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# ECONOMIC IMPACTS OF ACTIVITIES ON THE GREAT BARRIER REEF



Great Barrier Reef Marine Park Authority

Research Publication

# **ECONOMIC IMPACTS OF ACTIVITIES ON THE GREAT BARRIER REEF**

**S. Driml**

March, 1987



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## PREFACE

As an important component of the information collected for planning, managing and monitoring of the multiple use Great Barrier Reef Marine Park, the Great Barrier Reef Marine Park Authority (GBRMMPA) commissioned consultants to undertake economic analyses of all the major activities occurring in the Great Barrier Reef Region.

The GBRMMPA has adopted the sequential zoning of Sections of the Great Barrier Reef Marine Park (the Marine Park Sections are shown on Figure 2) and consequently the economic analyses were initially commissioned in association with zoning. In all, four consultants' reports were prepared for the GBRMMPA and together the reports present economic information for the entire Great Barrier Reef Region. The purpose of this Technical Memorandum is to present data and analyses from those four studies in a single volume to cover the whole Great Barrier Reef Region and to place the data and analyses in a descriptive and comparative framework.

The consultants' reports on which this report is based are: Jensen, 1979, Hundloe et al., 1981; McGinnity, 1981 and Driml et al., 1982. The first report was prepared in the Economics Department, University of Queensland and the latter three were reports prepared by the Institute of Applied Social Research, Griffith University. The computing for the input-output analysis for the Hundloe et al., 1981 and Driml et al., 1982 reports was undertaken by Dr R.C. Jensen and others in the Economics Department, University of Queensland.

Because the economic reports were commissioned by the GBRMMPA at different times, original data were presented for a number of different years. This causes some difficulty in making comparisons. Where monetary measures are first mentioned in this report they are, reported for the year for which they were collected. All the financial data have also been converted to 1981/82 dollars to allow direct comparison.

The economic information presented herein consists of descriptions of the activities within the Great Barrier Reef Region in terms of investment, employment and industry output, and analysis of regional economic impact of the activities in terms of flow-on effects as calculated using input-output analysis.

A total of 7 700 jobs (direct plus flow-ons) were generated by reef-based sectors. In descending order of contribution these were: commercial fishing, island resorts, recreational fishing, charter boats, research and island camping.

The regional distribution of total output effects, total (household) income effects and total employment effects was such that the Mackay Region generated the largest portion of all total effects followed in descending order by the Rockhampton, Cairns and Townsville Regions.

**KEYWORDS:** economic impacts, input-output analysis, commercial fishing, island resorts, charter boats, recreational fishing, island camping, research.

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**ECONOMIC IMPACTS OF ACTIVITIES  
ON THE GREAT BARRIER REEF**

S. M. DRIML

September 1986

**SUMMARY**

This report is a compilation of information from a number of research projects supported by the Great Barrier Reef Marine Park Authority. The data provides a baseline for monitoring economic change in the Marine Park.

Economic analysis has been undertaken of the following activities (sectors) occurring within the Great Barrier Reef Region; island resorts, charter boats, commercial fishing, recreational fishing, island camping and research.

The economic technique of 'input-output analysis' was employed. This produces information on the generation and distribution of output, (household) income and employment effects in regional and state economies.

The economic information produced is applicable to planning the Great Barrier Reef Marine Park and monitoring the effects of the Marine Park on economic activity.

Output effects, (household) income effects and employment effects referred to below, include both the direct consequences of economic activity in a sector plus flow-ons to the rest of the economy (in this case the four regions of Cairns, Townsville, Mackay and Rockhampton) in generating production and employment. The effects are calculated using 'multipliers'.

The direct output produced by all reef-based sectors in 1981/82 dollars was \$159 million.

The total output effect (direct plus flow-ons) generated through four regional economies was \$272m (1981/82). Island resorts contributed most to this total, followed in decreasing order of effects by recreational fishing, commercial fishing, the charter boat sector, research and island camping.

The total (household) income effects (direct plus flow-ons) were \$78m (1981/82). The largest portion of this was generated by commercial fishing followed by island resorts, charter boats and recreational fishing, research and island camping.

This report is intended as a reference to basic descriptions of reef-based activities and comparisons of major variables. Much of the descriptive economic data contained in this report are original data gathered specifically by the consultants and is not published elsewhere.\* The data presented in this report thus provides an 'historical' description of the reef-related sectors over the period of the late 1970's, early 1980's.

The other purpose of this report is to present multipliers which may be used to calculate regional economic impacts. The multipliers presented in this report will remain current until major structural change occurs in the sectors or the regional economies, and may be used with updated value of production data to provide economic impact information currently and in the short term future.

The monitoring program for the Great Barrier Reef Marine Park includes amongst its objectives "assess the socio-economic impact of the zoning plan and day-to-day management on Marine Park users and others outside." Thus value lies in not only producing contemporary economic information but also in building up an historical data bank on economic characteristics of reef use.

As author of this volume and co-author of two of the consultants' reports I would like to acknowledge the contribution of the following people: Dr Rod Jensen, Dr Guy West and Julian Morison all, then, of the Economics Department, University of Queensland; and Dr Tor Hundloe, Peter McGinnity, Daryl Hudson, Sandra Shaw and John Trigger at that time, all of the Institute of Applied Social Research, Griffith University. Section 4 of this work draws heavily on the work of Jensen in particular.

I would like to thank them for providing the research and analysis on which this volume is based. Any errors or omissions are of course, my responsibility.

Sally Driml  
1986.

\* Fisheries data are an exception, see Hundloe T., 1985. Fisheries of the Great Barrier Reef, Great Barrier Reef Marine Park Authority, Townsville.

## TABLE OF CONTENTS

<u>Title</u>	<u>Page</u>
1. Introduction	1
1. The sectors	2
2. The regions	3
3. The analysis	5
2. Sectors: Great Barrier Reef activities	7
1. Island resorts	7
2. Charter boats	9
3. Commercial fishing	11
4. Recreational fishing	12
5. Island camping	14
6. Research	15
7. Summary	16
3. Methodology: input-output analysis	18
1. Matrix manipulation	19
2. Creating reef-based sectors	21
3. Comments on the method	23
4. An input-output table	25
4. Interpretation of results	28
1. Island resorts - Rockhampton Region	28
5. Comparisons: multipliers and total impacts	38
1. Multipliers	38
2. Impacts	46
6. Conclusion	54
7. References	58

## APPENDICES

I. Cairns Region:	
a. Multipliers, regional level.	61
b. Multipliers, Queensland level.	62
c. Spatial distribution of flow-on effects.	63
d. Total impacts.	64
e. Disaggregated Flow-on impacts.	65
f. Transactions table.	66
II. Townsville Region:	
a. Multipliers, regional level.	68
b. Multipliers, Queensland level.	69
c. Spatial distribution of flow-on effects.	70
d. Total impacts.	71
e. Disaggregated Flow-on impacts.	72
f. Transactions table.	73

III.	Mackay Region:	
	a. Multipliers, regional level.	75
	b. Multipliers, Queensland level.	76
	c. Spatial distribution of flow-on effects.	77
	d. Total impacts.	78
	e. Disaggregated Flow-on impacts.	79
	f. Transactions table.	80

IV.	Rockhampton Region:	
	a. Multipliers, regional level.	82
	b. Multipliers, Queensland level.	83
	c. Spatial distribution of flow-on effects.	84
	d. Total impacts.	85
	e. Disaggregated Flow-on impacts.	86

#### FIGURES

Figure 1.	Reef-based sectors by region.	3
Figure 2.	Map of the Great Barrier Reef Region. locating economic regions and Marine Park Sections..	4
Figure 3.	A simplified input-output table.	19
Figure 4.	Output, income and employment multipliers.	40
Figure 5.	Multipliers by region - output and income.	41
Figure 6.	Multipliers by region - employment.	42
Figure 7.	Multipliers by sector - output and income.	44
Figure 8.	Multipliers by sector - employment.	45
Figure 9.	Total impacts - output, income and employment.	51
Figure 10.	Impacts by Region	52
Figure 11.	Impacts by sector.	53

#### TABLES

Table 1.	Comparative total output 1981/82.	17
Table 2.	Rockhampton Region input-output table.	26
Table 3.	Multipliers, regional level.	29
Table 4.	Multipliers, Queensland level.	34
Table 5.	Spatial distribution of flow-on effects.	34

Table 6.	Total impacts (including own-sector and flow-on effects) of six major activities in the Rockhampton Region.	35
Table 7.	Disaggregated flow-on impacts.	37
Table 8.	Comparative total output 1981/82.	46
Table 9.	Total output effects.	47
Table 10.	Total income effects.	47
Table 11.	Total employment effects.	48
Table 12.	Total multipliers - summary table.	56
Table 13.	Total impacts - summary table.	57



## 1. INTRODUCTION

This report describes in economic terms all the major human activities which occur within the Great Barrier Reef Region. The activities are grouped into the following 'sectors'; commercial fishing, recreational fishing from private motor boats, charter boat tourism, island resort tourism, island camping, and research. These sectors are described for the four economic regions into which the Great Barrier Reef Region may be classified. Basic descriptions of the sectors in terms of investment, employment and value of production are presented in section 2 of this report.

