,440 reported being members of fishing clubs. The mean was $15. The reported fees paid by all respondents ranged from $0 to $25, with a mean of $3.48 (median $0.15, mode $0). The population paid a total of $15,451 fishing club membership fees in 1980.

Fishing Magazines

Fishing magazines were purchased by forty-eight percent of the population. For all respondents, expenditure on fishing magazines ranged from $0 to $170, with a mean of $18 (median $0.93, mode $0). The annual expenditure by the population was $79,920.

LAST TRIP DATA

Motor Vehicle Fuel

The distance travelled by road on the last fishing trip ranged from 0km to 460km, with a mean of 80km (median 20.5km, mode 8km). Associated fuel costs ranged from $0 to $65, with a mean of $12 (median $6.83, mode $1). The annual vehicle fuel costs for the "average boat" was therefore approximately $288*. The annual payment in vehicle fuel costs by the population was $1,278,720.

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* Based on 24 fishing trips per annum for the "average boat".

Boat Fuel Costs

The distance travelled by sea on the last fishing trip ranged from 0km to 300km, with a mean of 27km (median 13.5, mode 40). Boat fuel costs associated with the last trip ranged from $1 to $165, with a mean of $17 (median $8.25, mode $1). The annual boat fuel costs for the "average boat" was therefore approximately $408. The annual expenditure on boat fuel by the population was $1,811,520.

Bait

Sixty-eight percent of all respondents reported purchasing bait for their last fishing trip. For all respondents, expenditure on bait ranged from $0 to $2, with a mean of $3.32 (median $2.28, mode $0). The annual expenditure on bait by the "average boat" was $80. The annual expenditure by the population was $355,200.

Ice

Ice was bought by only forty-three percent of the respondents on the last fishing trip. For all respondents expenditure on ice ranged from $0 to $15, with a mean of $1.52 (median $0.38, mode $0). The annual expenditure on ice by the "average boat" was $36.48. The annual expenditure by the population was $161,971.20.

Food

Sixty-four percent of the respondents reported buying food for their last fishing trip. For all respondents expenditure on food ranged from $0 to $60, with a mean of $9.00 (median $4, mode $0). The annual expenditure on food by the "average boat" was $216. The expenditure on food for fishing trips by the population was $959,040.

Location of Expenditure

One hundred percent of expenditure on all annual expenditure items was made within the Rockhampton region. It must be noted that payments for insurance and licence fees made within the region are usually transferred to capital city offices.

TABLE 2.47 : ROCKHAMPTON REGION, VALUE OF CAPITAL EQUIPMENT

Equipment Item	Value of Capital Equipment held by: Average Boat ($)	Population ($)
Boat, motor(s), trailer	4,147	18,412,680
Electrical equipment	160	710,400
Fish storage equipment	153	679,320
Fishing gear	243	1,078,920
T O T A L	4,703	20,881,320

TABLE 2.48 : ROCKHAMPTON REGION, EXPENDITURE IN 1980

Expenditure Item	Expenditure in 1980 by: Average Boat ($)	Population ($)
Capital Equipment		
Boat, motor(s), trailer	771.00	3,423,240
Electrical equipment	19.64	87,200
Fish storage equipment	9.24	40,990
TOTAL	799.88	3,551,430
Annual Expenditure Items		
Maintenance	269.00	1,194,360
Fishing gear	76.00	337,440
Insurance	68.00	301,920
Licence fees	50.55	224,442
Fishing club fees	3.48	15,451
Fishing magazines	18.00	79,920
Vehicle fuel	288.00	1,278,720
Boat fuel	408.00	1,811,520
Bait	80.00	355,200
Ice	36.48	161,971
Food	216.00	959,040
TOTAL	1,513.51	6,719,984
TOTAL EXPENDITURE IN 1980	$ 2,313.39	$10,271,414

2.4 SUMMARY

This section contains a summary of the data presented in Chapter 2. Also this section contains a brief comparison of important results from this study. The comparison is made between results for the four regions on which this present study is based and results of previous studies of relevance.

2.4.1 SUMMARY OF DATA

By use of mail surveys, it has been possible to determine the extent of private motor boat recreational fishing within the Great Barrier Reef region. The following findings were made.

- The total number of private motor boats registered in the towns and cities adjacent to the GBR region is approximately 25,300. Fifty-nine percent of these private motor boats are used for recreational fishing in the GBR region - approximately 14,900 boats.

- In total, approximately 197,000 recreational fishing trips are made per annum by private motor boat in the GBR region.

- The total fish catch per annum from the 14,900 boats is approximately 6.6 million kilograms.

- The total value of motor boats and "capital" equipment is approximately $84.5 million (based on purchase price).

- The expenditure in 1980 on boats, capital equipment and other items associated with fishing was approximately $37 million.

- Ninety-five percent of this money is spent in local regions and virtually all money is spent within Queensland.

A breakdown of the data by the four regions adjacent to the GBR region gives the following results.

Cairns Region

- 3,530 private motor boats make an average of 14 fishing trips per annum to the GBR region - a total of 49,400 trips per annum.

- 2,308,830 kg of fish are caught per annum from within the GBR region; average weight of fish 2.7kg.

- Average boat length, 5.1 metres.

- The value of boats and "capital" equipment is $22,051,910 (based on purchase price).

- The expenditure in 1980 on boats, "capital" equipment and other items associated with fishing was $9,954,509.

- Eighty-three percent of expenditure on boats and "capital" equipment and ninety-seven percent of expenditure on annual items was made in the Cairns region.

Townsville Region

- 4,320 private motor boats make an average of 14.4 fishing trips per annum to the GBR region - a total of 62,208 trips per annum.

- 1,881,383kg of fish are caught per annum from within the GBR region; average weight of fish 2.3kg.

- Average boat length, 5.2 metres.

- The total value of boats and "capital" equipment is $27,959,040 (based on purchase price).

- The expenditure in 1980 on boats, "capital" equipment and other items associated with fishing was $12,339,608.

- Eighty-four percent of expenditure on boats and "capital" equipment and ninety-six percent of expenditure on annual items was made in the Townsville region.

Mackay Region

- 2,597 private motor boats make an average of 10.5 fishing trips per annum to the GBR region - a total of 27,269 trips per annum.

- 1,103,655kg of fish are caught per annum from within the GBR region; average weight of fish, 2.2kg.

- Average boat length, 4.8 metres.

- The total value of boats and "capital" equipment is $13,613,474 (based on purchase price).

- The expenditure in 1980 on boats, "capital" equipment and other items associated with fishing was $4,534,521.

- Ninety-two percent of expenditure on boats and "capital" equipment and ninety-six percent of expenditure on annual items was made in the Mackay region.

Rockhampton Region

- 4,440 private motor boats make an average of 13 fishing trips per annum to the GBR region - a total of 57,720 trips per annum.

- 1,277,889kg of fish are caught per annum from within the GBR region; average weight of fish, 1.3kg.

- Average boat length, 4.5 metres.

- The total value of boats and "capital" equipment is $20,881,320 (based on purchase price).

- The expenditure in 1980 on boats, "capital" equipment and other items associated with fishing was $10,271,414.

- Ninety-two percent of expenditure on boats and "capital" equipment and one-hundred percent of expenditure on annual items was made in the Rockhampton region.

2.4.2 COMPARISON OF DATA

COMPARISON OF DATA : FISHING ACTIVITY

Table 2.49 shows a comparison of last trip to the sea data for the four regions. The mean number of fish caught per fishing trip to the GBR region is similar for the four regions, with a range from 13.1 to 18.2 fish per trip. Differences in the calculated weight of average fish exist with the average weight for the Rockhampton region being low in comparison to the other three regions. Variation in mean total catch weights and mean weight of catch per fisherman can be attributed in part to the variation in weight of average fish.

In all four regions, over 35% of fish catch is taken by only 10% of fishermen.

In total, it has been calculated that over 6.6 million kilograms of fish are taken from the GBR region per annum (based on last trip to the sea data). The fish catch found for the Rockhampton region may be compared with the fish catch found for the Capricornia Section of the Great Barrier Reef Marine Park in a previous study[8]. In that study, it was found that the approximately 830 private motor boats which visited the Capricornia Section per annum took 250,000 fish, with a weight of 250,000 to 375,000kg (1 to 1.5 kg per fish), or 300 to 450 kg fish per boat per annum. Within the Rockhampton region, 4,440 boats took 1,277,900kg or 290kg fish per boat per annum. The location of fishing differed between the two populations as those fishing in the Capricornia Section fished exclusively on reef. The "effort" involved also differed somewhat between the two populations. The fishermen from the Rockhampton region surveyed for this present study made an average of 13 trips to sea per annum; boats averaged 4.5 metres in length. Length of fishing trip ranged from 2 hours to 2 days. The fishermen surveyed in the Capricornia Section study made only 7.5 trips to sea per annum but boats averaged 6.4 metres in length; length of trip ranged from 1 day to 3 days. The number of fishermen per trip was about the same for both populations (2.3 to 2.6 people).

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8. Hundloe, T.J., Driml, S.M., Lack, S.W., McDonald, G.T., Op.Cit., 1980

TABLE 2.49 : SUMMARY TABLE: FISHING ACTIVITY DATA

	Region			
	Cairns	Townsville	Mackay	Rockhampton
Number of boats which fish at sea from region	3,530	4,320	2,597	4,440
Mean number fishing trips/annum/boat	19	20	18.8	24
Mean number fishing trips/annum to sea/boat	14	14.4	10.5	13
Total number fishing trips/annum to sea for region	49,400	62,208	27,269	57,720
Mean boat length (m)	5.1	5.2	4.8	4.5
LAST TRIP TO THE SEA				
Total catch for region (kg)	2,308,830	1,881,383	1,103,655	1,277,889
Mean number fish caught/boat/trip	16.8	13.1	18.2	16.2
Mean weight catch/boat/trip (kg)	44.9	30.1	40.3	21.8
Weight of average fish (kg)	2.7	2.3	2.2	1.3
Mean number people fishing/boat	2.6	2.6	2.6	2.6
Mean number fish caught/fisherman/trip	6.6	5.1	7.07	6.2
Mean weight catch/fisherman/trip (kg)	17.5	12.1	15.5	8.3
Percent of catch taken by top 10 percent of fishermen	39.6%	35.1%	40.3%	51.1%

The reported number of fishing trips per annum for the four regions ranged from 19 to 24 trips.

The mean number of fishing trips per annum taken by boats surveyed at Cairns Region and Townsville boat ramps[9] - 20 trips per annum for both surveys - agrees with the mail survey findings. Unfortunately, no further breakdown is available from boat ramp surveys on trip destination.

COMPARISON OF DATA : EXPENDITURE

Tables 2.50 and 2.51 summarize the expenditure data for the four regions covered in the mail surveys conducted for this present study.

Some comparison of values for the "average" boat in each region is warranted. Also included in this comparison is data from a mail survey of boat owners fishing in the Capricornia Section[10] and from boat ramp surveys conducted in the Cairns region and at Townsville[11].

Table 2.52 shows an expected trend of higher capital value with increasing boat length for all regions and surveys. Also included in Table 2.52 is the expenditure per trip for the average boat. The expenditure ranges from $48 to $73 per trip when the Townsville boat ramp data are excluded because of incomplete data. The Capricornia Section data are also not directly comparable in this instance as they are based on a selected population (boats over 4.5m) making a smaller number of trips per annum (7.5 trips). Expenditure categories are different, with expenditure on food not included in the data.

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9. See Appendix.

10. Hundloe, T.J., Driml, S.M., Lack, S.W., McDonald, G.T., Op.Cit., 1980

11. See Appendix.

TABLE 2.50 : SUMMARY TABLE: EXPENDITURE DATA CAPITAL EQUIPMENT

Expenditure Item	Regions				
	Cairns	Townsville	Mackay	Rockhampton	Total
Boat, motor(s), trailer	18,634, 870	24,753,600	12,096,826	18,412,680	73,897,976
Electrical equipment	1,281,390	946,080	366,177	710,400	3,304,047
Fish storage equipment	801,310	747,360	332,416	679,320	2,560,406
Fishing gear	1,334,340	1,512,000	818,055	1,078,920	4,743,315
TOTAL	22,051,910	27,959,040	13,613,474	20,881,320	84,505,744

TABLE 2.51 : SUMMARY TABLE: EXPENDITURE DATA ANNUAL EXPENDITURE ITEMS

	Cairns	Townsville	Mackay	Rockhampton	Total
Expenditure in Region:					
Expenditure on capital equipment in 1980	4,135,815	6,221,019	2,026,597	3,261,927	15,645,358
Maintenance	1,417,577	1,001,376	281,255	1,194,360	3,894,568
Fishing gear	253,383	217,512	150,496	337,440	958,831
Insurance	157,509	367,200	77,910	301,920	904,539
Licence fees	187,090	211,680	119,462	224,442	742,674
Fishing Club fees	18,991	15,120	5,194	15,451	54,756
Fishing magazines	61,634	51,840	15,582	79,920	208,976
Vehicle fuel	277,146	426,816	350,335	1,278,720	2,233,017
Boat fuel	1,205,283	1,272,240	698,203	1,811,520	4,987,246
Bait	342,410	241,920	137,641	355,200	1,077,171
Ice	106,147	133,920	54,537	161,971	456,575
Food	715,637	771,552	355,270	959,040	2,801,499
Imports					
Capital equipment	935,575	1,213,229	165,430	289,503	2,603,737
Annual expenditure items	140,312	194,184	96,608	-	431,104
TOTAL	9,954,509	12,339,608	4,534,521	10,271,414	37,100,052

TABLE 2.52 : COMPARISON OF EXPENDITURE DATA

	Cairns Region Mail Survey	Townsville Region Mail Survey	Mackay Region Mail Survey	Rockhampton Region Mail Survey	Cairns Region Boat Ramp Survey	Townsville Region Boat Ramp Survey	Capricornia Section Mail Survey
Capital items "av. boat"*	$5,869	$6,122	$4,927	$4,460	$6,855	$5,223	$7,500
Average boat length	5.1m	5.2m	4.8m	4.5m	5.4m	4.9m	5.9m
Annual items "av. boat"	$1,383	$1,136	$902	$1,514	$1,235	$730**	$761 ***
Expenditure on annual items/trip	$73	$57	$48	$63	$62	$37**	$101
Mean number trips/ annum	19	20	18.8	24	20	20	7.5

* Fishing gear has been excluded to avoid double counting.

** Does not contain all expenditure items.

*** See previous comments re incomparability (e.g., food not included).

CHAPTER 3

COMMERCIAL FISHING

COMMERCIAL FISHING

3.0 INTRODUCTION

This chapter presents the results of surveys of commercial fishing conducted within the Great Barrier Reef region. The information presented in this chapter is of a type never before gathered for fisheries within the Great Barrier Reef region. The emphasis is on economic data.

As noted in Chapter 1, information on fishing operations based in the home ports from Bundaberg to Yeppoon was reported in a previous report[1]. This present report covers commercial fishing from the remainder of the home ports adjacent to the Great Barrier Reef region - from Clairview (near St. Lawrence) in the south to Cooktown in the north. These home ports lie within three economic regions; Cairns, Townsville and Mackay. The report covers commercial fishing by vessels with east-coast licences only.

This chapter is comprised of four main sections. The first section concerns the survey method adopted for this study. The main means of gathering information was by personal interview. A description of the survey method and comments on the representativeness of the survey is presented in the first section. Section two of this chapter reports details of the sample of vessels surveyed. Information on variables including vessel length and fishing method is reported.

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1. Hundloe, T., Driml, D., Lack, S., McDonald, G. Economic Characteristics of Fishing in the Capricornia Section of the Great Barrier Reef Marine Park, Institute of Applied Social Research, 1980.

Data on expenditure and income relating to commercial fishing is presented in section three of this chapter. The data are in a form suitable for input-output analysis, that is, location of expenditure and income in relation to regional economies as well as volume of expenditure and income are recorded. Section four of this chapter gives a summary of data presented in the chapter.

3.1 SURVEY METHOD

Information on commercial fishing operations was collected during personal interviews with commercial fishing vessel owners or skippers, mostly at the vessel's home port. The sample of commercial fishing operations chosen for the survey represented all types of commercial fishing undertaken within the GBR region. A co-operative effort was mounted by the then Queensland Fisheries Service[2], Fisheries Division of the Commonwealth Department of Primary Industry and the Institute of Applied Social Research in order to collect data on commercial fishing operations. The participation of the three organizations provided sufficient resources to allow extensive field work to be undertaken. The data was collected by personal interview of a sample of commercial fishermen from Clairview in the south to Cooktown in the north. A total of 176 person-days were spent in the field. The amount of work involved in obtaining the required data is highlighted by the fact that interviews were conducted at a rate of only 0.85 interviews per person-day. Data were collected during two survey periods. In February 1981, field work was conducted from Townsville to Cooktown and in May 1981, field work was conducted from Clairview to Ayr.

The sample of commercial fishing vessel owners interviewed was drawn from Queensland Fisheries Service records of licenced commercial fishing vessels. The list of names and addresses of owners of selected vessels formed the list of target respondents. The sample was selected to be representative of the population with regard to home port, type of fishing undertaken and vessel length. Care was also taken to select target respondents who had been working in the fishery in the same vessel since at least mid-1979 and preferably since mid-1977.

There were two decisions made when selecting the sample which somewhat limit the information gathered on fishing in the GBR region. Firstly, only those fishing vessels with licences to fish the Queensland east coast, but without Gulf of Carpentaria endorsements were included. It is known that some vessels which

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2. Now named: Division of Dairying and Fisheries, Department of Primary Industries.

fish primarily in the limited entry northern prawn fishery also fish on the east coast.

Secondly, the survey covered only those vessels registered in home ports adjacent to the GBR region. Again, it is known that vessels from home ports south of the GBR region do some fishing within the GBR. The extent to which these exclusions might lead to underestimates of fishing within the GBR region is discussed below.

Difficulties were encountered in the field in contacting some of the target respondents. The main reason for non-contact was that target respondents were away fishing. Very few refusals were encountered. Where it was necessary, substitute respondents were drawn from a reserve list of vessel owners.

The questionnaire used for the interviews was a modified version of the standard schedule used by the Fisheries Division, Commonwealth Department of Primary Industry. The most significant amendment was the addition of questions on the location of expenditure.

In addition to answering questions on the survey schedule, respondents were asked to sign a form authorizing access to financial records held by their accountants. Accountants were subsequently approached for copies of respondents' profit and loss statements for the three financial years, 1977/78, 1978/79 and 1979/80. Accounts were not obtained for all respondents or for all years. Some small number of respondents did not wish to give access to accounts and some respondents had no accountant and no prepared accounts. Also, not all respondents were fishing for the three years in question. Of the fishing vessel owners interviewed, 72% were fishing in 1977/78, 87% were fishing in 1978/79 and 100% were fishing in 1979/80.

Analysis

In order to present economic information without considerable delay not all the information from the survey schedules has been analysed.[3]

The information that has been analysed is sufficient to provide a general description of fishing operations and information on income and expenditure associated with commercial fishing.

Information not analysed to date includes detailed fuel information, estimation of depreciation based on equipment life, socio-economic information on skipper and crew and further structural details of vessels.

For the purposes of analysis, commercial fishing vessels were categorized according to the type of fishing undertaken and economic region of home port (Cairns, Townsville and Mackay).

Two categories of primary fishing method were recognized: (1) otter trawling, and (2) all other fishing methods. The division was made to provide a more useful presentation of the information than would be given by simply reporting on all commercial fishing together.

The two categories of primary fishing method represent a logical division of the fleet. Otter trawlers make up 51% of the commercial fleet and are, on average, longer than vessels in the other fishing methods category. In addition, otter trawlers are classified distinctly from other vessels in the fleet. A specific otter trawler licence is required to work in the east coast prawn fishery.

Although there are differences between vessel size and mode of fishing amongst vessels in the other fishing methods category, these are not as distinct as the division between otter trawlers and all other vessels. Many vessels, (otter trawlers included) utilize a number of different fishing methods and it is not possible or meaningful to make a strict division of vessels according to fishing methods.

An alternative means of categorizing vessels would be by length thereby paying some attention to fishing capacity. The information provided here however, categorized on a regional basis, is most appropriate for input-output analysis. The sample collected was considered too small to divide up, according to region, fishing method and length class.

Definition of the Population

A total of 150 acceptable interviews of commercial fishing vessel owners resulted from the field work undertaken in the Cairns, Townsville and Mackay economic regions. In order to be able to convert information from the sample of 150 into information on the population, checks on representativeness have to be made.

Firstly, it is necessary to define the population to be considered. Of interest is the population of commercial fishing vessels which fish within the GBR region. This population includes (i) vessels which have home ports adjacent to the GBR region and fish exclusively within the waters of the GBR region, (ii) vessels which have home ports adjacent to the GBR region and which do all or part of their fishing outside the waters of the GBR region, i.e. vessels operating in the Gulf of Carpentaria and south of Sandy Cape on Fraser Island, (iii) vessels which do not come from home ports adjacent to the GBR region but which do some (or all) of their fishing within the waters of the GBR region. The number of vessels which are registered in the home ports adjacent to the GBR region and therefore which make up types (i) and (ii) are known, see Table 3.1.

Only vessels in category (i) are included in this analysis. These vessels are otter trawlers with licences to fish on the east coast only, and all local vessels engaging in other fishing methods. It is the number of vessels in category (i) which makes up the "population" figure used to convert average fishing vessel data to population data. Therefore this analysis represents commercial fishing which occurs primarily within the GBR region. Category (ii) vessels have been excluded from this analysis. These vessels

are mostly otter trawlers with the primary focus of their fishing being within the Gulf of Carpentaria. Exclusion of these vessels will lead to an underestimate of the economic impact of commercial fishing in the GBR region because some of these vessels also hold east coast otter trawling licences and can fish within the GBR region on the way to and from the Gulf and their east-coast home port. The extent to which these vessels fish within the GBR region is unknown, though some indicative data are available. Unpublished Department of Primary Industry records show that 97 otter trawlers, with Gulf licences landed some catch at Cairns in 1980. The total number of otter trawlers which landed some catch in Cairns in 1980 was 441. It is not known where the catch landed by the Gulf vessels originated. The Gulf fishing vessels have an economic impact on their east coast home ports as they can return each year for repairs and maintenance. It is considered however that the major part of expenditure by those vessels is for the purpose of fishing in the Gulf.

The vessels in category (iii) include otter trawlers and other vessels which move north from their home ports into the GBR region to fish.

It is considered that it is valid to exclude category (iii) vessels from this analysis. Surveys of location of income and expenditure by commercial fishing vessels have shown that the bulk of transactions are made at each vessel's home port.[4] Those vessels which fish within the GBR region but which have home ports outside the GBR region will therefore have major economic ties with their home ports and only a minor economic impact on economic regions adjacent to the GBR region. The economic impact which does occur will be through purchase of fuel and provisions, emergency repairs and landing of catch.

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4. See Section 3.3 : Economic Analysis.

TABLE 3.1 ; COMMERCIAL FISHING VESSEL NUMBERS - JANUARY 1981 [6]

Region	Otter trawlers east coast only *	Otter trawlers Gulf licences	Total otter trawlers	Other fishing methods *
Cairns	196	169	365	157
Townsville	129	19	148	149
Mackay	36	0	36	89
Total	361	188	549	395

* Populations used in Section 3.2 in this report.

6. Williams, M. Survey of fishing operations in Queensland 1981. Fisheries Research Branch, Department of Primary Industries. In press and unpublished records, Fisheries Research Branch, Department of Primary Industries.

3.2 FISHING ACTIVITY

This section presents various descriptive variables pertaining to the commercial fishing vessels included in the survey of vessels registered in home ports from Clairview to Cooktown. The information in this section is for commercial fishing vessels operating at the time of the survey, that is, in 1981. The size of the sample relative to the number of east coast fishing vessels registered in 1981 is shown in Table 3.2. The sample of 150 vessels is categorized according to economic region and fishing method.

TABLE 3.2 : COMMERCIAL FISHING, SAMPLE SIZE 1981

Region	Fishing method	No. vessels in pop'n 1981	Sample size	Sample percent of population
Cairns	Otter trawling	196	40	20.4%
	Other fishing methods	157	23	14.6%
Townsville	Otter trawling	129	34	26.4%
	Other fishing methods	149	25	16.8%
Mackay	Otter trawling	36	8	22.2%
	Other fishing methods	89	20	22.5%

3.2.1 CAIRNS REGION, COMMERCIAL FISHING DESCRIPTIVE VARIABLES

The Cairns economic region encompasses the east coast from Tully to Thursday Island. Sixty-three fishing vessel owners with their home port in the Cairns economic region were interviewed. Forty of these were otter trawler owners and the remaining twenty-three were vessel owners engaged in a range of fishing methods other than otter trawling. The vessels included in the survey were distributed between home ports as shown in Table 3.3.

TABLE 3.3 : PERCENTAGE OF INTERVIEWS: CAIRNS REGION PORTS

Home port	Percentage of interviews	
	Otter trawlers	Other fishing vessels
	(n = 40)	(n = 23)
Thursday Island	2.5%	0%
Cooktown	5%	8.5%
Port Douglas	15%	8.5%
Cairns	52.5%	52%
Innisfail	25%	21.5%
Tully	0%	8.5%

3.2.1.1 Otter trawlers

Fishing methods: Of the vessels included as otter trawlers, some vessels also engaged in other fishing methods. Other methods nominated were: mackerel trolling, gill netting, hand lining, beam trawling, crabbing and oyster gathering.

The following table shows the breakdown of the number of other fishing methods in which the trawlers were engaged.

TABLE 3.4 : OTHER FISHING BY TRAWLERS: CAIRNS REGION SAMPLE

Number of fishing methods	Number of vessels	Percentage of total
Otter trawling only	30	75%
Otter trawling and 1 other method	5	12.5%
Otter trawling and 2 other methods	2	5%
Otter trawling and 3 other methods	2	5%
Otter trawling and 4 other methods	1	2.5%
	40	100

The number of nets towed whilst otter trawling ranged from 1 to 4, with the most common number of nets towed being 2.

TABLE 3.5 : NETS TOWED: CAIRNS REGION SAMPLE

Number of nets	Number of vessels	Percent of trawlers
1	2	5%
2	26	65%
3	10	25%
4	2	5%
	40	100%

Vessels Characteristics: The otter trawlers included in the sample ranged in length from 8.5 metres to 17.1 meters, with a mean length of 12.6 metres (median 12.7m. model 12.8m).

The "horsepower" of the vessels in kilowatts ranged from 15 kW to 224 kW with a mean of 109 kW (median 104, mode 90 kW).