It is emphasised that at the time the researchers undertook the studies on which this volume is based, little data were available on the economic characteristics of Great Barrier Reef-based activities. One of the major products of this research was the provision of basic descriptive data on the extent and location of human activities in the Great Barrier Reef Region and these data were used by the GBRMPA in the marine park planning process.

Further understanding of the economic aspects of human activities is aided by analysis to determine the 'economic impact' of sectors. The methodology adopted for analysis, termed 'input-output analysis', is discussed in section 3. The interpretation of analysis is presented in a stepwise fashion in section 4 so that the interested reader may interpret the extensive results, which are presented in detail as Appendices.

The information derived from the analysis is most useful if examined in a comparative sense, and this is undertaken in section 5. Both multipliers, and the economic impact data calculated using the multipliers, are presented and contrasted according to sector and region. The economic impacts are described for 1981/82, thus forming a basis for monitoring changes in economic activity since that time.

## 1.1 The sectors

The Great Barrier Reef-based activities included in analysis are those which lie within the outer boundaries of the Great Barrier Reef Region. The Great Barrier Reef Region, shown on Figure 2, is defined by the Great Barrier Reef Marine Park Act 1975 and is the area which is being progressively planned (zoned) as a multiple use Marine Park.

The adjacent mainland is not included in the Great Barrier Reef Region although the economic activities within the Great Barrier Reef Region are closely associated with the mainland. Most of the islands within the outer boundaries of the Great Barrier Reef Region are not included in the Marine Park, however resort activities on these islands are included in the economic analysis because of their close association with the Great Barrier Reef Region. Hereafter the area will be referred to simply as the 'Reef' to emphasise that the Great Barrier Reef Region, plus islands lying within its outer boundaries, are included.

The Reef-based activities with which this report is concerned cover all major uses of the Reef. The activities have been grouped into the following 'sectors':

- Island Resorts
- Charter Boats (including day-trips)
- Commercial Fishing
- Recreational Fishing (from private boats)
- Island Camping
- Research

A brief description of each sector is given in section 2 of this report, including the more important data on each sector. The data and economic analysis present a 'baseline' as they represent the first such data collected and analysis undertaken for the Great Barrier Reef Marine Park.

## 1.2 The regions

The geographic and functional unit for this economic analysis is the economic region. A region may be any size from a city to a nation and beyond. For the purposes of the economic analysis of the Reef-based sectors, analysis was undertaken for local regions and the State of Queensland.

The four local economic regions chosen for analysis are shown on Figure 2. These regions are based on the Australian Bureau of Statistics' Statistical Divisions and were chosen because input-output tables are available for those Statistical Divisions. For the purpose of this analysis the Wide Bay - Burnett and Fitzroy Statistical Divisions are combined into one region and re-named the Rockhampton Region. The Mackay Statistical Division is renamed the Mackay Region, the Northern Statistical Division is renamed the Townsville Region and the Far Northern Statistical Division is renamed the Cairns Region (renaming was basically for convenience and to reflect the major economic focus in each region). Reef-based activities are considered to be a part of the adjacent mainland economic region as indicated on Figure 2.

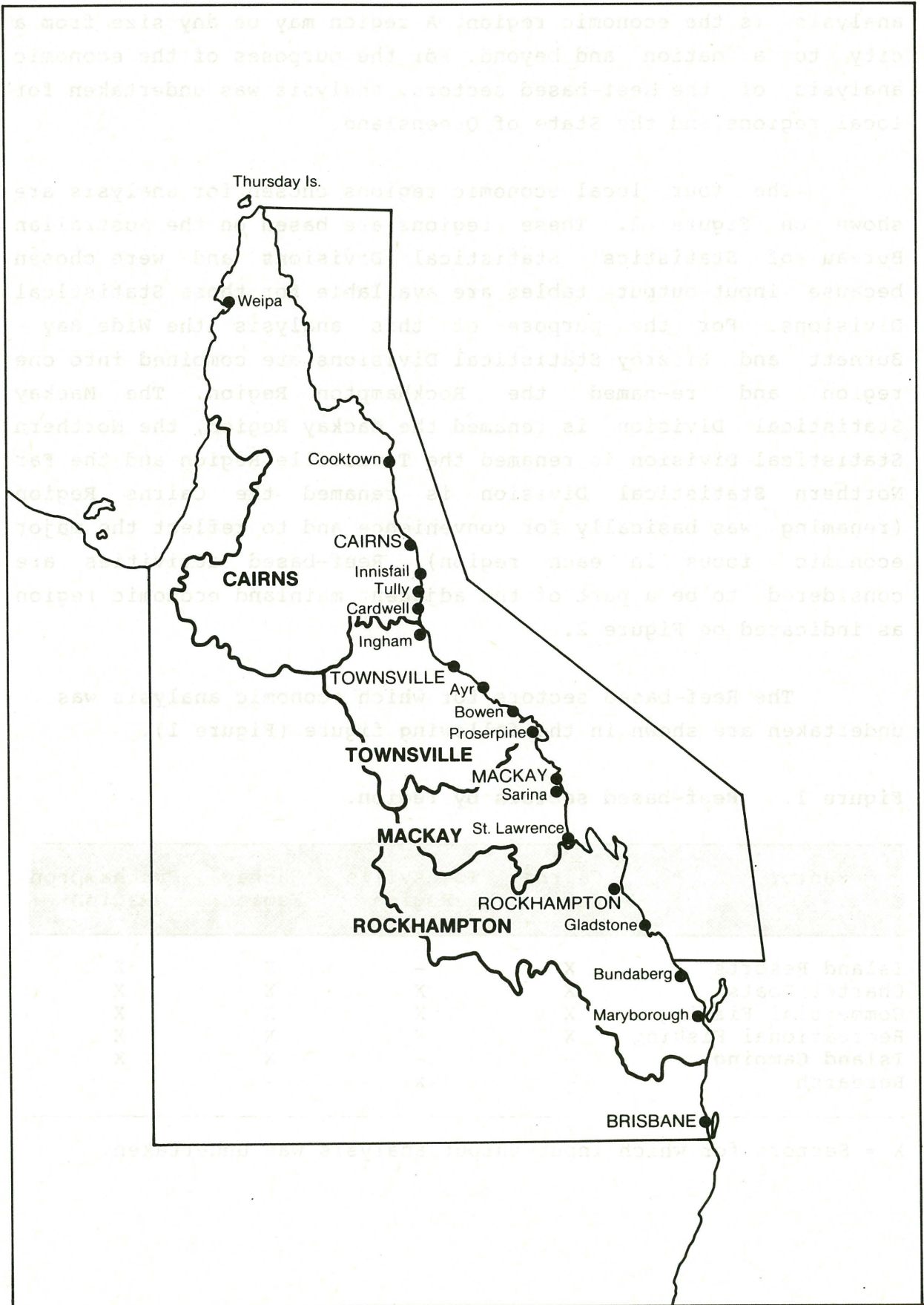
The Reef-based sectors for which economic analysis was undertaken are shown in the following figure (Figure 1).

Figure 1. Reef-based sectors by region.

Sector	Cairns Region	Townsville Region	Mackay Region	Rockhampton Region
Island Resorts	X	-	X	X
Charter Boats	X	X	X	X
Commercial Fishing	X	X	X	X
Recreational Fishing	X	X	X	X
Island Camping	-	-	X	X
Research	-	X	-	-

X = Sectors for which input-output analysis was undertaken.

Figure 2. Map of the Great Barrier Reef Region locating economic regions and Marine Park Sections.



### 1.3 The analysis

The particular economic analysis undertaken was 'input-output analysis'. This is one means of looking at the economic characteristics of the Reef-based sectors and provides information on the flow-on effects of an increase or decrease in output from a sector in terms of output, income and employment. This type of information can be of use in planning the Marine Park. Input-output analysis is considered a useful approach in monitoring the impact on economic activity which may be due to the Marine Park, over time. This approach to economic analysis is only one of several which produce different types of information that may be of use in decision making.

It needs to be stressed that this type of economic impact analysis is limited to consideration of the distribution of gross impacts and not the economic efficient allocation of resources. In other words, input-output analysis does not show whether a particular activity is generating net economic benefits or if a change in the activity will alter net economic benefits.

Input-output analysis provides information on the association of one sector with all other sectors in the economy and on impacts of economic growth or decline in one sector on the rest of the economy. For instance, in the case of commercial fishing, through input-output analysis, multipliers can be produced which estimate the effect of an increase or decrease of output from the sector (sales of fish products) on sector output, income and employment, not only for the commercial fishing sector but throughout the regional and state economies. Thus not only the 'direct effects' on a sector are measured but also 'flow-on' effects to the rest of the economy.

This type of information provided by input-output analysis is relevant to planning where economic impact is an element to be considered in decision making.

Where a planning decision restricts certain activities and a decrease in the value of production is predicted, the distribution of impacts throughout the region and the state can be quantified. On the other hand a planning decision may promote the growth of some activities. The likely increase in economic activity may be quantified using multipliers.

Reef-based sectors may be compared with each other in terms of distributional economic impact and this information is an important element of the economic information useful to decision-makers if competition between uses occurs and trade-offs are required. One particular advantage of the input-output technique as developed for these studies of the Reef Sectors is that 'non-commercial' activities such as recreational fishing and camping are able to be included and the economic impact of expenditure on those activities calculated.

Monitoring of the impact of a Marine Park plan on the regional and state economy over time may be undertaken using input-output analysis every five years or so. Such an exercise requires the collection of up to date figures on the value of production of a sector. This data may be analysed using input-output multipliers to calculate impact effects. Comparisons over time and between sectors may tell much about any economic effects of a zoning plan.

## **2. SECTORS: GREAT BARRIER REEF ACTIVITIES**

The data collected for the input-output analysis presented in this report range over the years 1978/79 to 1981/82. Thus the data provide an historical picture of the economic characteristics of Reef-based activities over that period. The year to which the data refers is indicated in brackets. In most cases the data are primary data, collected by surveys undertaken as part of consultancies for the GBRMPA. In all cases the data presented in this section are descriptive data for each sector, not yet subject to further analysis. For each sector, the descriptive data is presented according to economic region. Standardized data converted to 1981/82 dollars are also presented at the end of the chapter.

### **2.1 Island resorts**

In 1981, there were 17 island resorts (excluding Magnetic Island) operating in the Great Barrier Reef Region. Although these resorts are generally not actually located within the Great Barrier Reef Marine Park (Commonwealth jurisdiction begins at low water mark around most islands), the close association between resorts and Reef-based recreation qualified island resorts for classification as a Reef-based sector. Information on the economics of island resorts was gathered by both personal interviews and mail surveys over the period 1979 to 1982.

#### **Cairns Region**

The resorts on Lizard Island, Green Island and Dunk Island were included in the Cairns Region. These resorts together had a capacity of 305 beds in 140 rooms/units and generated approximately 66 000 visitor nights in 1980. Tourist expenditure (excluding day-trippers), on transport to (from the adjacent mainland) and accommodation and expenses at these resorts was approximately \$5 million (1979/80) (Hundloe et al., 1981).

### **Townsville Region**

Magnetic Island was not included in this sector because of the diversity of activities on the island and its status as a suburb of Townsville.

At the time of collecting data within the Townsville Region, only Hinchinbrook Island resort had been operating for some time. The present Orpheus Island resort commenced operations in 1982. Hinchinbrook Island resort had a capacity of 90 beds in 15 units and attracted around 7 000 guests in 1981, while employing, on average, 7 staff. Financial details were not available for confidentiality reasons (Driml et al., 1982).

### **Mackay Region**

This region is the focus of island resort tourism on the Great Barrier Reef. In 1981 there were eight island resorts operating in the region, with resorts on: Brampton, Newry, Lindeman, Hayman, Daydream and South Molle Islands and two resorts, Happy Bay and Palm Bay on Long Island. Together these resorts had a capacity of 1 600 beds in 585 units. Employment was approximately 578 persons in full-time equivalents. Gross output (revenue from accommodation and other sales) was around \$25 million in 1980/81 (McGinnity, 1981).

### **Rockhampton Region**

Within the Rockhampton Region there were resorts on Heron Island and Great Keppel Island in 1982. Also included in this sector were the low cost units and commercial camping facilities on Lady Elliott Island and on Great Keppel Island ('Wappaburra Haven').

Together the resorts of Heron Island and Great Keppel Island had a capacity of 490 beds, while Wappaburra Haven had 12 units. On average, 189 staff were employed by these establishments, and the gross output was approximately \$9.2 million (1978/79) (Jensen, 1979; Driml et al., 1982).

## 2.2 Charter boats

The term 'charter boats' describes those vessels available for hire for extended trips for fishing, diving etc. and also generally includes vessels which provide regular day-trips and ferry services. For two regions, Cairns and Rockhampton the day-trip component was investigated separately.

### Cairns Region

The charter boat sector as described here includes both 'conventional' charter boats which undertake extended charters and the ferry boats which take day-trips on set routes (for example, to Green Island). The major components of the conventional charter boat fleet working out of Cairns is the game fishing fleet and the economics of this fleet were described by Owen (1980). In the 1979 season, 30 boats participated in the four month marlin season whilst 18 of these boats were available for charter all year. Employment in full-time equivalents was approximately 70 people. Gross output (earnings from charter fees) in 1979 was \$3.1 million.

The day-trip sector for the Cairns Region was analysed separately. Between 145 000 and 155 000 day-trips were made within the Cairns region in 1980/81. The major component of this sector in 1981 was the Green Island ferry trip. Employment was generated for 80 people in full-time equivalents. The gross output was approximately \$2.3 million (1981) (Hundloe et al., 1981).

### **Townsville Region**

As of June 1982, around 24 charter boats plus two ferries to Magnetic Island were operating from ports in the Townsville Region. Fishing and diving/snorkelling were the major activities undertaken from charter boats. A considerable amount of part-time employment is involved in the industry, estimated employment was 40 persons in full-time equivalents. The estimated output from this sector was \$1.6 million in 1982 (Driml et al., 1982).

### **Mackay Region**

Charter boat operations in the Mackay Region cater largely for tourism around the Whitsunday Islands and include a large 'bareboat' component. In 1980, around 60 conventional charter boats (including ferries) and 52 bareboats operated in the Mackay Region. Approximately 94 persons (in full-time equivalents) were employed in this sector. Gross output (revenue from charter fees and other sales) was \$13.4 million in 1980/81 (McGinnity, 1981).

### **Rockhampton Region**

The number of conventional charter boats operating from the Rockhampton Region in 1980, was 14 boats. The major activity undertaken was recreational fishing in the Capricornia Section of the Great Barrier Reef Marine Park or in the Swain Reefs area. The conventional charter boat fleet had a replacement value of \$3 million (1980) and employed around 28 people in full-time equivalents. The output of this sector (charter fees) was \$1.3 million in 1981/82.

In addition, day-trip/ferry services operate to Great Keppel Island. In 1982, there were four vessels (one of which was a hydrofoil) operating on this run. The day-trip service carried approximately 100 000 people in 1982 and employed 23 people in full-time equivalents.

The output was approximately \$1.2 million (1981/82). Because complete data was not available, it was not possible to include the day-trip component in the Rockhampton Region charter boat sector for input-output analysis (Driml et al., 1982).

### 2.3 Commercial fishing

Commercial fishing data for the Cairns, Townsville and Mackay Regions were collected in a major survey conducted by personal interview in 1980. The financial data pertain to the three previous financial years, 1977/78 to 1979/80. Data for the Rockhampton Region were collected by mail survey and personal interviews in 1980 and data pertain to the year 1978/79. All commercial fishing vessels registered in home ports adjacent to the Great Barrier Reef Region except those endorsed to fish in the Gulf of Carpentaria are included. Data on sales of fish and seafoods generally represent an under-reporting due to black-market sales and the figures calculated may be low estimates of the actual situation.

Otter trawling for prawns and, to a lesser extent for scallops, is the dominant fishery. Mackerel fishing, demersal reef fishing and inshore fisheries (netting and crabbing) are the other important fisheries.

#### Cairns Region

The Cairns Region has the largest Reef fishing fleet of the four regions, with 378 vessels - 196 otter trawlers and 157 vessels engaged in other fishing methods (netting, trolling, handlining etc.) - based in Cairns Region home ports in 1981. The number of people employed in total was approximately 700, with a full-time equivalent of around 500 persons. The 1981 market value of vessels was approximately \$25.8 million. Gross output (sales of fish and seafoods) was approximately \$9.8 million in 1979/80 (Hundloe et al., 1981; Hundloe, 1985).

### **Townsville Region**

The population of commercial fishing vessels with their home ports in the Townsville Region was 278 vessels in 1981, 129 of which were otter trawlers and 149 were vessels engaged in other fishing. Full-time equivalent employment was around 320 persons (around 520 people were involved in the industry indicating a high proportion of part-time work involved). The output from this sector was \$7.8 million in 1978/79 (Driml et al., 1982; Hundloe, 1985).

### **Mackay Region**

Home ports in the Mackay Region catered for 125 commercial fishing vessels in 1981, 36 otter trawlers and 89 vessels engaged in other fishing in 1981. The full-time equivalent employment was estimated at 250 people. Gross output (fish and seafood sales) was approximately \$2.7 million (1979/80) (McGinnity, 1981; Hundloe, 1985).