The estimated current market value of the vessels (with equipment) included in the sample ranged from $15,000 to $325,000. The mean current market value of vessels was $110,781 (median $86,000, mode $200,000).

Employment: The number of people usually fishing, including the skipper (either employed skipper or owner/skipper), ranged from 1 to 3 persons, with the most common number of people on the vessel being 2 persons. Approximately 392 people in total would be employed on the 196 fishing vessels (not necessarily full-time).

TABLE 3.6 : TRAWLER CREW: CAIRNS REGION SAMPLE

Number of crew	Number of vessels	Percentage of vessels
1	4	10
2	27	67.5
3	9	22.5
	40	100

Indebtedness: Sixty-five percent of surveyed trawler owners. had loans to finance their fishing operations.

Income from fishing: As can be seen from the following table, 90% of the fishing vessel owners surveyed relied on fishing to provide 100% of their income.

TABLE 3.7 : PERCENTAGE OF INCOME FROM FISHING: TRAWLERS, CAIRNS REGION

Percent of income from fishing	Number of vessel owners	Percent of respondents
less than 10%	3	7.5%
90%	1	2.5%
100%	35	90%
	39	100%

3.2.1.2 Other fishing methods

Fishing method: It can be seen from Table 3.8 that of the twenty-three surveyed vessels engaged in other fishing methods only five were solely engaged in one fishing method.

TABLE 3.8 : OTHER FISHING VESSELS: CAIRNS REGION: NUMBER OF METHODS

Number of fishing methods	Number of vessels	Percentage of vessels
One method only	5	21.7%
Two methods	6	26.1%
Three methods	10	43.5%
Four methods or more	2	8.7%
	23	100%

Table 3.9 shows the percentage of vessels engaged in the various fishing methods.

TABLE 3.9 : OTHER FISHING VESSELS: CAIRNS REGION SAMPLE: TYPES OF FISHING

Fishing method	Number of vessels	Percentage of vessels
Gill netting	20	86%
Trolling	18	78%
Hand lining	10	43%
Beam trawling	3	13%
Crabbing	2	9%
Oyster gathering	1	4%

Vessel Characteristics: The length of vessels engaged in other fishing methods ranged from 3.9 metres to 14.3 metres, with a mean length of 7.7 metres (median 7.9m, mode 7.9m).

The "horsepower" of the vessels in kilowatts ranged from 6 kW to 206 kW with a mean of 68.7 kW (median 48 kW, mode 15 kW).

The estimated current market value (including equipment) of sampled other fishing method vessels ranged from $600 to $68,000.

The mean current market value was $26,000 (median $20,000, mode $50,000).

Employment: The mean number of people usually fishing, including the skipper (either employed or owner/skipper) was 2. The number of crew ranged from one to five people, the most common number of people being one. Approximately 314 people would be employed on the 157 fishing vessels (not necessarily full time).

TABLE 3.10 : OTHER FISHING VESSELS CREW: CAIRNS REGION SAMPLE

Number of crew	Number of vessels	Percentage of vessels
1	9	39.1%
2	8	34.8%
3	5	21.7%
5	1	4.3%
	23	100%

Indebtedness: Thirty-five percent of surveyed other fishing method vessel owners had loans to finance their fishing operations.

Income from fishing: Sixty-five percent of other fishing method vessel owners surveyed rely solely (i.e. 100%) on fishing for their income.

TABLE 3.11 : PERCENTAGE OF INCOME FROM FISHING: OTHER FISHING: CAIRNS REGION SAMPLE

Percent of income from fishing	Number of vessel owners	Percent of vessel owners
20%	2	8.7%
21% - 50%	2	8.7%
51% - 75%	4	17.3%
100%	15	65.3%
	23	100%

3.2.2 TOWNSVILLE REGION, COMMERCIAL FISHING DESCRIPTIVE VARIABLES

The Townsville economic region encompasses the east coast towns from Bowen to Cardwell. Fifty-nine fishing vessel owners with a home port in the Townsville economic region were interviewed. Thirty-four of these were otter trawler owners and the remaining twenty-five were vessel owners engaged in a range of fishing methods other than otter trawling. The vessels included in the survey were distributed between home ports as shown in Table 3.12.

TABLE 3.12 : PERCENTAGE OF INTERVIEWS: TOWNSVILLE REGION PORTS

Home port	Percentage of interviews	
	Otter trawlers	Other fishing vessels
	(n = 34)	(n = 25)
Bowen	29.4%	24.0%
Ayr	2.9%	0.0%
Lucinda	5.9%	10.0%
Townsville	61.8%	36.0%
	100.0%	100.0%

3.2.2.1 Otter trawlers

Fishing methods: Of the vessels included as otter trawlers, some vessels also engaged in other fishing methods. Other methods nominated were: mackerel trolling, gill netting, hand lining, beam trawling, crabbing and beach netting. The following table shows the breakdown of the number of other fishing methods in which the trawlers were engaged.

TABLE 3.13 : OTHER FISHING BY TRAWLERS: TOWNSVILLE REGION SAMPLE

Fishing methods	Number of vessels	Percent of total
Otter trawling only	17	50%
Otter trawling and 1 other method	6	17.6%
Otter trawling and 2 other methods	8	23.5%
Otter trawling and 3 other methods	2	5.9%
Otter trawling and 4 other methods	1	2.9%
	34	100%

The number of nets towed whilst otter trawling ranged from 1 to 4, with the most common number of nets towed being 2.

TABLE 3.14 : NETS TOWED: TOWNSVILLE REGION SAMPLE

Number of nets	Number of vessels	Percent of trawlers
1	4	12.1%
2	23	69.7%
3	4	12.1%
4	2	6.1%
	33	100%

Vessel characteristics: The otter trawlers included in the sample ranged in length from 7.0 metres to 16.5 metres, with a mean length of 12.4 metres (median 12.7m, mode 15.2m).

The "horsepower" of the vessels in kilowatts ranged from 15kW to 239 kW with a mean of 104 kW (median 90 kW, mode 86 kW).

The estimated current market value of the vessel (with equipment) included in the sample ranged from $9,000 to $250,000. The mean current market value of vessels was $88,739 (median $65,937, mode $80,000).

Employment: The number of people usually fishing, including the skipper (either employed skipper or owner/skipper) ranged from 1 to 3 persons, with the most common number of people on the vessel being 2 persons. Approximately 258 people in total would be employed on the 129 fishing vessels (not necessarily full-time).

TABLE 3.15 : TRAWLER CREW: TOWNSVILLE REGION SAMPLE

Number of crew	Number of vessels	Percentage of vessels
1	5	14.7%
2	22	64.7%
3	7	20.6%
	34	100.0%

Indebtedness: Fifty percent of surveyed trawler owners had loans to finance their fishing operations.

Income from fishing: As can be seen from the following table, 82% of the fishing vessel owners surveyed relied on fishing to provide 100% of their income.

TABLE 3.16 : PERCENTAGE OF INCOME FROM FISHING: TRAWLERS, TOWNSVILLE REGION SAMPLE

Percent of income from fishing	Number of vessel owners	Percent of respondents
less than 50%	3	9.1%
70%	1	3.0%
90%	2	6.1%
100%	27	81.8%
	33	100.0%

3.2.2.2 Other fishing methods

Fishing method: It can be seen from Table 3.17 that of the twenty-five surveyed vessels engaged in other fishing methods, only four were solely engaged in one fishing method.

TABLE 3.17 : OTHER FISHING VESSELS: TOWNSVILLE REGION SAMPLE: NUMBER OF METHODS

Number of fishing methods	Number of vessels	Percent of vessels
One method only	4	16%
Two methods	11	44%
Three methods	10	40%
	25	100%

Table 3.18 shows the percentage of vessels engaged in the various fishing methods.

TABLE 3.18 : OTHER FISHING VESSELS: TOWNSVILLE REGION SAMPLE: TYPES OF FISHING

Fishing method	Number of vessels	Percentage of vessels
Gill netting	21	84%
Trolling	14	56%
Hand lining	10	40%
Beam trawling	5	20%
Crabbing	2	8%
Beach netting	4	16%

Vessel characteristics: The length of vessels engaged in other fishing methods ranged from 4.1 metres to 12.2 metres, with a mean length of 7.3 metres (median 6.4m, mode 9.1m).

The "horsepower" of the vessels in kilowatts ranged from 17 kW to 127 kW, with a mean of 50.6 kW (median 45 kW, mode 18 kW).

The estimated current market value (including equipment) of sampled other fishing method vessels ranged from $950 to $80,000. The mean current market value was $15,640 (median $10,100, mode $10,000).

Employment: The mean number of people usually fishing, including the skipper (either employed or owner/skipper) was 1.6. The number of crew ranged from one to three people, the most common number of people being one. Approximately 238 people in total would be employed on the 149 fishing vessels (not necessarily full time).

TABLE 3.19 : OTHER FISHING VESSELS CREW: TOWNSVILLE REGION SAMPLE

Number of crew	Number of vessels	Percent of vessels
1	12	48%
2	11	44%
3	2	8%
	25	100%

Indebtedness: Fifty-two percent of surveyed other fishing method vessel owners had loans to finance their fishing operation.

Income from fishing: Fifty-six percent of other fishing method vessel owners surveyed rely solely(i.e.100%) on fishing for their income, however a further 20% depend on fishing for at least 80% of their income.

TABLE 3.20 : PERCENTAGE OF INCOME FROM FISHING: OTHER FISHING: TOWNSVILLE REGION SAMPLE

Percent of income from fishing	Number of vessel owners	Percent of vessel owners
20-30%	2	8%
50-60%	4	16%
80-90%	5	20%
100%	14	56%
	25	100.0%

3.2.3 MACKAY REGION, COMMERCIAL FISHING DESCRIPTIVE VARIABLES

The Mackay economic region encompasses the east coast town from Sarina to Proserpine. Twenty-eight fishing vessel owners with a home port in the Mackay economic region were interviewed. Eight of

these were otter trawler owners and the remaining twenty were vessel owners engaged in a range of fishing methods other than otter trawling. The vessels included in the survey were distributed between home ports as shown in Table 3.21.

TABLE 3.21 : PERCENTAGE OF INTERVIEWS: MACKAY REGION PORTS

Home Port	Percentage of Interviews	
	Otter trawlers	Other fishing vessels
	(n = 8)	(n = 20)
Mackay	50%	70%
Seaforth	37.5%	-
Proserpine	12.5%	10%
Airlie Beach	-	5%
Clairview	-	5%
Sarina	-	10%
	100.0%	100.0%

3.2.3.1 Otter trawlers

Fishing methods: Of the vessels included as otter trawlers, some vessels also engaged in other fishing methods. Other methods nominated were: Mackerel trolling, gill netting, hand lining, beam trawling, crabbing oyster gathering and beach netting. The following table shows the breakdown of the number of other fishing methods in which the trawlers were engaged.

TABLE 3.22 : OTHER FISHING BY TRAWLERS: MACKAY REGION SAMPLE

Number of fishing methods	Number of vessels	Percentage of total
Otter trawling only	2	25%
Otter trawling and 1 other method	4	50%
Otter trawling and 2 other methods	0	0%
Otter trawling and 3 other methods	2	25%
	8	100.0%

The number of nets towed whilst otter trawling ranged from 1 to 3, with the most common number of nets towed being 2.

TABLE 3.23 : NETS TOWED: MACKAY REGION SAMPLE

Number of nets	Number of vessels	Percent of trawlers
1	2	25.0%
2	5	62.5%
3	1	12.5%
	8	100.0%

Vessel characteristics: The otter trawlers included in the sample ranged in length from 8.9 metres to 13.7 metres, with a mean length of 11.4 metres (median 11.5m, mode 13.7).

The "horsepower" of the vessels in kilowatts ranged from 30 kW to 134 kW with a mean of 97.9 kW (median 87.5 kW, mode 30 kW).

The estimated current market value of the vessel (with equipment) included in the sample ranged from $15,000 to $110,000. The mean current market value of vessels was $51,000 (median $40,000, mode $40,000).

Employment: The number of people usually fishing, including the skipper (either employed skipper or owner/skipper) ranged from 1 to 5 persons, with the most common number of people on the vessel being 2 persons. Approximately 72 people in total would be employed on the 36 fishing vessels (not necessarily full-time).

TABLE 3.24 : TRAWLER CREW: MACKAY REGION SAMPLE

Number of crew	Number of vessels	Percentage of vessels
1	1	12.5%
2	5	62.5%
3	1	12.5%
5	1	12.5%
	8	100.0%

Indebtedness: Thirty-eight percent of surveyed trawler owners had loans to finance their fishing operations.

Income from fishing: As can be seen from the following table, 71% of the fishing vessel owners surveyed relied on fishing to provide 100% of their income.

TABLE 3.25 : PERCENTAGE OF INCOME FROM FISHING: TRAWLERS, MACKAY REGION SAMPLE

Percent of income from fishing	Number of vessel owners	Percent of respondents
30%	1	14.3%
75%	1	14.3%
100%	5	71.4%
	7	100.0%

3.2.3.2 Other fishing methods

Fishing method: It can be seen from Table 3.26 that of the twenty surveyed vessles engaged in other fishing methods eight were solely engaged in one fishing method.