### **Rockhampton Region**

Numbers of fishing vessels operating from home ports in the Rockhampton Region in 1980 were estimated at 129 otter trawlers and 140 vessels engaged in other fishing. Although a total of 580 people participated in this industry, the full-time equivalent employment was around 420 persons. Commercial fishing returned around \$9.8 million in 1979/80 dollars (Driml et al., 1982; Hundloe, 1985).

### **2.4 Recreational fishing**

This sector covers recreational fishing and other recreational activities from privately owned motor boats. In 1981 there were approximately 25 000 such boats registered in cities and towns adjacent to the Great Barrier reef Region.

### **Cairns Region**

A survey of privately owned motor boats in the Cairns Region established that in 1981 approximately 3 530 boats were used to make recreational fishing trips into the GBRR. recreational fishing is a non-commercial activity and therefore there is no conventional output as in commercial fishing (fish sales) or in resort and charter boat sectors (accommodation and charter fees). Economic impact does arise from money spent on equipment, fuel etc. necessary to go fishing and it is this expenditure which is used as a proxy for gross output. this amount for the Cairns Region was approximately \$10 million in 1980. There is no direct employment attributed to recreational fishing (Hundloe et al., 1981; Hundloe, 1985).

### **Townsville region**

Approximately 4 320 private motor boats travelled into the Great Barrier Reef Region from ports in the Townsville Region to undertake recreational fishing in 1981. For this sector, expenditure was \$12.3 million (1980) (Driml et al., 1982; Hundloe, 1985).

### **Mackay Region**

The Mackay Region supports the smallest number of private motor boats undertaking recreational fishing in the Great Barrier Reef Region at around 2 597 boats in 1981. Expenditure in 1980 was approximately \$4.5 million (McGinnity, 1981, Hundloe, 1985).

### **Rockhampton Region**

In 1981, 4 440 private motor boats from the Rockhampton Region were used to fish in the Great Barrier Reef Region. Expenditure by Rockhampton Region recreational fishermen was \$10.2 million (1980) (Driml et al., 1982; Hundloe, 1985).

## 2.5 Island camping

This activity was included as a Reef-based sector because of the close association between island camping and Reef-based recreation. The Queensland National Parks and Wildlife Service (Q.NPWS) issues permits for camping on island National Parks - although an unknown number of people camp without permit. Information on island camping in the Cairns Region indicated that it was negligible and so this sector is not included in the input-output analysis.

### Townsville Region

There are five island National Parks adjacent to the Townsville Region on which camping is permitted. 2 700 people obtained permits for island National Parks in 1981/82. Unfortunately because of confidentiality of records held by Q.NPWS, it was not possible to survey these campers to determine economic characteristics.

### Mackay Region

The Whitsunday group of islands and other islands in the Mackay Region contain around 80 island National Parks. In 1980/81, around 1 500 campers were issued permits, however the Q.NPWS estimate that actual camping numbers were around 5 500 people. A survey of expenditure estimated that \$1.2 million was spent on island camping in 1980/81. Around two-thirds of expenditure was made in the Mackay Region (McGinnity, 1981).

### Rockhampton Region

During 1981/82, approximately 2 500 people obtained camping permits for islands including island National Parks adjacent to the Rockhampton Region. A survey of people who had camped on islands in 1981/92 was conducted. Campers spent \$0.28 million in 1981/82, around half of which was spent in the Rockhampton Region (Driml et al., 1982).

## 2.6 Research

Expenditure on research in the Great Barrier Reef Region is sufficiently high to qualify this sector for inclusion in this study of economic impact. The Mackay Region does not include any research stations. Unfortunately, data from the Lizard Island Research Station in the Cairns Region were not available at the time of analysis - the characteristics could be expected to be similar to those of the Rockhampton Region in terms of input-output characteristics.

### Townsville Region

Townsville is the main centre for research on the Great Barrier Reef, being the site of the Australian Institute of Marine Science, the James Cook University (including Orpheus Island Research Station) and the Great Barrier Reef Marine Park Authority.

The GBRMPA has as its main functions the planning and management of the Great Barrier Reef Marine Park and, in that context, funds research. Because its reason for existence is the Great Barrier Reef, the total annual budget of the GBRMPA has been included in this sector.

Research is also undertaken in the Great Barrier Reef Region by other universities and government bodies (CSIRO for example). However, it has been found that most expenditure is made within the region in which the institution is located, and that the economic impact in the Townsville Region is small (chartering of vessels is covered under the charter boat sector).

Full-time equivalent employment for GBR research in the Townsville Region has been calculated at 160 persons. Expenditure is taken as a proxy for gross output and this has been estimated at \$6.8 million for 1981/82 (Driml et al., 1982).

## Rockhampton Region

The foci for research in the Rockhampton Region are the Heron Island and One Tree Island Research Stations. In 1979, there were eight people employed at the research stations. Estimated expenditure due to research in the Rockhampton Region was low, at \$90 000 (Jensen, 1979).

Results of analysis for this sector are not presented in this report because of the relatively insignificant value of output.

### 2.7 Summary

The economic data reported in this chapter has been converted into 1981/82 dollars in Table 1, to allow direct comparison between sectors and regions.

The figures in the table represent the 1981/82 dollar values of the 'total output' or value of production figures used for input-output analysis. Where a normal commercial activity is concerned (island resorts, charter boats, commercial fishing), the figures quoted are for gross revenue.

'Total output' figures quoted for non-commercial activities (recreational fishing, island camping, research) are gross expenditure figures.

Table 1. Comparative total output 1981/82.

Sector	Cairns Region	Townsville Region	Mackay Region	Rockhampton Region	Total output
Island resorts	6.0	n.a.	27.7	12.2	45.9
Charter boats	6.6	1.6	14.8	2.5	25.5
Commercial fishing	11.8	9.4	3.3	11.8	36.3
Recreational fishing	11.6	14.2	5.2	11.8	42.8
Island camping	n.a.	n.a.	1.3	0.3	1.6
Research	n.a.	6.8	n.a.	0.1	6.9
<b>TOTAL</b>	<b>36.0</b>	<b>32.0</b>	<b>52.3</b>	<b>38.7</b>	<b>159.0</b>

All values are A\$ millions.

n.a. - not applicable/available

### 3. METHODOLOGY: INPUT-OUTPUT ANALYSIS

The term 'economic impact' has come to include the class, size and distribution of effects of economic activity. An economic activity creates impacts in terms of output (value of production), household income, and employment. The size of these impacts and how they are distributed - in the regional, state or national economy - is the subject of economic impact analysis.

Economic impact analysis focused, for example, on a regional economy, traces through the linkages in that economy to quantify the impact of a growth or decline in economic activity on the levels of output of a growth or decline in economic activity, on the levels of output in the remainder of the regional economy, on the level of household income throughout the regional economy, and on the number of jobs created in that economy. The analysis is undertaken using a technique introduced in section 1 termed 'input-output analysis'. Using input-output analysis, the impacts throughout the economy of an increase or decrease in output from a particular economic activity may be estimated.

Input-output analysis is a technique which traces the inputs and outputs of an industry throughout a defined economy. The economy is described for the analysis by a matrix with a row and column representing each industry sector. To make the technique manageable, the large number of industries in an economy are grouped into a smaller number of 'sectors'. The input-output table thus constructed is a matrix showing a 'snapshot' of transactions within an economy at a given time. The matrix can be manipulated to provide information in the form of 'multipliers' from which impacts may be calculated.

### 3.1 Matrix manipulation

The initial setting out of information in a matrix is important. The sectors within an economy are arranged so that the sales to other sectors (inputs) are shown down a column. The sectors make up the 'endogenous' part of the table, as shown below in Figure 3.

The sales to 'final demand', which includes personal consumption, investment, some government expenditure and imports, (Jensen, 1979) are shown as a column or columns.

The 'primary inputs' in production, are shown as rows and include depreciation, indirect taxes, wages and salaries (to householders), gross operating surplus, imports and other value-added items (Jensen, 1979), Final demand and primary inputs are 'exogenous' parts of the table.

Figure 3. A simplified input-output table.

SELLING SECTORS	PURCHASING SECTORS					
	Fishing	Tourism	Mining	Household Consumption	Other Final Demand	Total Output
Fishing	20	10	30	10	30	100
Tourism	10 (Endogenous sectors)			(Exogenous sectors)		
Mining	30					
H'sehold	30					
Other Primary Inputs	10 (Exogenous sectors)					
Total Input	100					

One aspect of the exogenous sectors, household payments and consumption, may be included with the endogenous part of the table if it is wished to measure the impacts induced by household consumption. (secondary spending of wages and salaries received).

A brief description of matrix manipulation follows. For a full description of the mathematics of the matrix manipulation, see Morison et al., (1982).

The 'multipliers' produced by matrix manipulation are the key information from input-output analysis. A range of multipliers which describe various elements of impacts and their causes are produced.

The first step undertaken in manipulating the input-output table by matrix algebra is to produce a technical coefficients table by dividing values in the column vector by the total column value. The 'First Round' multiplier is found by summing the technical coefficients in the endogenous part of the table (the industry sectors). This multiplier describes the own sector impact of a \$1 change in output in that sector.

When the endogenous part of the table is inverted using matrix algebra, 'Industrial Support' multipliers are produced. These measure the 'second and subsequent round effects as successive waves of output increases occur in the economy to provide industrial support as a response to the \$1 increase in output' (West et al., 1979).

The original technical coefficients table is then 'closed' with respect to households by including the household vectors with the endogenous sector and again inverting the matrix. The multipliers for 'Consumption Induced' effects are produced in the same way as industrial support multipliers and describe the effects of successive waves of household spending.

The above manipulations provide three types of output multipliers which, when added together, give the 'Flow-On' effect of an initial \$1 increase or decrease in expenditure. That initial effect is termed the 'Direct' multiplier (always having a value of \$1 for output effects) and together with the Flow-On multiplier makes up the 'Total' multiplier.

Income and employment effects are derived similarly by multiplying the technical coefficients table and then the open and closed inverted tables by household income and employment coefficient vectors respectively.

This explanation of multipliers will take on more meaning when the results of analysis of Reef-based activities are described in the next section of this report, but first the means of incorporating data on Reef-based activities into input-output tables is described.

### 3.2 Creating Reef-based sectors

Input-output tables were available for the regions of Queensland and these tables included Reef-based activities aggregated into other sectors. In order to look at Reef-based activities separately it was necessary to split these off into separate sectors. As there was no information available on the size of Reef-based sectors, it was necessary to collect primary data to build row and column vectors for each Reef-based sector. The data in the Reef-based sector was then subtracted from the regional sector in which it originally appeared, to avoid double counting, for example, commercial fishing data was subtracted from the 'Forestry, fishing, hunting' sector.

Data required to be collected from primary sources included the items on which expenditure was made and the location and value of purchases. Where sales were relevant, as in the case of commercial fishing, the location of sales was also recorded.

Information had to be gathered on exports and imports to the region and on employment in the Reef-based sectors. Data requirements were high. Data were gathered by mail questionnaires of recreational fishermen, campers, charter boat operators and some island resorts. Personal interviews were conducted with commercial fishermen, resort operators, research institutions and a proportion of recreational fishermen and charter boat owners. Where possible with commercial operators, profit and loss statements were used as a data source supplemented by questions on location of purchase. Further details of data gathering are included in McGinnity (1981) and in Driml et al. (1982).

The data gathered required further manipulation to construct row and column vectors. The input-output tables are in 'basic' values which means that retail markups, imports and indirect taxes must be deducted from the amount paid for a particular item and allocated to the correct sectors. For instance, in the case of processed food purchases by an island resort: some food will be imported into the region and expenditure on that food is allocated to the 'Imports'; some food will have been purchased from local retailers and wholesalers, in which case the sales markup is allocated to the 'Trade' sector; and the remaining expenditure is allocated to the local 'Food manufacturing' sector.

In the case of Reef-based activities there are some non-commercial activities - recreational fishing, camping, research - which do not have outputs measured in dollar terms like conventional industries.

The commercial fishing sector presented a case where, for various reasons, recorded input was higher than output. In these cases, total output was set equal to total input (expenditure).

It is usual in setting up an input-output table to adjust total input to equal measured total output (by making adjustment to the 'value added' row).

### 3.3 Comments on the method

An input-output table records transactions for one year. The data collected for economic analysis of Reef-based sectors were available in their most current form for different years for different activities and regions and attempts have been made to standardise data for comparison. For each region, internal standardisation was undertaken to ensure that all the data collected plus the base input-output table were for the same year. The analysis for the Cairns Region was for the 1979/80 year, the analysis for the Mackay Region was for the 1980/81 year and the analysis for the Townsville and Rockhampton Regions was for the 1978/79 year.

The fact that data vary across three financial years raises questions about comparability. As multipliers are proportional measures, the size of multipliers will not be changed as much as gross measures are changed due to inflation, however some small reduction in comparability does occur. It is worth noting that analysis for the Townsville and Rockhampton Regions was also undertaken (but not reported) for the 1979/80 year and in most cases, multipliers were the same as those for 1978/79, and in no instance was the variation great. Standardisation within a table (as was undertaken) is a more important requirement to establish accurate relativities between output, income and employment measures, provided the range of time over which data were collected for different regions is not great.

Input-output analysis is a technique which has been under constant development for a number of decades. Although fairly widely used both in Australia and overseas, it has limitations. As the basis of the technique is the matrix describing an economy in simplified terms, this presents a static, aggregated, linear, description of an economy. The results of analysis reflect those limitations and must be interpreted accordingly.

The static nature of the table would not be a problem if new tables could be compiled regularly. However, the large amount of data required makes compilation time-consuming and costly. The latest tables available for Australia at the time of the analysis were for the 1978/79 financial year (Australian Bureau of Statistics, 1980). It was only in 1982 that 1978/79 tables became available for Queensland regions (Morison, et al., 1982). Where economies experience significant structural change the accuracy of dated tables is placed in doubt.

Aggregation in tables refers to two dimensions: aggregation on the economy level, and aggregation on the sectoral level. At the economy level the tables produced for Queensland regions are constructed from tables produced for Australia. It is possible to construct regional tables by reducing the Australian tables by a suitable quotient. Jensen et al. (1979) developed 'augmented' tables for Queensland regions by reducing Australian tables and inserting what regional data were available.

An alternative approach is to build tables from the ground up using regional information collected by survey. While this would give a more accurate picture of the regional economy, it is a more costly and complex process. This report combines the two approaches using regional tables developed from the Australian tables and original data on Reef-based sectors collected by surveys at the regional level.

Where industries are aggregated into 'sectors', information can be lost. Aggregation is, however, necessary for practical use of the tables. The table for Australia has 109 sectors while those for Queensland regions have only 19 sectors. With aggregation, the assumption is that all industries within a sector will have the same relationship with other sectors. The reasonableness of this assumption will vary from sector to sector. In the analysis of Reef-based activities the problem has been largely avoided by creating separate sectors for each activity.

The linearity of relationships in the table means that any changes imposed on the economy will be seen to have a constant effect. No account can be taken of economies of scale or threshold levels of operation. Again, this influences the accuracy of results, but if care is taken in considering the scale of operation of the sector or industry being investigated when interpreting the results, the limitation may be largely overcome.

The limitations discussed above do affect the accuracy of the results which will be obtained from input-output analysis. The problems are more evident the smaller (in gross output terms) the sector under investigation. The sectors representing economic activity on the Reef are mostly smaller than others in the 19 sector Queensland regional tables. Jensen (1979) has warned that the results of analysis of the reef-related sectors should be treated with caution and give an 'order of magnitude' result only. 'Order of magnitude' information can be useful - particularly where no indication of economic impact existed previously. Comparison between Reef-related activities is valid where analysis is undertaken using the same regional tables and the same assumptions.

### 3.4 An input-output table

The input-output table compiled for the Rockhampton Region is shown as an example on the following pages in Table 2. The regional table produced by Morison *et al.* (1982) for the 1978/79 financial year is augmented by the separation of sectors for Island Resorts (12A), Charter Boats (12B), Island camping (12C), Recreational Fishing (12D), Commercial Fishing (12E) and Research (12F).

Table 2. Rockhampton Region: Transactions table (\$ 000).