TABLE 3.26 : OTHER FISHING VESSELS: MACKAY REGION: SAMPLE NUMBER OF METHODS

Number of fishing methods	Number of vessels	Percent of vessels
One method only	8	40%
Two methods	6	30%
Three methods	4	20%
Four methods or more	2	10%
	20	100%

Table 3.27 shows the percentage of vessels engaged in the various fishing methods.

TABLE 3.27 : OTHER FISHING VESSELS: MACKAY REGION: SAMPLE TYPES OF FISHING

Fishing method	Number of vessels	Percentage of vessels
Gill netting	15	75%
Trolling	4	20%
Hand lining	10	50%
Beam trawling	1	5%
Crabbing	8	40%
Oyster gathering	1	5%
Beach netting	1	5%

Vessel characteristics: The length of vessels engaged in other fishing methods ranged from 3.2 metres to 12.8 metres, with a mean length of 6 metres (median 4.3m, mode 3.9m).

The "horsepower" of the vessels in kilowatts ranged from 6 kW to 261 kW, with a mean of 41.4 kW (median 28 kW, mode 19 kW).

The estimated current market value (including equipment) of sampled other fishing method vessels ranged from $2000 to $80,000. The mean current market value was $13,830 (median $3,000, mode $1,000).

Employement: The mean number of people usually fishing, including the skipper (either employed or owner/skipper) was 2. The number of crew ranged from 1 to 5 people, the most common number of people being two. Approximately 178 people in total would be employed on the 89 fishing vessels (not necessarily full-time)

TABLE 3.28 : OTHER FISHING VESSELS CREW: MACKAY REGION SAMPLE

Number of crew	Number of vessels	Percentage of vessels
1	6	30%
2	10	50%
3	2	10%
4	1	5%
5	1	5%
	20	100%

Indebtedness: Thirty-five percent of surveyed other fishing method vessel owners had loans to finance their fishing operation.

Income from fishing: Only forty percent of other fishing method vessel owners surveyed rely solely (i.e. 100%) on fishing for their income.

TABLE 3.29 : PERCENTAGE OF INCOME FROM FISHING: OTHER FISHING: MACKAY REGION SAMPLE

Percent of income from fishing	Number of vessel owners	Percent of vessel owners
10% - 40%	5	25%
50% - 70%	5	25%
80% - 90%	2	10%
100%	8	40%
	20	100.0%

3.3 ECONOMIC ANALYSIS

The purpose of this section is to present data on annual income and expenditure associated with commercial fishing in the GBR region and to determine the location of the economic impact of commercial fishing. Location of impact is considered in terms of the economic regions adjacent to the GBR region.

The information used in this section is based on that contained in profit and loss statements prepared for taxation purposes. Where possible, statements for the three financial years, 1977-78, 1978-79 and 1979-80 were obtained from respondents. Statements were only included for analysis where the respondent had been fishing for a whole year.

As noted previously, not all respondents had been fishing or had accounts available for the three years in question. Therefore, the size of the sample on which economic data is based is somewhat smaller than the sample on which the information in previous sections is based (see Tables 3.30, 3.31).

Limitations exist in using accounts prepared for taxation purposes as a source of information. These limitations are outlined below. However, this is a legitimate form of accounting and is the only form of financial record kept by most of the respondents. These accounts are the best available means of gathering income and expenditure information.

The income values used in this analysis are income for sales of fish and seafoods only. In returns prepared for taxation purposes income tends to be understated. There are at least two means by which this happens. Firstly, there is a large blackmarket for fish and seafood in Queensland. Recent estimates put the blackmarket in the ports of Cairns and Townsville at more than 50% of all landings.[7] It is probable that many fishermen deal to some extent on the black

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7. Final Report of Committee to Enquire into Matters Relating to Fish Marketing and the Future Operations of the Fish Board. 1981, p.11.

market. As there are no records kept of cash sales on the black-market, there is no reason to report such sales for taxation purposes.

A second reason for understatement of income arises where fishermen deal with processing companies. Processing companies not only buy product, but most also sell gear, fuel and other supplies for commercial vessels. Often fishermen are paid for their landed product net of expenditure on goods sold by the company. This method of payment may lead to fishermen recording net income rather than gross income. Some instances of this recording method were identified in the survey and adjusted for after subsequent investigations.

TABLE 3.30 : SAMPLE SIZE WITH COMPLETE ECONOMIC DATA, BY YEAR

Region	Fishing method	1977/78	1978/79	1979/80
Cairns	Otter trawling	14	18	24
	Other fishing methods	11	12	13
Townsville	Otter trawling	14	22	26
	Other fishing methods	9	16	17
Mackay	Otter trawling	4	5	4
	Other fishing methods	6	8	9

TABLE 3.31 : SAMPLE SIZE WITH COMPLETE ECONOMIC DATA 1979/80

Region	Fishing method	Number vessels in pop'n 1980*	Sample size	Sample percent of pop'n
Cairns **	Otter trawling	183	24	13.1%
	Other fishing methods	195	13	6.7%
Townsville	Otter trawling	139	26	18.7%
	Other fishing methods	149	17	11.4%
Mackay	Otter trawling	34	4	11.8%
	Other fishing methods	106	9	8.5%

* Populations used in Section 3.3 in this report.

** These populations are slightly higher than those used in the previous Cairns report (Hundloe, T., Driml, S., Shaw, S., McGinnity, P., Jensen, R., West, G., Op. Cit. 1981) as better estimates of fishing vessel numbers have been made available by the Division of Dairying and Fisheries, Department of Primary Industries.

The expenditure values used in this analysis are expenditure associated with fishing operations only. Expenditure recorded on profit and loss statements may be correct, understated or, more likely overstated. Understatement may arise due to the abovementioned method of recording income from landed product net of expenditure on goods purchased from processing companies. Such expenditure is therefore not recorded unless expenditure exceeds income. Overstatement of expenditure is possible where a fisherman wishes to reduce his tax liability.

Other than in the situation mentioned above, it was not possible to adjust accounts for any suspected overstatement or understatement as no data were available on which to base adjustment. Therefore analysis of existing profit and loss statement data was undertaken, and the limitations of this must be borne in mind when considering results. The magnitude of discrepency due to over- or understatement

is thought to be most significant in the area of income data. Indications for some respondents were that income was understated by up to 100% due to blackmarket sales.

One type of adjustment was made to all profit and loss statements and this concerned payments to skippers. Some accounts showed payments to owners-skippers. This is a legitimate accounting practice.

Ninety-seven percent of the fishing vessels were skippered by owner operators. In order to allow determination of profits on expenditure other than owner operator's lablour, all recorded payments of salary or bonuses to skippers were excluded from the expenditure side of the accounts.

In order to determine profits on expenditure including owner operator's labour, it is necessary to attribute a value representative or a "normal" salary for a skipper. Because recorded payments to owner operators as skippers varied a great deal - depending on the profitability of the operation - a skipper's salary was calculated based on the wages paid to the few employed skippers. This value is not included in expenditure data but may be used to calculate returns on investment.

Questions were asked to determine the location of sales of product and of expenditure on a range of items. This information was used to calculate income generated from and expenditure accruing inside and outside the region of the home port.

Categories of Income and Expenditure Data

Mention must be made of the categories in which income and expenditure are reported.

Income from the sale of fish and seafoods is listed as a single value on profit and loss statements and it was a straightforward matter to determine the income accruing to the average fishing vessel in each category. Information on the location of sales was used to calculate the value of sales inside and outside the region in question.

Expenditure is recorded on profit and loss statements according to a number of categories. For the purpose of analysis 22 standard categories of commercial fishing expenditure adopted by the Fisheries Division, Department of Primary Industry were used.

The categories into which expenditure are divided are self explanatory (see Tables 3.32 to 3.39). The only adjustments made in this analysis were to define the "Other" category as electricity and water services and to delete the "Payment to Skipper", and "aerial spotting" categories from the original categories.

While expenditure categories on most profit and loss statements followed close to this format, it was necessary to aggregate entries on some statements. The value of expenditure inside and outside the region in question was calculated based on information given by respondents.

Sample Means

The income and expenditure data collected are reported according to region (Cairns, Townsville, Mackay) and type of fishing (otter trawling, other fishing methods). Therefore there are six sets of data and for each there are records for three financial years (1977/78, 1978/79, 1979/80). The means of the sample data have been calculated and are presented in Tables 3.32 to 3.37. For these tables, the sample means for the three financial years have been aggregated into a "3 year mean". The sample means for the 1979/80 financial year are also shown. All values are in 1979/80 dollars. The June Consumer Price Index figures for Brisbane were used as a basis for inflation.

Population Data

In order to determine the income and expenditure generated by the population of commercial fishing vessels it is necessary to multiply sample means by an appropriate factor. For the purposes of this report, the population has been stratified according to region of home port and type of fishing. The sample means were therefore multiplied by the total number of vessels in each strata (see Table 3.31). It was only possible to calculate population figures for the 1979/80 financial year as licence records for previous years do not contain adequate information. Tables 3.38 and 3.39 contain population data for the three regions. Table 3.40 summarizes vessel market value (1981), expenditure (1979/80) and income (1979/80 for the population of commercial fishing vessels. It is important to note that Tables 3.38 to 3.40 are based on stratification according to region and type of fishing.

TABLE 3.32 : CAIRNS REGION, OTTER TRAWLING "AVERAGE VESSEL"

	3 year mean* ($) Sample		1979/80 ($) Sample	
	Inside region	Outside region	Inside region N = 24	Outside region
Expenditure on:				
Crew salaries	5,835		4,251	
Commission and selling costs	211		94	
Freight and cartage	91		43	
Food	1,427	39	960	95
Fuel	5,752	125	7,183	
Bait	21		0	
Boat repair and maintenance	7,429	270	8,323	675
Gear replacement and repair	1,934	79	1,611	175
Boat insurance	377	1,197	601	830
Vehicle cost	969		927	
Harbour dues and licences	490	38	737	47
Accountancy	216	50	198	52
Banking and postal charges	633		579	
Travel	876		614	
Subscriptions	8		12	
Rates and taxes	25		31	
Rental and hire charges	430	111	456	
Miscellaneous	302		609	
Interest	1,866	913	2,666	2,155
Packing costs	32		42	
Depreciation	5,338		4,698	
Other	68		63	
	34,330	2,822	34,698	4,029
TOTAL	37,152		38,727	
INCOME	51,639	328	44,986	546
TOTAL	51,961		45,532	

* 1977/78, 1978/79 and 1979/80 in 1979/80 dollars.

TABLE 3.33 : CAIRNS REGION, OTHER FISHING METHODS "AVERAGE VESSEL"

	Sample			
	3 year mean* ($)		1979/80 ($)	
	Inside region	Outside region	Inside region	Outside region
			N = 13	
Expenditure on:				
Crew salaries	614		895	
Commission and selling costs	99		94	
Freight and cartage	4		3	
Food	62		149	
Fuel	684		967	
Bait	0		0	
Boat repair and maintenance	1,310		1,618	
Car repair	631	110	625	88
Boat insurance	26	53	14	78
Vehicle cost	305		421	
Harbour dues and licences	217		256	
Accountancy	67		61	2
Banking and postal charges	104		149	
Travel	13		17	
Subscriptions	10		15	
Rates and tax	30		58	
Rental and hire	18		30	
Miscellaneous	20		32	
Interest	137	256	191	99
Packing cost	107		157	
Depreciation	1,753		2,065	
Other	75		96	
	6,286	419	7,913	267
TOTAL	6,705		8,180	
INCOME	6,397	170	7,502	153
	6,567		7,655	

* 1977/78, 1978/79 and 1979/80 in 1979/80 dollars.

TABLE 3.34 : TOWNSVILLE REGION, OTTER TRAWLING "AVERAGE VESSEL"

	Sample			
	3 year mean* ($)		1979/80 ($)	
	Inside region	Outside region	Inside region	Outside region
			N = 26	
Expenditure on:				
Crew salaries	4,371		1,662	
Commission and selling costs	122		69	
Freight and cartage	30		26	
Food	739	56	664	65
Fuel	3,646	198	4,515	518
Bait	13	14	16	42
Boat repair and maintenance	5,636	1,046	4,636	2,597
Car repair	1,245	688	1,160	268
Boat insurance	611	275	611	246
Vehicle cost	667		491	
Harbour dues and licences	394		464	
Accountancy	174	51	166	58
Banking and postal charges	288	31	275	36
Travel	346		97	
Subscriptions	10		10	
Rates and taxes	23		4	
Rental and hire charges	853		1,039	
Miscellaneous	291		100	
Interest	1,125		1,334	140
Packing costs	15		2	
Depreciation	3,890		3,796	
Other	200		175	
	24,689	2,359	21,312	3,970
TOTAL	27,048		25,282	
INCOME	34,651	1,640	26,582	2,248
TOTAL	36,291		28,830	

* 1977/78, 1978/79 and 1979/80 in 1979/80 dollars.

TABLE 3.35 : TOWNSVILLE REGION, OTHER FISHING METHODS, "AVERAGE VESSEL"

Sample

	3 year mean* ($)		1979/80 ($)	
	Inside region	Outside region	Inside region	Outside region
			N = 17	
Crew salaries	518		812	
Commission and selling costs	153		121	
Freight and cartage	28		44	
Food	119	3	189	
Fuel	809	10	1,236	16
Bait	13		14	
Boat repair and maintenance	874	203	1,148	266
Car repair	207	124	286	135
Boat insurance	0	35	0	10
Vehicle cost	266		295	
Harbour dues and licences	208		263	
Accountancy	49	15	63	17
Banking and postal charges	105		111	
Travel	50		105	
Subscriptions	5		10	
Rates and taxes	54		45	
Rental and hire charges	32		95	
Miscellaneous	175		298	
Interest	232		191	133
Packing costs	30		52	
Depreciation	988		1,390	
Other	389		951	
	5,304	390	7,719	577
TOTAL	5,694		8,296	
FISH SALES	7,372	1,950	8,126	2,709
TOTAL	9,322		10,835	

* 1977/78, 1978/79 and 1979/80 in 1979/80 dollars.