SECTOR	1	2A	2B	3A	3B	4A	4B	4C	4D	4E	4F	5	6	7
1	10101	0	0	0	0	73008	0	0	0	0	25	0	0	0
2A	11606	3319	34	3	4	82278	0	0	0	0	222	0	0	0
2B	277	0	119	527	8	398	5627	1	10	10	29	130	92	0
3A	0	0	0	8	0	87	0	1	27346	525	5	54788	1	3
3B	9	1	29	1209	1350	126	0	13	4075	3406	381	0	1863	9
4A	3736	328	51	97	71	23543	8	7	64	3	133	8	33	233
4B	4	761	85	731	81	317	5570	125	342	198	32	2	10718	1098
4C	258	311	30	183	112	95	34	2021	60	30	2	90	855	591
4D	50	115	6	587	222	263	92	853	17243	175	110	142	5279	188
4E	0	0	91	165	225	666	137	35	587	4715	3	17	19213	241
4F	971	1107	114	302	131	172	58	25	1068	106	1306	106	139	398
5	5452	4636	23	5758	1159	3915	694	743	16027	1406	330	19652	937	4906
6	988	847	323	572	682	1107	195	231	428	291	53	1978	450	1467
7	6571	7095	1765	1902	983	11319	2627	3537	4668	1306	767	2159	11366	28309
8	7150	3468	695	4416	2461	13861	2366	1474	9078	3464	630	3720	7795	7667
9	28	58	0	2372	1432	1801	672	717	1137	258	129	555	3086	22651
10	92	222	0	103	23	29	0	13	0	0	11	0	0	0
11A	1386	240	4	292	81	70	3	0	14	2	1	10	6	51
11B	261	11	3	337	190	93	96	52	47	10	3	694	15	966
12A	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12B	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12C	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12D	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12E	0	0	0	0	0	4548	0	0	0	0	0	0	0	0
12F	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W & S	90193	88984	2379	56174	6369	49409	18019	22477	30896	5998	1308	26445	40021	147581
O.V.A	82710	96750	9430	141267	14204	8195	10298	16761	42116	6291	1624	80342	35863	88081
IMPORTS	21406	33710	1668	41207	10512	12513	8435	10822	59559	2529	5352	39531	62308	65760
TOTAL	243249	241963	17049	258212	40300	287801	54931	59908	214765	30723	13256	230339	199740	370200
EMPLOY	9401	9275	466	2775	506	4887	2105	2354	2292	670	267	2155	5161	17955

Table 2. Continued.

SECTOR	8	9	10	11A	11B	12A	12B	12C	12D	12E	12F	H-H	O.F.D	EXPORTS	TOTAL
1	0	0	0	0	0	0	0	0	0	0	0	0	0	1601150	2432490
2A	0	7	33	13	185	0	0	0	0	0	0	10101	0	134158	241963
2B	272	0	2	0	46	0	0	0	0	0	0	522	7081	1898	17049
3A	5	0	1	43	3	0	0	0	0	0	0	0	8960	166448	258212
3B	27	0	0	7	14	0	0	0	0	0	0	0	2801	24980	54931
4A	15	116	71	167	230	174	0	14	0	117	2	6444	0	194111	287801
4B	697	242	562	1617	917	12	0	0	0	0	1	6129	1882	22808	54931
4C	4106	42	48	67	9	317	8	73	0	633	6	10275	11092	28560	59908
4D	79	9	72	121	233	0	0	0	0	25	0	2075	4094	182732	214765
4E	112	3	8	66	133	1	0	0	0	0	0	0	1162	3143	30723
4F	519	78	70	1338	113	254	0	1	0	11	2	647	223	3997	13256
5	3581	4259	1438	5605	11675	6	0	0	0	60	0	17559	37391	83127	230339
6	18725	1236	1763	3778	309	1045	0	0	0	0	0	15868	147405	0	199741
7	11180	2346	420	3977	2431	125	2664	27	0	389	0	58106	201071	3038	370203
8	3378	2567	2025	5416	2194	444	0	1	0	155	4	15590	122174	1836	224058
9	1138	9821	2658	337	4516	236	263	0	0	218	3	65874	29190	1513	150772
10	0	49	10	34	32	29	195	0	0	42	0	7457	59515	0	67892
11A	187	473	149	137	348	5	13	0	0	2	0	42609	139878	12860	198821
11B	160	3491	364	377	3322	78	0	2	0	0	0	119064	10112	3784	143532
12A	0	0	0	0	0	0	0	1	0	0	4	2048	1	7207	9261
12B	0	0	0	0	0	0	0	69	0	0	0	232	0	754	1055
12C	0	0	0	0	0	0	0	0	0	0	0	138	0	122	260
12D	0	0	0	0	0	0	0	0	0	0	0	8108	0	0	8108
12E	0	0	0	427	0	28	279	0	0	0	0	672	0	3017	8977
12F	0	0	0	0	0	0	0	0	0	0	0	1	0	67	68
W.S.	104362	52657	48831	138641	61327	1702	0	0	0	4418	29	0	0	0	999042
O.V.A.	18337	64181	1420	22995	45033	1018	1252	7	0	600	12	161058	0	0	950369
EXPORTS	56535	9143	7946	13657	10460	3787	3434	138	0	2307	5	283836	0	0	767096
TOTAL	224055	150720	67891	198820	143530	9261	8108	260	8108	8977	68	892413	784032	1040275	0
EMPLOY	8359	5006	4170	11834	5187	189	0	0	0	416	8	0	0	0	0
1	Animal Industries			4C machinery, appliances		8	Transport, Communication	12C Island Camping				H-H Households			
2A	Other Agriculture			4D Metals, metal products		9	Finance	12D Recreational Fishing				OFD Other Final Demands			
2B	Forstry, Hunting			4E Non-metallic minerals		10	Public Administration	12E Commercial Fishing				Employ			
3A	Coal, Crude petroleum	Mining		4F Other manufacturing		11A Community Service		12F Research				Number employed			
3B	Other Mining			5 Electricity, etc.		11B Entertainment		12G Day Trips							
4A	Food manufacturing			6 Building Construction		12A Island Resorts		W&S Wages and Salaries							
4B	Wood and Paper manufacturing			7 Trade		12B Charter Boats		OVA Other Value Added							

#### 4. INTERPRETATION OF RESULTS

Input-output analysis of up to six Reef-based sectors for four economic regions and the state of Queensland provides a vast amount of data which cannot all be discussed individually. As will be emphasised in section 5 of this report, the total multipliers and the total impacts calculated from these are of most interest as it is these total figures which are of most use in understanding economic impacts. Input-output analysis provides a great deal of information on the elements which make up the total effects. Appendices I to IV contain the complete results of analysis for the four regions, Cairns, Townsville, Mackay and Rockhampton, and for the state of Queensland.

This section of the report contains a guide to interpreting the multipliers contained in the Appendices for all Reef-based sectors. The guide is in the form of an 'interpretation' of the multipliers using an example of one sector for one region, in this case, the Island Resorts sector in the Rockhampton Region. Any other sector may be interpreted using this formula. The following passages in this section are largely quoted from Jensen (in Driml et al., 1982).

##### 4.1 Island resorts - Rockhampton Region

The various multipliers making up the output income and employment effects are discussed below. The interpretation is based on Table 3, (similar tables for each region are presented in Appendices Ia, IIa, IIIa, and IVa).

Examination of the Island Resorts rows in Table 3 shows that each (average) dollar of output of the Island Resorts sector can be expected to exert the following effect on the Rockhampton regional economy.

Table 3. Rockhampton Region: Multipliers by activity, regional level<sup>(c)</sup>.

SECTOR	MULTIPLIERS				RATIOS			
	Initial Impact (1)	First Round Support (2)	Indust. Consump. Induced (4)	Total Flow on (5)	Type IA (7)	Type IB (8)	Type IIA (9)	Type IIB (10)
<b>A. OUTPUT MULTIPLIERS (\$) (a)</b>								
1. Island Resorts	1.000	.297	.114	.275	1.686	.686	-	-
<b>B. INCOME MULTIPLIERS (\$) (a)</b>								
2. Island Resorts	.184	.087	.034	.098	.404	.220	1.476	1.663
<b>C. EMPLOYMENT MULTIPLIERS (b)</b>								
3. Island Resorts	.020	.009	.004	.009	.043	.023	1.448	1.623

- (a) Per dollar of output
- (b) Employees per thousand dollars of output
- (c) Rounding errors occur.

**Output effects (Row 1)**

- (i) 29.7 cents in First Round output effects (Column 2), as a result of direct purchases by Island Resorts from other firms in the regional economy. These firms, in effect need to supply output to a level of 29.7 cents for each dollar of output of the Island Resorts.
- (ii) 11.4 cents in Industrial Support output effects, as the firms supplying first round goods and services to the Island Resorts in turn purchase goods and services from each other in terms of second, third and subsequent round effects. Each round of purchases becomes progressively smaller due to leakages from the economy in the form of imports, until the effects of each additional round are insignificant.
- (iii) 27.5 cents in Consumption Induced effects. These arise from consumer expenditure arising from household income generated by Island Resorts. The employees of the Island Resorts, and of the firms experiencing First Round and Industrial Support effects can be expected to undertake personal consumption expenditure in the region; this expenditure in turn is responsible for a certain level of demand and output in the region. Together with the initial dollar, these result in:
- (iv) a Total Output effect on all firms in the region of \$1.686; or
- (v) a Flow-On output effect, including First Round, Industrial Support and Consumption Induced effects, of 68.6 cents. While the initial impact or cause of the impact is the average dollar of output of the Island Resort (or each additional dollar of output), the effect of the impact on the local economy is the Flow-On multiplier.

**Income effects (Row 2)**

Each dollar of output of the Island Resorts sector results in household income effects in the regional economy of:

- (vi) 18.4 cents in household income for employees within the Island Resorts sector (Column 1), or 'own sector' employment.
- (vii) 8.7 cents in household income associated with employees in firms supplying First-Round goods and services to Island Resorts.
- (vii) 3.4 cents in household income associated with employees in firms supplying Industrial Support goods and services.
- (ix) 9.8 cents in household income associated with Consumption-Induced output, making
- (x) a Total household income effect of 40.4 cents or

- (xi) a Flow-on household income in all sectors of the economy of 22.0 cents.