TABLE 3.36 : MACKAY REGION, OTTER TRAWLING, "AVERAGE VESSEL"

	Sample			
	3 year mean* ($)		1979/80 ($)	
	Inside region	Outside region	Inside region	Outside region
			N = 4	
Expenditure on:				
Crew salaries	4,278		9,677	
Commission and selling costs	180		270	
Freight and cartage	13		27	
Food	672		1,157	
Fuel	2,493		3,992	
Bait	43	153	128	460
Boat repair and maintenance	3,800	1,296	5,461	312
Gear replacement and repair	28	372	0	1,012
Boat insurance	20	313	0	763
Vehicle cost	247		229	
Harbour dues and licences	498		799	
Accountancy	67	32	49	48
Banking and postal charges	359		434	
Travel	16		0	
Subscriptions	10		17	
Rates and taxes	263		765	
Rental and hire charges	403		407	
Aerial spotting				
Miscellaneous	132		139	
Interest	463		382	
Packing costs	94		167	
Depreciation	3,617		6,812	
Other	222		286	
	17,918	2,166	31,198	2,595
TOTAL	20,084		33,793	
FISH SALES	17,897	2,333	25,730	6,433
TOTAL	20,230		32,163	

* 1977/78, 1978/79 and 1979/80 in 1979/80 dollars.

TABLE 3.37 : MACKAY REGION, OTHER FISHING METHODS, "AVERAGE VESSEL"

	3 year mean* ($) Sample		1979/80 ($) Sample	
	Inside region	Outside region	Inside region N = 9	Outside region
Expenditure on:				
Crew salaries	3,346		3,551	
Commission and selling costs	729		1,174	
Freight and cartage	6		18	
Food	877		1,005	
Fuel	2,280		930	
Bait	28	238	0	338
Boat repair and maintenance	1,820		2,287	
Gear replacement and repair	305	21	108	5
Boat insurance	80	45	84	42
Vehicle cost	473		271	
Harbour dues and licences	319		358	
Accountancy	48	1	34	
Banking and postal charges	118		96	
Travel	41		35	
Subscriptions	0		0	
Rates and taxes	24		22	
Rental and hire charges	16		48	
Miscellaneous	204		200	
Interest	163		94	
Packing costs	22		6	
Depreciation	1,699		1,729	
Other	78		138	
	11,110	305	12,188	385
TOTAL	11,415		12,573	
INCOME	13,090	121	14,868	125
TOTAL	13,211		14,993	

* 1977/78, 1978/79 and 1979/80 in 1979/80 dollars

TABLE 3.38 : OTTER TRAWLING, POPULATION DATA 1979/80

	CAIRNS REGION		TOWNSVILLE REGION		MACKAY REGION	
	Population = 183		Population = 139		Population = 34	
	($) Inside region	($) Outside region	($) Inside region	($) Outside region	($) Inside region	($) Outside region
Crew salaries	777,933		231,018		329,018	
Commission & selling costs	17,202		9,591		9,180	
Freight and cartage	7,869		3,614		918	
Food	175,680	17,385	92,296	9,035	39,338	
Fuel	1,314,489		627,585	72,002	135,728	
Bait	0		2,224	5,838	4,352	15,640
Boat repair and maintenance	1,523,109	123,525	644,404	360,983	185,674	10,608
Gear replacement and repair	212,463	32,025	161,240	37,252	0	34,408
Boat insurance	109,983	151,890	84,929	34,194	0	25,942
Vehicle cost	169,641		68,249		7,786	
Harbour dues & licences	134,871	8,601	64,496		27,166	
Accountancy	36,234	9,516	23,074	8,062	1,666	1,632
Banking & postal charges	105,957		38,225	5,004	14,756	
Travel	112,362		13,483		0	
Subscriptions	2,196		1,390		578	
Rates and taxes	5,673		556		26,010	
Rental and hire charges	83,448		144,421		13,838	
Aerial spotting						
Miscellaneous	111,447		13,900		4,726	
Interest	487,878	394,365	185,426	19,460	12,988	
Packing costs	7,686		278		5,678	
Depreciation	859,734		527,644		231,608	
Other	11,529		24,325		330,616	
TOTAL	6,349,734	737,307	2,962,368	551,830	1,060,732	88,230
	7,087,041		3,514,198		1,148,962	
INCOME	8,232,438	99,918	3,694,898	312,472	874,820	218,722
TOTAL	8,332,356		4,007,370		1,093,542	

TABLE 3.39 : OTHER FISHING METHODS, POPULATION DATA 1979/80

	CAIRNS REGION		TOWNSVILLE REGION		MACKAY REGION	
	Population = 195		Population = 149		Population = 106	
	($) Inside region	($) Outside region	($) Inside region	($) Outside region	($) Inside region	($) Outside region
Expenditure on:						
Crew salaries	174,525		120,988		376,406	
Commission & selling costs	18,330		18,029		124,444	
Freight and cartage	585		6,556		1,908	
Food	29,055		28,161		106,530	
Fuel	188,565		184,164	2,384	98,580	
Bait	0		2,086		0	35,828
Boat repair & maint.	315,510		171,052	39,634	242,422	
Gear replacement & repair	121,875	17,160	42,614	20,115	11,448	530
Boat insurance	2,730	15,210	0	1,490	8,904	4,452
Vehicle cost	82,095		43,955		28,726	
Harbour dues & licences	49,920		39,187		37,948	
Accountancy	11,895	390	9,387	2,533	3,604	
Banking & postal charges	29,055		16,539		10,176	
Travel	3,315		15,645		3,710	
Subscriptions	2,925		1,490		0	
Rates and taxes	11,310		6,705		2,332	
Rental and hire charges	5,850		14,155		5,088	
Aerial spotting						
Miscellaneous	6,240		44,402		21,200	
Interest	37,245	19,305	28,459	19,817	9,964	
Packing costs	30,615		7,748		636	
Depreciation	402,675		207,110		183,274	
Other	18,720		141,699		14,628	
TOTAL	1,543,035	52,065	1,150,131	85,973	1,291,928	40,810
	1,595,100		1,236,104		1,332,736	
INCOME	1,462,890	29,835	1,210,774	403,641	1,576,008	13,250
TOTAL	1,492,725		1,614,415		1,589,258	

TABLE 3.40 : POPULATION DATA (STRATIFICATION BY REGION AND FISHING METHOD)

	OTTER TRAWLING	OTHER FISHING METHODS	TOTAL
Vessel Market Value 1981[a]			
Cairns Region	$21,713,000	$4,082,000	$25,795,000
Townsville Region	$11,447,000	$2,330,000	$13,777,000
Mackay Region	$ 1,836,000	$1,230,800	$ 3,066,800
TOTAL	$34,996,000	$7,642,800	$42,638,800
Expenditure 1979/80[b]			
Cairns Region	$ 7,087,040	$1,595,100	$ 8,682,140
Townsville Region	$ 3,514,200	$1,236,100	$ 4,750,300
Mackay Region	$ 1,148,960	$1,332,740	$ 2,481,700
TOTAL	$11,750,200	$4,163,940	$15,914,140
Income 1979/80[b]			
Cairns Region	$ 8,332,360	$1,492,730	$ 9,825,090
Townsville Region	$ 4,007,370	$1,614,420	$ 5,621,790
Mackay Region	$ 1,093,540	$1,589,250	$ 2,682,790
TOTAL	$13,433,270	$4,696,400	$18,129,670

a. As recorded at the time of survey in 1981. Sample size otter trawlers 82, other fishing methods 68. See section 3.2 for sample means. Values shown in 1981 dollars (rounded off).
b. Data from Tables 3.38 and 3.38 (rounded off) based on sample with financial data for 1979/80. Sample size, otter trawlers 54, other fishing methods 39. Values shown in 1979/80 dollars.

STRATIFICATION BY VESSEL LENGTH

Another means of stratifying the population and sample of fishing vessels is by vessel length. This would give a good basis for converting from sample to population figures particularly for otter trawlers. The otter trawlers in the population vary from less than 9 metres in length to over 17 metres and important factors such as fishing capacity, vessel value, income and expenditure vary accordingly. Stratification of the population and the sample according to vessel length would lessen the possibility of underestimation or overestimation of population values due to under sampling or over sampling certain length classes, as suitable raising factors would be used for conversion from sample to population data. Unfortunately it was not possible to stratify by length class in any detail for the purposes of this report. Because the study was conducted on a regional basis and stratification by region and fishing method was necessary, the resulting samples were too small to further stratify by length class with any accuracy. However, attempts were made in selecting the original list of vessels to survey in the field to represent length classes proportionally. A guide on how the sample and population length class proportions compare for the three regions together in 1979/80 is given in Table 3.41.

It can be seen that the longer vessels are relatively over sampled. Thus conversion of sample data to population data without correction for length will lead to some overestimation of values. In order to determine if serious discrepancies occur, the analysis below compares population values calculated using stratification by region with population values calculated using stratification by length class. This analysis is only undertaken for otter trawlers.

TABLE 3.41 OTTER TRAWLERS - LENGTH CLASS

		Length Class				
		6-9metres	9-12metres	12-15metres	15-19metres	Total
Population 1979/80 (3 regions)	Vessel numbers	57	88	134	77	356
	percentage	(16%)	(24.7%)	(37.6%)	(21.6%)	(100%)
Sample with financial data 1979/80 (3 regions)	Vessel numbers	3	14	24	13	54
	percentage	(5.5%)	(25.9%)	(44.4%)	(24%)	(100%)

Vessel market value, expenditure and income sample means were calculated for the total sample of otter trawlers (3 regions together) according to length class. Sample means and population data are shown in Table 3.42 and 3.43. A comparison of population data from Table 3.40 (stratification by region) and population data from Tables 3.42 and 3.43 (stratification by length class) is shown in Table 3.44. From this comparison it can be seen that stratification by region produces population values for market value 4.3% lower, expenditure 3.8% higher and income 6.5% higher than does stratification by length class. As there is less than 10% difference in calculated population values, it is considered by these authors that stratification of the sample and population by region has produced acceptable results.

TABLE 3.42 MARKET VALUE[a] OTTER TRAWLERS 1981 (STRATIFIED BY LENGTH CLASS - 3 REGIONS)

	Length Class				
	6-9metres	9.1-12metres	12.1-15metres	15.1-19metres	Total
Vessels in Sample 1981	10	22	32	18	82
Vessel market value-sample mean	$20,000	$55,048	$137,772	$164,444	$107,070 (weighted mean =$101,326)
Vessels in population 1981	58	89	136	78	361
Vessel market value-population	$1,160,000	$4,899,272	$18,736,992	$12,826,632	$36,578,896

a Market value with licence in 1981 dollars

TABLE 3.43 INCOME AND EXPENDITURE[a] OTTER TRAWLERS 1979/80 (STRATIFIED BY LENGTH CLASS - 3 REGIONS)

	Length class				
	6-9metres	9.1-12metres	12.1-15metres	15.1-19 metres	Total
Vessels in sample 1979/80	3	17	21	13	54
Expenditure Sample mean	$7,931	$19,905	$36,414	$54,996	$34,107 (weighted mean = 31,792)
Income- Sample mean	$9,128	$21,333	$35,974	$69,925	$38,046 (weighted mean = 35,400)
Vessels in population 1979/80	57	88	134	77	356
Expenditure- population	$452,067	$1,751,640	$4,879,476	$4,234,692	$11,317,875
Income- population	$520,296	$1,877,304	$4,820,516	$5,384,225	$12,602,341

a in 1979/80 dollars

TABLE 3.44 COMPARISON OF POPULATION DATA, OTTER TRAWLERS

	Stratification by Region [a]	Stratification by Length class [b]
Vessel market value[c] 1981		
Mean (n=361)	$ 96,940	$ 101,326
Population	$34,996,000	$36,578,896
Expenditure 1979/80[d]		
Mean (n=356)	$ 33,006	$ 31,792
Population	$11,750,200	$11,317,880
Income 1979/80[d]		
Mean (n=356)	$ 37,734	$ 35,400
Population	$13,433,270	$12,602,341

(a) Data from Table 3.40 Means weighted by region

(b) Data from Tables 3.42 and 3.43 Means weighted by length class

(c) in 1981 dollars

(d) in 1979/80 dollars

Location of expenditure

The percent of expenditure made in the local region of the home port was as shown on Table 3.45 below. The high proportion of expenditure made in the local regions means that local fishing fleets are likely to be important to the regional economy.

TABLE 3.45 : EXPENDITURE IN REGION*

Region	Fishing method	
	Otter trawling	Other fishing methods
Cairns	92%	94%
Townsville	91%	93%
Mackay	89%	97%

*Based on 3 year means.

Location of income

Only a small percentage of catch landed is not put through the home port (see Table 3.46). This means that the local fishing fleet contributes to the local regional economy in providing product for seafood processing and distribution industries.