**Employment effects (Row 3)**

Each \$'000 output of the Island Resorts sector is associated with:

- (xii) .020 employees within the Island Resort sector,
- (xiii) .009 employees in firms supplying First Round goods and services
- (xiv) .004 employees in firms supplying Industrial Support goods and services,
- (xv) .009 employees in firms as a result of Consumption Induced output effects, making:
- (xvi) .043 employees in Total effects; or
- (xvii) .023 employees in Flow-On employment effects.

**Type I and II ratios**

As noted above, these multipliers refer to the average dollar of output of each sector. Income (and employment) impacts are often expressed on a 'per unit of income' (or employment) basis in terms of the Type I and Type II ratios shown in Table 3. These ratios are not multipliers in the strict sense since they do not employ a casual linkage, but are often used to denote an association between the impacting sector and the expected impact. For example, each dollar of household income generated in the Island Resorts sector is associated with \$1.476 in household income in Type IA effect (Initial + First Round effect), \$1.633 in Type IB effect (Initial + Direct - Industrial Support effect), \$2.198 in type IIA (Total effect) and \$1.198 in Type IIB (Flow-On) household income effects. Similarly, Type I and II employment ratios are provided in Part C of Table 3.

## Regional and state distribution of flow-on impacts

As outlined above, the multipliers of Table 3 show the relative impact of the Island Resorts sector on the economy of the Rockhampton Region. Similarly impacts on the state as a whole may be interpreted from Table 4 and Tables Ib, IIb, IIIb and IVb in the Appendices. As expected, the multipliers for the impacts at the state level are larger due to the fact that the multipliers for the state as a whole include purchases from the rest of Queensland i.e. Queensland other than the Rockhampton Region. It is useful to draw these multipliers together and to compare the impact of flow-on effects, according to the distribution of the impacts. This has been done, as far as existing data will allow.

These 'flow-on' effects are presented for all regions in the Appendices (Tables Ic, IIc, IIIc and IVc) and the information for Rockhampton Region Island Resorts is mirrored in Table 5.

To continue the use of Rockhampton Region Island Resorts as an example, Table 5 shows (Column 1, Row 1) that each dollar of output of Island Resorts can be expected to produce an output flow-on of \$1.33 in the rest of the economy. Row (2) shows that the expected flow-on to the sector of the region will be 68.6 cents, meaning that 64.4 cents (Row 3) will flow to the rest of the Queensland economy, it can be reasonably expected that the large part of this rest of state flow-on will occur in Brisbane, which is the main source of supply of non-local goods and services to the regions of the state.

In a similar way, each dollar of output of Island Resorts can be expected to be associated with 15.7 cents in household income in the rest of the state and each thousand dollars of output of that sector to result in 0.014 persons employed in the rest of the state. Although it would be expected that there will be a similar general pattern in the spatial distribution of output, income and employment flow-on effects, there is no a priori reason why there should be a close correspondence.

In fact the proportion of total state flow-ons which occur in the region are respectively 51.6 percent for output, 58.5 percent for household income and 59.9 percent for employment in the case of the Island Resorts. These proportions are shown in Part C of Table 5.

### Total Impacts

The interpretation so far has been confined to the relative impacts of the various activities in terms of the average dollar of output of these activities. Part B of Table 5 converts these impacts into absolute terms to allow some examination of the scale of the effects of these activities on the regional and state economies. For example Column (4) shows that the total flow-on output effect of the Island Resorts sector on the sectors of the state as a whole is \$16.23m (i.e. \$12.2m output in 1981/82 dollars x 1.330 (Table 4) with rounding errors), on the region \$8.372 and by subtraction \$47.86m on the rest of the state. In a similar manner the absolute household income effect on the state as a whole is expected to be about \$4.60m, on the region as a whole \$2.68m, and on the rest of the state to the extent of \$1.91m.

The previous discussion has been cast mainly in terms of flow-on effects. The total economic effect of each activity will include both the operations of the activity and the flow-on impacts on the rest of the economy. These are shown in Table 6 (and Tables Id, IID, IIId and IVd in the Appendices), which simply aggregates for each activity the value of output, income and employment used in the input-output transactions tables, with the flow-on effects shown in Part B of Table 5 (and Appendix Tables Ic, IIc, IIIc and IVc).

Table 4. Rockhampton Region: Multipliers by activity, Queensland level<sup>(c)</sup>.

SECTOR	MULTIPLIERS				RATIOS				
	Initial Impact (1)	First Round (2)	Indust. Support (3)	Cons. Induced (4)	Total Flow-on (5)	Type IA (7)	Type IB (8)	Type IIA (9)	Type IIB (10)
<b>A. OUTPUT MULTIPLIERS (\$) (a)</b>									
1. Island Resorts	1.000	.478	.309	.542	2.330	-	-	-	-
<b>B. INCOME MULTIPLIERS (\$) (a)</b>									
2. Island Resorts	.189	.122	.081	.173	.566	1.647	2.078	2.992	1.992
<b>C. EMPLOYMENT MULTIPLIERS (b)</b>									
3. Island Resorts	.020	.012	.008	.017	.057	1.597	1.999	2.810	1.810

- (a) Per dollar of output
- (b) Employees per thousand dollars of output
- (c) Rounding errors occur.

Table 5. Rockhampton Region: Spatial distribution of flow-on effects<sup>(c)</sup>.

SECTOR	PART A. MULTIPLIERS (a)		PART B. AMOUNTS (e)		PART C. PROPORTIONS		
	Output (\$) (1)	Income (\$) (2)	Output (\$'M) (4)	Income (\$'M) (5)	Output (%) (7)	Income (%) (8)	Employment (%) (9)
<b>Island Resorts</b>							
1. State Level	1.330	.377	16.23	4.60	100.0	100.0	100.0
2. Rockhampton Region	.686	.220	8.37	2.68	51.6	58.5	59.9
3. Rest of Queensland	.644	.157	7.86	1.91	48.4	41.5	40.1

- (a) Per dollar of output
- (b) Employees per thousand dollars of output
- (c) Rounding errors occur
- (d) Drawn from Tables 4.1 and 4.2
- (e) Calculated by application of multipliers to sector output levels (shown in Table 2.1) 1981/82 dollars

For example, the value of output of the Rockhampton Region Island Resorts sector is \$12.20m (in 1981/82 dollars); summed with the flow-on effects of this sector at the state level of \$16.23m (Table 5), produces the total output value of Island Resorts at the state level of \$28.42m (in 1981/82 dollars).

**Table 6. Total impacts (including own-sector effect and flow-on effect) of six major activities in Rockhampton Region. (all values are in 1981/82 dollars)**

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	Output (\$million)	Income (\$million)	Employment (employees)
<u>Island resorts</u>			
State level	28.42	6.84	696
Rockhampton Region	20.56	4.92	525
Rest of Queensland	7.86	1.92	171

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#### Disaggregated impacts

Most of the interpretation of results above has referred to the impacts of the Island Resort sector on the economy of the state of Queensland and the Rockhampton Region as a whole, i.e. including all sectors in those economies. It is possible to develop disaggregated or partial multipliers which show how these aggregate flow-on effects are distributed over the various sectors of the economy.

The disaggregated impacts developed for this study are shown for Island Resorts, in Table 7 and for those sectors of sufficient size to make this analysis meaningful, in Tables Ie, IIe, IIIe and IVe in the Appendices. The results presented for output and employment effects are limited in two ways. First, it will normally be the case that the main effects of sector flow-ons will be concentrated in a few sectors, with a number of small impacts recorded in various sectors.

In recognition of the limitations of the data and technique, impacts of less than five percent of total flow-ons have not been shown in Table 7 and in the Appendices. Secondly, the flow-on disaggregation has been limited to the two or three 'larger' sectors in the region for presentation in the Appendices, in further recognition of data and technique limitations.

Table 7 shows output impacts in Columns (1) and (2), and employment impacts in columns (3) and (4). It shows (Column 1) for example that at the regional level 18.9 percent of the output effects of the Island Resorts sector occur in the Building and Construction sector and that there is a wide distribution of almost equivalent impacts over six other sectors.

It has been illustrated in this chapter that input-output analysis can provide a large amount of data useful in describing sectors and economies. The interpretation illustrated here for Island Resorts in the Rockhampton Region may be applied to any or all of the sectors in the four regions. In order to assist this application, appropriate references have been made to the relevant tables in the Appendices throughout this chapter. A caveat should be issued here as the results of input-output analysis are not exact measures but are order of magnitude estimates only, and this warning is especially important for the smaller sectors. Although much detail is available from input-output analysis perhaps the best way to use the information is in gross comparison as presented in the following chapter.