TABLE 3.46 : INCOME IN REGION*

Region	Fishing method	
	Otter trawling	Other fishing methods
Cairns	99%	97%
Townsville	95%	79%
Mackay	88%	99%

*Based on 3 year means.

Payment to skipper

The mean payment to an employed otter trawler skipper is $12,100 per annum. This figure is based on the very few instances of employed skippers. No instances of employed skippers were encountered amongst vessels in the "other fishing methods" category.

Fish and seafood catch

The catch by the population of vessels has only been recorded in dollar terms. A very rough estimate of the catch in terms of kilograms of fish and prawns and other seafoods may be made by converting dollars to kilograms using the average price per kilogram of fish and prawns. In order to do this the assumption has been made that all catch by otter trawlers is prawns. The average price at the Queensland Fish Board for prawns in 1979/80 was $4.43[8]. It must also be assumed that the catch from vessels in the other fishing methods category is fish and that a value of $2/kg for whole fish is a reasonable price for 1979/80. The results of the calculations are on Table 3.42. The abovementioned assumptions and the fact of the existence of the blackmarket make this estimated catch a minimum value only.

TABLE 3.42 : ESTIMATED VOLUME OF FISH/PRAWN CATCH

		Income from fish/prawn sales 1979/80	Price/ kg.	Estimated number kilograms
Cairns:	Otter trawling	$8,332,360	$4.43	1,880,890
	Other fishing methods	$1,492,730	$2*	746,370
T'ville:	Otter trawling	$4,007,370	$4.43	904,600
	Other fishing methods	$1,614,420	$2	807,210
Mackay:	Otter trawling	$1,093,540	$4.43	246,850
	Other fishing methods	$1,589,250	$2	794,630

* Estimated average for whole fish based on Queensland Fish Board prices, 1979/80.

8. Queensland Fish Board Annual Report, 1980.

Table 3.43 shows Queensland Fish Board landings for the three regions for 1979/80. Only a part of the commercial catch is landed through Fish Board Depots.

TABLE 3.43 : QUEENSLAND FISH BOARD LANDINGS 1979/80

		Kilograms landed	Price/ kg.	Estimated value ($)	Total
Cairns:	Prawns	155,533	$5.25	$816,562	$816,562
	Other seafood*	na	na	$ 79,893)	
	Whole fish	128,473	$2**	$256,946)	$1,069,279
	Fish fillets	146,488	$5**	$732,440)	
T'vle:	Prawns	165,805	$5.54	$920,068	$920,068
	Other seafood	na	na	$144,460)	
	Whole fish	102,076		$204,152)	$1,024,052
	Fish fillets	135,088		$675,440)	
Mackay:	Prawns	99,614	$4.16	$414,452	$414,452
	Other seafood	na	na	$ 39,628)	
	Whole fish	33,188	$2	$ 66,376)	$867,034
	Fish fillets	152,206	$5	$761,030)	

Source: Queensland Fish Board Annual Report, 1980.

* Includes mud crabs, sand crabs, moreton bay lobsters, oysters, scallops, crayfish - it is not appropriate to add weights for these items.

** Estimated average based on Queensland Fish Board prices, 1979/80.

3.4 SUMMARY

The following is a summary of data for the three regions investigated, firstly presented in total and then region by region. Note the three region total does not cover the entire GBR region as it excludes Rockhampton region data.

Three region total

- 361 otter trawlers (east coast only) and 395 vessels engaging in other fishing methods are based in home ports in the three regions.

- The number of people employed on fishing vessels is 1,452. (not all these people are employed full time in fishing.)

- The total annual expenditure associated with commercial fishing is approximately $16 million.

- Over 90% of expenditure is made within local regions.

- The total annual income (value of catch) to commercial fishing is approximately $18 million.

- The 1981 market value of vessels (and equipment) is approximately $43 million.

Cairns region

- 183 otter trawlers (east coast only) and 195 vessels engaging in other fishing methods are based in home ports in the Cairns region.

- The number of people employed on fishing vessels is 706. (Not all these people are employed full time in fishing.)

- The annual expenditure by east coast otter trawlers is approximately $7,087,000. The annual expenditure by vessels engaging in other fishing methods is approximately $1,595,000. The total annual expenditure for the Cairns region is approximately $8,682,000.

- Ninety-one percent of expenditure is made within the Cairns region.

- The annual income (value of catch) to east coast otter trawlers is approximately $8,332,000. The annual income to vessels engaging in other fishing methods is approximately $1,493,000. The total annual income for the Cairns region is approximately $9,825,000.

- Ninety-nine percent of catch by Cairns region vessels is landed in the Cairns region.

- The 1981 market value of east coast otter trawlers (vessels and equipment) is approximately $21,713,000. The 1981 market value of vessels engaging in other fishing methods is approximately $4,082,000. The total 1981 market value of vessels (and equipment) based in the Cairns region is approximately $25,795,000.

Townsville region

- 139 otter trawlers (east coast only) and 149 vessels engaging in other fishing methods are based in home ports in the Townsville region.

- The number of people employed on fishing vessels is 496. (Not all these people are employed full time in fishing.)

- The annual expenditure by east coast otter trawlers is approximately $3,514,000. The annual expenditure by vessels engaging in other fishing methods is approximately $1,236,000. The total annual expenditure for the Townsville region is approximately $4,750,000.

- Eighty-seven percent of expenditure is made within the Townsville region.

- The annual income (value of catch) to east coast otter trawlers is approximately $4,007,000. The annual income to vessels engaging in other fishing methods is approximately $1,614,000. The total annual income for the Townsville region is approximately $5,621,000.

- Eighty-seven percent of catch by Townsville region vessels is landed in the Townsville region.

- The 1981 market value of east coast otter trawlers (vessels and equipment) is approximately $11,447,000. The 1981 market value of vessels engaging in other fishing methods is approximately $2,330,000. The total 1981 market value of vessels (and equipment) based in the Townsville region is approximately $13,777,000.

Mackay region

- 36 otter trawlers (east coast only) and 89 vessels engaging in other fishing methods are based in home ports in the Mackay region.

- The number of people employed on fishing vessels is 250. (Not all these people are employed full time in fishing.)

- The annual expenditure by east coast otter trawlers is approximately $1,149,000. The annual expenditure by vessels engaging in other fishing methods is approximately $1,333,000. The total annual expenditure for the Mackay region is approximately $2,482,000.

- Ninety-five percent of expenditure is made within the Mackay region.

- The annual income (value of catch) to east coast otter trawlers is approximately $1,094,000. The annual income to vessels engaging in other fishing methods is approximately $1,589,000. The total annual income for the Mackay region is approximately $2,683,000.

- Ninety-one percent of catch by Mackay region vessels is landed in the Mackay region.

- The 1981 market value of east coast otter trawlers (vessels and equipment) is approximately $1,836,000. The 1981 market value of vessels engaging in other fishing methods is approximately $1,230,800. The total 1981 market value of vessels (and equipment) based in the Mackay region is approximately $3,066,800.

CHAPTER 4

RECREATIONAL FISHING FROM CHARTER BOATS

CHARTER BOATS

The term "charter boats" is used to include all passenger-carrying vessels operating within the GBR region. With respect to fishing within the GBR region charter boats may be divided into two groups - those for which fishing is a major activity and those for which fishing is a minor activity or is not undertaken at all. Vessels of the former type include the Cairns marlin fleet, while the second type includes island ferry services.

This chapter reports data collected on fishing from charter boats and economic information on charter boat operations. It must be noted that as fishing is not the sole activity offered by charter boats, the economic information on charter boat operations does not relate solely to fishing. Information on major sectors of the charter boat industry has been included in previous reports to the Great Barrier Reef Marine Park Authority by the Institute of Applied Social Research. That information is presented only in summary form in this chapter. This chapter is arranged primarily according to regions, with a summary at the end of the chapter.

4.1 CAIRNS REGION CHARTER BOATS

Charter boat activity in the Cairns region was reported on in the 1981 IASR report entitled Proposed Cairns Section of the Great Barrier Reef Marine Park: some economic characteristics and multipliers.

Economic information was presented and input-output analysis was undertaken. The data was drawn mainly from a study by Keith Owen, Fisheries Division, Department of Primary Industry[1]. This study covered charter boats in the Cairns region which participate in the marlin fishery and other fishing outside the marlin season. This definition includes the majority of the fishing charter boats in the Cairns region. Unfortunately, no fish catch data was collected during that study. The economic information collected is summarized below.

- 32 game boats and 7 mother ships participated in the 1979 marlin season;
- replacement value of vessels and equipment was $9,935,000 (1979);
- annual expenditure was $2,093,000 (1979);
- annual income from charter boat fees was $2,780,000 (1979).

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1. Owen, K. The North Queensland Black Marlin Game Fishery. Fisheries Division, Department of Primary Industry, Canberra. 1980.

4.2 TOWNSVILLE REGION CHARTER BOATS

The majority of charter boat activity in the Townsville region is from the port of Townsville. The information presented in this section was collected by mail survey of charter boats operating out of the Port of Townsville. The response rate to the survey was 43% with follow-up. The list of charter boats operating out of Townsville was obtained from the Townsville Harbour Master.

The number of "charter boats" operating out of Townsville in mid 1981 was 14. Of these vessels, two were owned by angling clubs and not available for commercial charter, one was involved only in coal port dredging and construction work and one was the regular Magnetic Island ferry. The remaining vessels were available for commercial charter. The following information is for those 10 commercial charter boats[2]. It should be noted that although income and expenditure data are presented for the entire charter operation, not all of this is related to fishing trips. For the fleet of 10 vessels, around 420 of a total of 1,330 charter-days per annum are spent on charters for which the primary activity is fishing.

4.2.1 FISHING ACTIVITY

Number of Trips

The charter boats working from Townsville did not engage only in fishing trips. Reported trip purposes were: fishing; diving or snorkelling; scenic tours; ferrying people to islands, cargo work and scientific charters. The number of trips made primarily for fishing per annum ranged from 10% to 15% of a charter boat's total

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2. The vessels owned by angling clubs are important with regard to fish catch; however, such information has already been collected by the GBRMPA (Craik, W. "Recreational Fishing on the Great Barrier Reef" paper to Queensland Amateur Fishermen's Council, 1981.). Insufficient information on expenditure in relation to these two vessels was provided to allow inclusion in this analysis.

number of charter-days. The estimated number of trips per annum made primarily for fishing by Townsville-based charter boats is approximately 210 trips. As trips average 2 days duration, this makes 420 charter days in total. Fishing is a secondary activity on some trips made primarily for other purposes. The estimated number of trips per annum for which fishing is a secondary purpose is 140 trips (around 280 charter days).

Number of Passengers

The mean number of passengers on a charter trip is 14 persons. The total number of person-days spent primarily for fishing is 5,780 days per annum. The total number of person-days spent with fishing as a secondary activity is 1,930 days per annum.

Fish Catch

The reported weight of fish caught per passenger per day on trips primarily for fishing ranged from 5kg to 100kg. The annual catch from the 10 boats is approximately 87,000kg.

The reported weight of fish caught per passenger per day on trips where fishing was a secondary activity ranged from 1kg to 2.5kg. The annual catch from the 10 boats in this case is approximately 7,3000kg. The total annual catch of fish by the charter fleet is approximately 94,300kg.

4.2.2 ECONOMIC ANALYSIS

The following presents income and expenditure data for charter boats. This data relates to all activity by charter boats, not just fishing activity.

Income

The charter fee per person per day for a fishing trip ranges from $30 to $40. For the "average boat", income from trips primarily for

fishing was $18,480 in 1980/81. For the 10 boats, income from trips primarily for fishing was $184,800 in 1980/81.

The total income from all sources for the "average boat" was $56,662 in 1980/81. For the 10 boats, annual income was approximately $566,600 in 1980/81.

Expenditure

Expenditure data by category and location is presented in Table 4.1 The data are for the year 1980/81. The expenditure by the "average boat" (mean of the sample) was $59,297; total expenditure for the 10 boats was $592,970. Ninety-two percent of expenditure was made within the Townsville region.

TABLE 4.1 : EXPENDITURE DATA - TOWNSVILLE CHARTER BOATS ($ 1980/81)

Expenditure Category	Average Boat $	Total Population $
Fuel and oil	8,033	80,330
Food, drink, etc.	4,504	45,040
Bait	389	3,890
Boat repair & maintenance	5,580	55,800
Gear replacement & repair	3,289	32,890
Rental & hire charges	871	8,710
Licences	184	1,840
Harbour dues	358	3,580
Boat insurance, loan interest	4,655	46,550
Business expenses	5,319	53,190
Wages employed skipper	8,210	82,100
Wages crew and other emp.	3,660	36,600
Other	5,554	
Depreciation*	7,738	77,380
Imports	4,822	48,220
	59,297	592,970

* Estimated at 5% per annum on market value.

Employment

The employment associated with charter boat operations ranges from 2 to 4 persons. Total employment for 10 boats is approximately 28 persons. This number includes skippers and crew as well as shore-based workers.

Value of Boat and Equipment

The market value of boats and equipment (including auxilary boats, motors, electrical equipment etc.) and related shore-based facilities ranges from $132,000 to $300,000 per operation. The market value of the "average boat" and equipment is $185,000. The total market value of all boats and equipment is $1,850,000.

A Caveat

Because of the relatively small population of charter boat operators working out of Townsville and the consequent small sample, the above data should be interpreted with considerable caution.

4.3 MACKAY REGION CHARTER BOATS

Charter boat activity in the Mackay region centres on the Whitsunday islands. The ports of Mackay and Shute Harbour are the departure points for the Whitsunday islands. Sixty charter boats work out of those ports.

A mail survey of charter boats in Mackay and Shute Harbour was conducted to collect economic and fish catch information. The fish catch information is presented in this report. The economic information and results of input-output analysis are to be included in a forthcoming report to the Great Barrier Reef Marine Park Authority by McGinnity.

4.3.1 FISHING ACTIVITY

Number of Trips

The charter boats working from ports in the Mackay region did not engage only in fishing trips. Reported trip purposes were: fishing; diving or snorkelling; scenic tours; ferrying people to islands; cargo work.

Forty seven of the 60 charter boats conducted some trips where the primary activity was fishing. The estimated number of trips per annum made primarily for fishing by Mackay region based charter boats is 1,118 trips. As trips average 2.5 days in duration, in total 2,800 charter days per annum are spent with fishing as a primary activity. The estimated number of trips per annum where fishing is a secondary activity is 2,538 trips. As these trips also average 2.5 days duration, 6,350 charter days per annum are spent with fishing as a secondary activity.

Number of Passengers

The mean number of passengers on a trip with fishing as the primary purpose is 10, while on trips where fishing is a secondary activity, the mean number of passengers is 8.8.

Fish Catch

The reported weight of fish caught per passenger per day on a trip primarily for fishing ranged from 0.5kg to 32kg, mean 9kg. The annual catch from all boats on primary fishing trips is 252,000kg. Where fishing was a secondary activity, the mean weight of fish caught per passenger per day was 1.6kg (range 0kg to 8kg). The annual catch from all boats on secondary fishing trips is 89,400kg. The total fish catch per annum from Mackay region charter boats is approximately 340,000kg.

Whitsunday Islands Campers : Fish Catch

It has been previously noted that charter boat services include ferrying people to islands. The Whitsunday islands are an important camping destination. Campers on the Whitsunday islands were surveyed by mail, making it possible to make some estimate of fish catch by these people. Further information on camping in the Whitsundays will be presented in the forthcoming report by McGinnity.

The estimated number of campers per annum on the Whitsunday islands is 6,100. Seventy-one percent of the campers travel to the islands by charter boat and 24% use private motor boats.

The mean catch per person per annum is 8 fish (median 0.36, mode 0, range 0 to 148) with a total weight of 6.8kg (median 0.35kg, mode 0kg, range 0kg to 106kg).

The estimated total fish catch by campers was 41,900kg or 49,400 fish.

4.4 ROCKHAMPTON REGION CHARTER BOATS

Charter boats with home ports in the Rockhampton region visit the Capricornia Section of the Great Barrier Reef Marine Park, the Swain Reefs and to a much lesser extent, other areas of the GBR region. Information on charter boat activity in the Capricornia Section was reported in the 1980 report entitled, Economic Characteristics of Fishing in the Capricornia Section.

Of the 10 vessels from the Rockhampton region, all of which fished within the Capricornia Section, all except one also fished in the Swain Reefs area. The economic information presented in the previous report therefore covers all economic information for charter boats in the Rockhampton region. It is summarized below. Information relating to fishing within the Swain Reefs was not presented in the previous report and is presented below.

4.4.1 FISHING ACTIVITY

Number of Trips

Nine charter boats were found to be operating to the Swain Reefs in 1980. Around 123 trips are made per annum to the Swain Reefs. This number is around one third of the total trips made by charter boats operating regularly from home ports in the Rockhampton region. The mean number of trips made per boat per annum is 14 (range 1 to 32).

Number of Fishermen

The mean number of fishermen per boat is 9 (range 6 to 12). In total, around 1,100 persons fish per annum.

Fish Catch : Swain Reefs

The mean weight of fish catch per fisherman per trip is 45kg (range 13.5kg to 100kg). In total approximately 50,000kg of fish are caught per annum in the Swain Reefs.

Fish Catch : Total

The annual fish catch from all charter boats from the Rockhampton region is approximately 127,500 to 161,500kg. The catch from the Capricornia Section is 70,000 to 104,000kg; that from the Swain Reefs is 50,000kg and catch from elsewhere on the Great Barrier Reef is 7,500kg.

4.4.2 ECONOMIC INFORMATION SUMMARY

- replacement value of vessels and equipment, approximately $2 million (1980);
- annual income from fishing trips to Capricornia Section, approximately $330,000;
- annual income from fishing trips to Swain Reefs, approximately $300,000;
- annual expenditure by charter boat operators, over $350,000. (Not all expenditure items were recorded);
- ninety-percent of expenditure was made within the Rockhampton region.

4.5 SUMMARY

The following is a summary of the information on recreational fishing from charter boats presented in this chapter.

Cairns Region

- 32 game boats and 7 mother ships participated in the 1979 marlin season
- replacement value of vessels and equipment is $9,935,000 (1979)
- annual expenditure by charter boats is $2,093,000 (1979)
- annual income from charter boat fees is $2,780,000 (1979)

Townsville Region

- 10 charter boats worked out of the port of Townsville in 1981
- annual fish catch from charter boats is 94,300kg
- market value of vessels and equipment is $1,850,000 (1981)
- annual expenditure by charter boats is $593,000 (1981)
- ninety-two percent of expenditure is made within the Townsville region
- annual income from charter boat fees is $566,600 (1981)

Mackay Region

- sixty charter boats worked in the Mackay region, mostly around the Whitsunday Islands in 1981
- annual fish catch from charter boats is 340,000kg
- annual fish catch by Whitsunday Islands campers is 49,400kg.

Rockhampton Region

- ten charter boats from ports within the Rockhampton region worked in the GBR region in 1980
- annual fish catch from charter boats is 127,500kg to 161,500kg
- replacement value of vessels and equipment is approximately $2 million (1980)
- ninety percent of expenditure is made within the Rockhampton region
- annual income from fishing trip fees is approximately $650,000 (1980).

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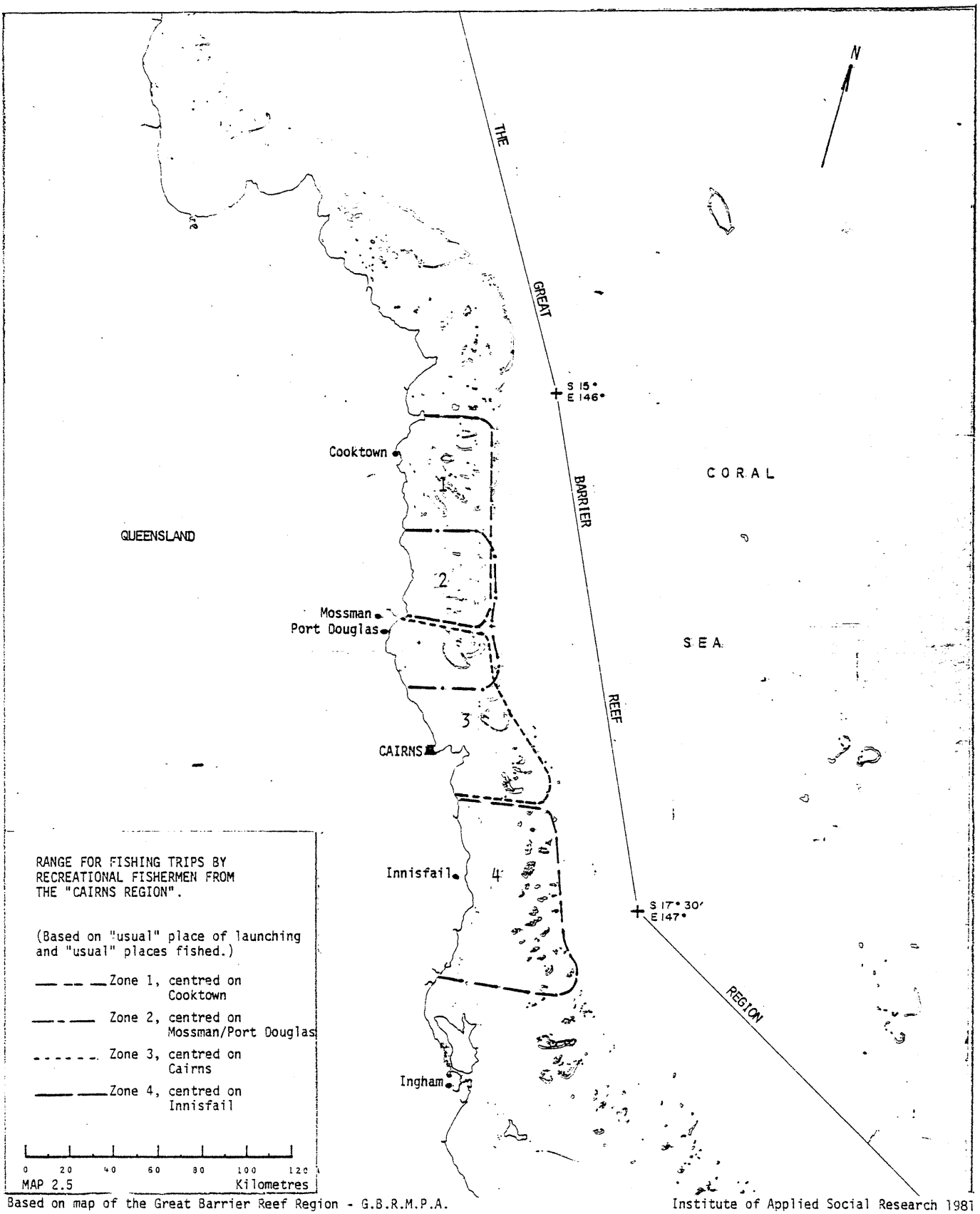
APPENDIX 1 : MAPS, RANGE OF FISHING TRIPS BY RECREATIONAL FISHERMEN BY REGION.

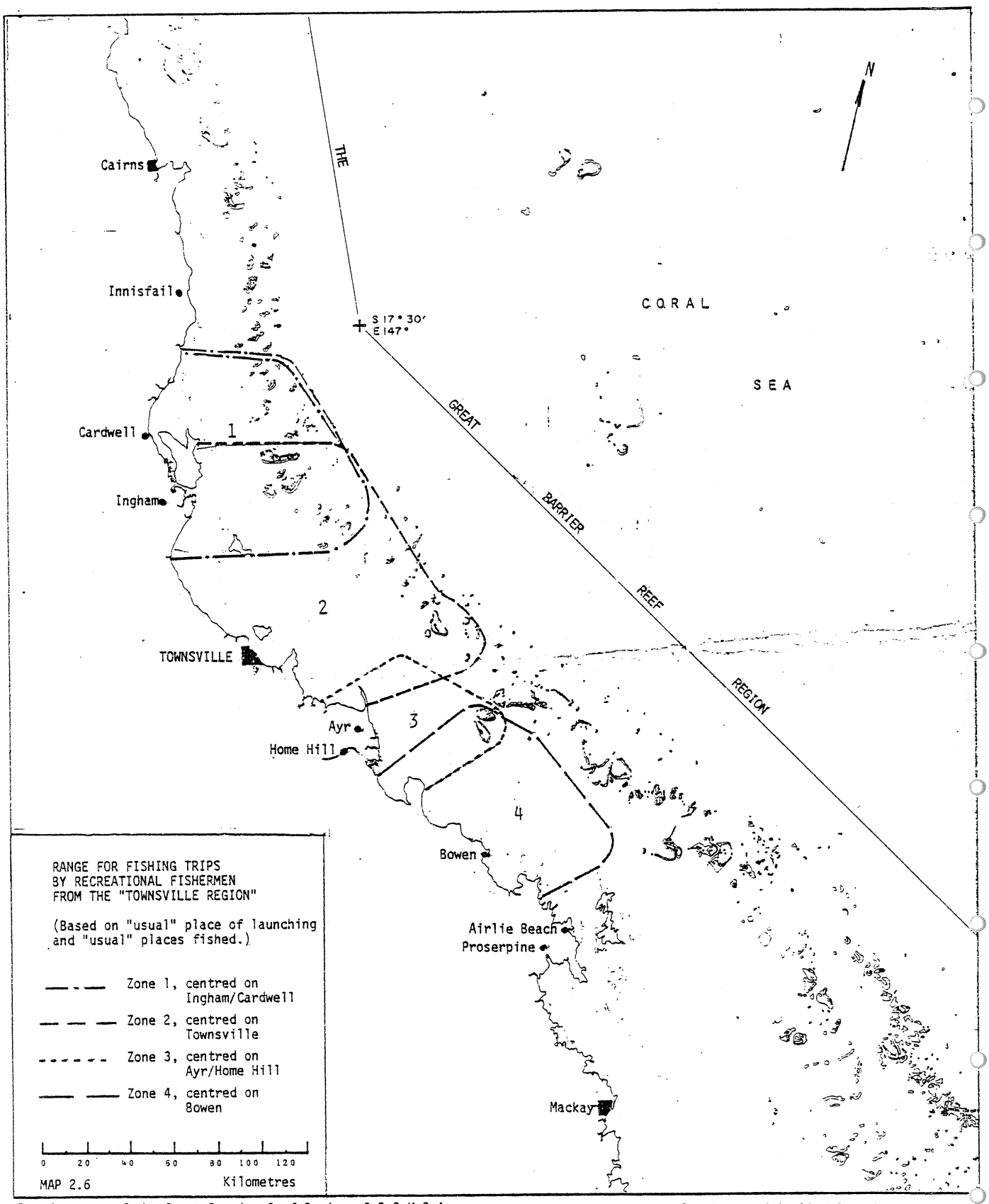
CONTENTS: MAPS 2.5, 2.6, 2.7 and 2.8.



MAP 2.5

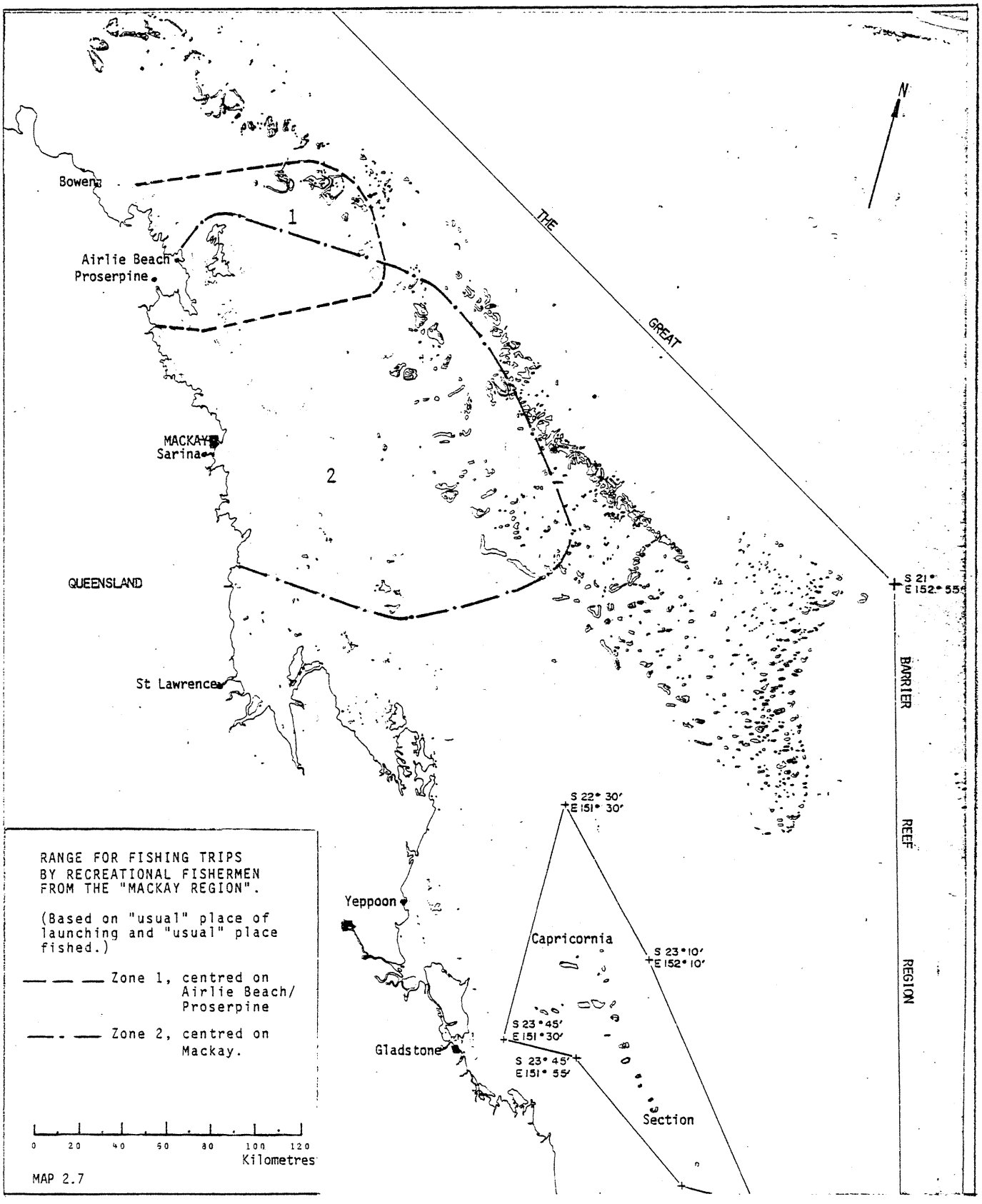
Based on map of the Great Barrier Reef Region - G.B.R.M.P.A.

Institute of Applied Social Research 1981



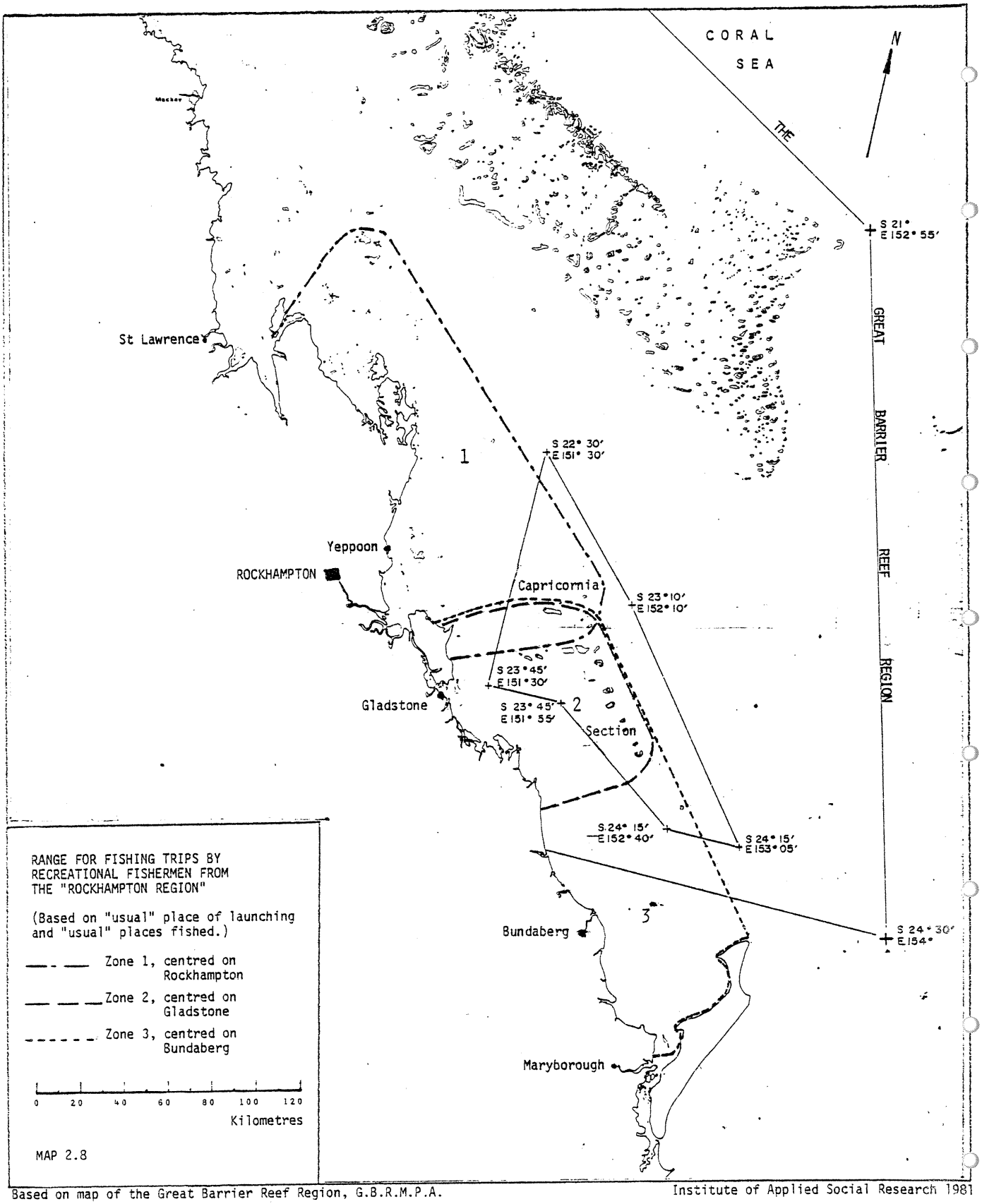
Based on map of the Great Barrier Reef Region, G.B.R.M.P.A.

Institute of Applied Social Research 1981



Based on map of the Great Barrier Reef Region, G.B.R.M.P.A.

Institute of Applied Social Research 1981



Based on map of the Great Barrier Reef Region, G.B.R.M.P.A.

Institute of Applied Social Research 1981

APPENDIX 2 : RECREATIONAL FISHING, BOAT RAMP SURVEYS

Recreational fishermen returning from fishing trips in private motor boats have been surveyed at boat ramps on two occasions in 1980-81. Surveys have been conducted over a range of boat ramps from Tully to Port Douglas and at boat ramps in Townsville. These surveys are of use as checks on mail surveys of private motor boat owners. Information was collected on both fishing activity and expenditure; only expenditure data is reported here.

CAIRNS REGION BOAT RAMP SURVEY

A survey of private motor boats was carried out at boat ramps from Tully to Port Douglas over three weeks in August and September 1980 by the Great Barrier Reef Marine Park Authority and the Institute of Applied Social Research.

It was found that the mean number of trips made per annum was 20. The mean length of boats recorded in the survey was 5.4 metres. Expenditure data was collected during the survey and mean values for expenditure are shown on Table A1.

TOWNSVILLE BOAT RAMP SURVEY

Over the period 20 December, 1980 and 7 January, 1981 the Great Barrier Reef Marine Park Authority with the Queensland Fisheries Service undertook a boat ramp survey of amateur boat fishermen fishing from Townsville boat ramps. Forty-three (43) fishermen were interviewed. The data is of interest as comparison with the larger mail survey.

The vast majority of boat owners did not venture to the Great Barrier Reef proper. In fact only approximately 7% fished on the Reef proper. The others fished mainly in Cleveland Bay, around Cape Cleveland and around Magnetic Island.

The mean number of annual fishing trips undertaken anywhere (that is, not necessarily in the area fished for the trip of the interview) was found to be approximately 20. The range was 1 to 150. Approximately 3/4 of boat owners had made 20 or less trips.

The mean number of persons per boat was 3. In some cases not all persons per boat fished. The mean number per boat actually fishing was found to be approximately 2.57 fishermen.

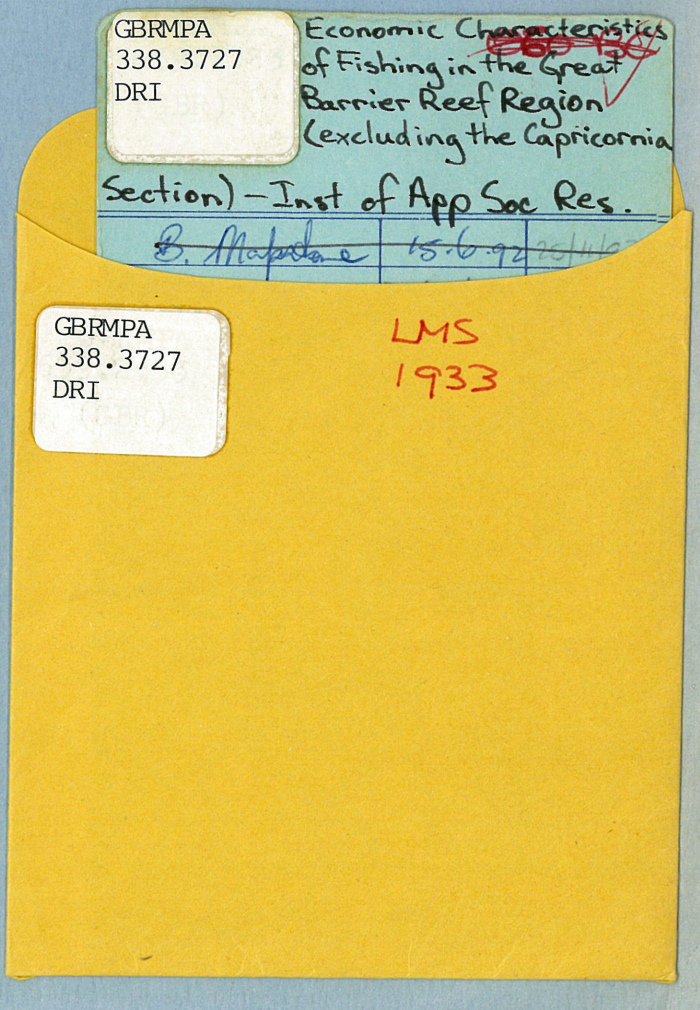
The mean number of fish caught and kept per boat was found to be 4.6 fish. Seventy percent (70%) of boats caught 5 fish or less.

The mean boat length was found to be approximately 4.9 metres. Expenditure data collected during the survey is shown on Table A1.

TABLE A1 : EXPENDITURE DATA, BOAT RAMP SURVEYS

	Cairns Region Boat Ramp Survey ($)	Townsville Region Boat Ramp Survey ($)
CAPITAL EQUIPMENT		
Boat, motor(s), trailer	6,477	4,953
Electrical equipment	302	221
Fish storage equipment	76	49
TOTAL	6,855	5,223
ANNUAL EXPENDITURE		
Maintenance	328	227
Fishing gear	73	36
Insurance	89	60
Licence fees	49	24
Fishing club fees	3	2
Fishing magazines	9	9
Vehicle fuel	NA	NA
Boat fuel	500	320
Bait	52	52
Ice	NA	NA
Food	132	NA
TOTAL	1,235	730

NA: values for these items not available.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