Table 7. Rockhampton Region: Disaggregated flow-on impacts of activities (a).

SECTOR	OUTPUT IMPACTS Island Resorts		EMPLOYMENT IMPACTS Island Resorts	
	Region (1)	State (2)	Region (3)	State (4)
1. Animal Industries	-	-	-	-
2A. Other Agriculture	-	-	-	-
2B. Forestry, Fishing	-	-	-	-
3A. Coal Mining	-	-	-	-
3B. Other Mining	-	-	-	-
4A. Food Manufacturing	7.8	11.0	-	5.9
4B. Wood & Paper Manufact.	-	-	-	-
4C. Machinery, etc.	6.2	7.8	7.6	6.6
4D. Metal Products	-	-	-	-
4E. Non-metallic Minerals	-	-	-	-
4F. Other Manufacturing	-	7.0	-	-
5. Elect., Gas & Water	-	-	-	-
6. Building & Construction	18.9	11.6	15.1	8.9
7. Trade	10.2	10.4	15.3	17.5
8. Transport, Communication	10.9	11.5	12.7	13.7
9. Finance	10.3	9.1	10.7	10.7
10. Public Admin.	-	-	-	-
11A. Community Services	-	-	5.5	5.3
11B. Entertainment	9.6	8.0	10.8	9.3

(a) This table includes only the "main" listed flow-on efficient or over.

## 5. COMPARISONS: MULTIPLIERS AND TOTAL IMPACTS

As is evident from the last chapter, a large amount of data are generated by input-output analysis. It is, however, the total impacts made up of initial plus flow-on effects which are usually of most interest. Continuing the example of Rockhampton Region Island Resorts, if the output is \$12.2 million, what does this mean in terms of total output, income and employment generated throughout the regional and state economies? What will be the effect of an increase or decrease of \$1 or \$1 million on the output of the sector? These questions may be answered by using total multipliers.

The additional data produced by input-output analysis help explain what goes in to make up total impacts, i.e. industrial support, and consumption-induced effects. Also, input-output analysis shows in which other sectors of the economy these effects are felt the most. Because most Reef-based sectors are relatively small in terms of output, these sub-divisions of the total multipliers must be accepted with some caution; they are indicative rather than precise measures.

The most useful approach in interpreting the data derived from input-output analysis is in a comparative sense, across sectors and across regions. This comparison follows first in terms of multipliers, and secondly in terms of impacts - dollars and employment.

### 5.1 Multipliers

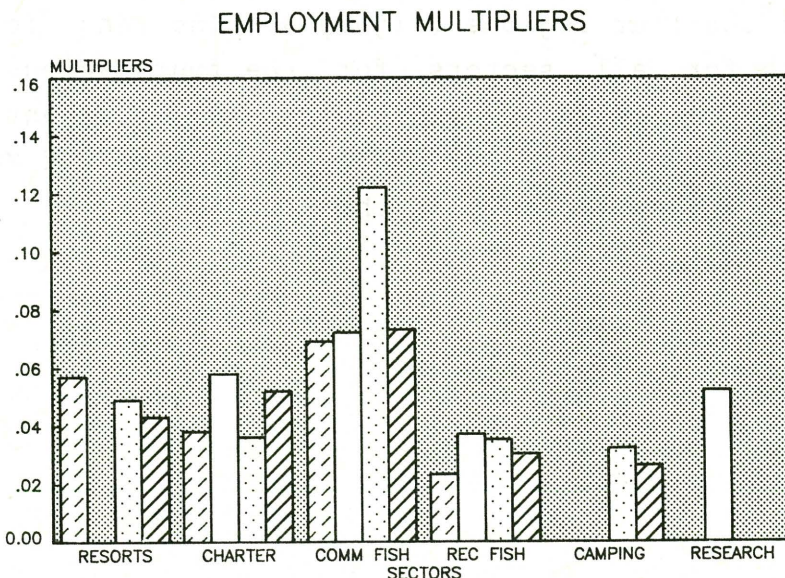
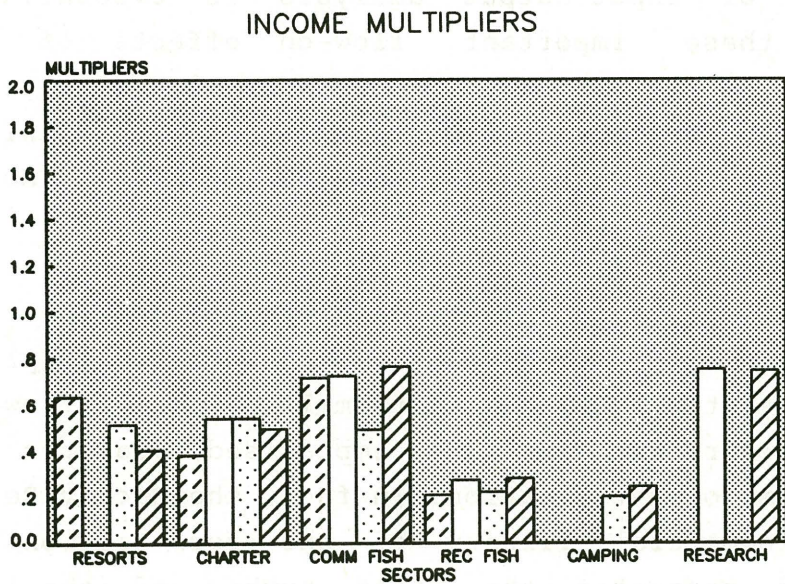
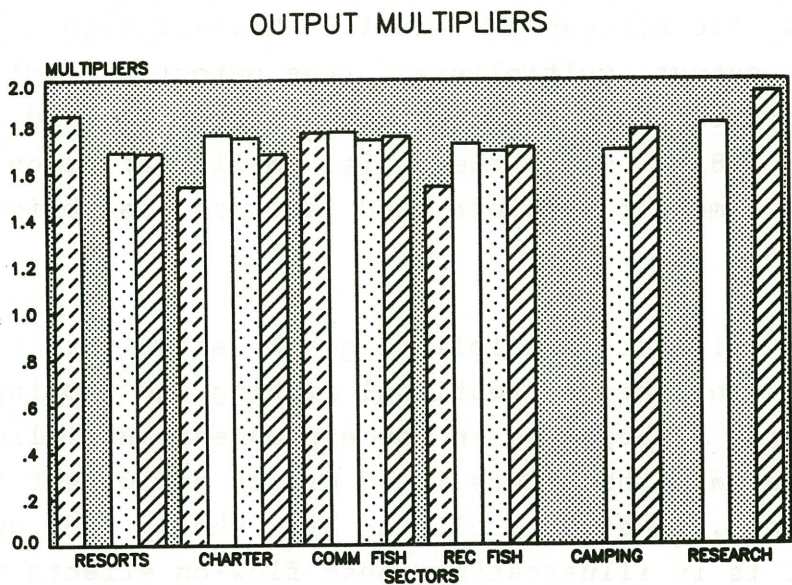
Input-output analysis produces a total output, total income and total employment multiplier for each sector, for each region and the State. These multipliers are listed in Appendices I to IV, and regional multipliers are presented here graphically.

Figure 4 shows total output, income and employment multipliers for the four regions and six sectors. All output multipliers lie between 1.4 and 1.9 which is within the expected range for output multipliers. (The output multipliers for all sectors for the four regions range between 1.3 and 2.4 (Morison et al., 1982). That there is small variation in output multipliers amongst regions and sectors is obvious from this graph.

The income multiplier graph shows distinctly lower multipliers in the Recreational Fishing and Camping sectors, a feature which is repeated in the employment multipliers. This is due to the fact that there is no direct employment in either of these sectors, the multipliers are wholly made up of flow-on effects. It is in illustrating these flow-on effects that much of the value of input-output analysis is evident. Without such analysis these important flow-on effects of recreational activities may be ignored. The range of income multipliers, from 0.2 to 0.8 for Reef-based sectors, falls within the range recorded for all sectors for the four regions by Morison of 0.2 to 1.1 (Morison et al., 1982).

The only multiplier deserving comment at this stage is for Mackay Region Commercial Fishing. This multiplier reflects both the relatively high direct employment plus flow-on effects. The multiplier, it must be emphasised, measures relative not absolute employment creation. In fact, the Mackay Region has the smallest commercial fishery of the four regions in terms of output and generates the least number of jobs in commercial fishing of the four regions (Figure 9). The range for employment multipliers for all sectors for the four regions reported by Morison et al. (1982) is 0.02 to 0.1, and employment multipliers for Reef-based sectors, with the exception of Mackay Region commercial fishing, fall within that range.

Figure 4. Output, income and employment multipliers.



CAIRNS
TOWNSVILLE
MACKAY
ROCKHAMPTON

Figure 5. Multipliers by region - output and income.

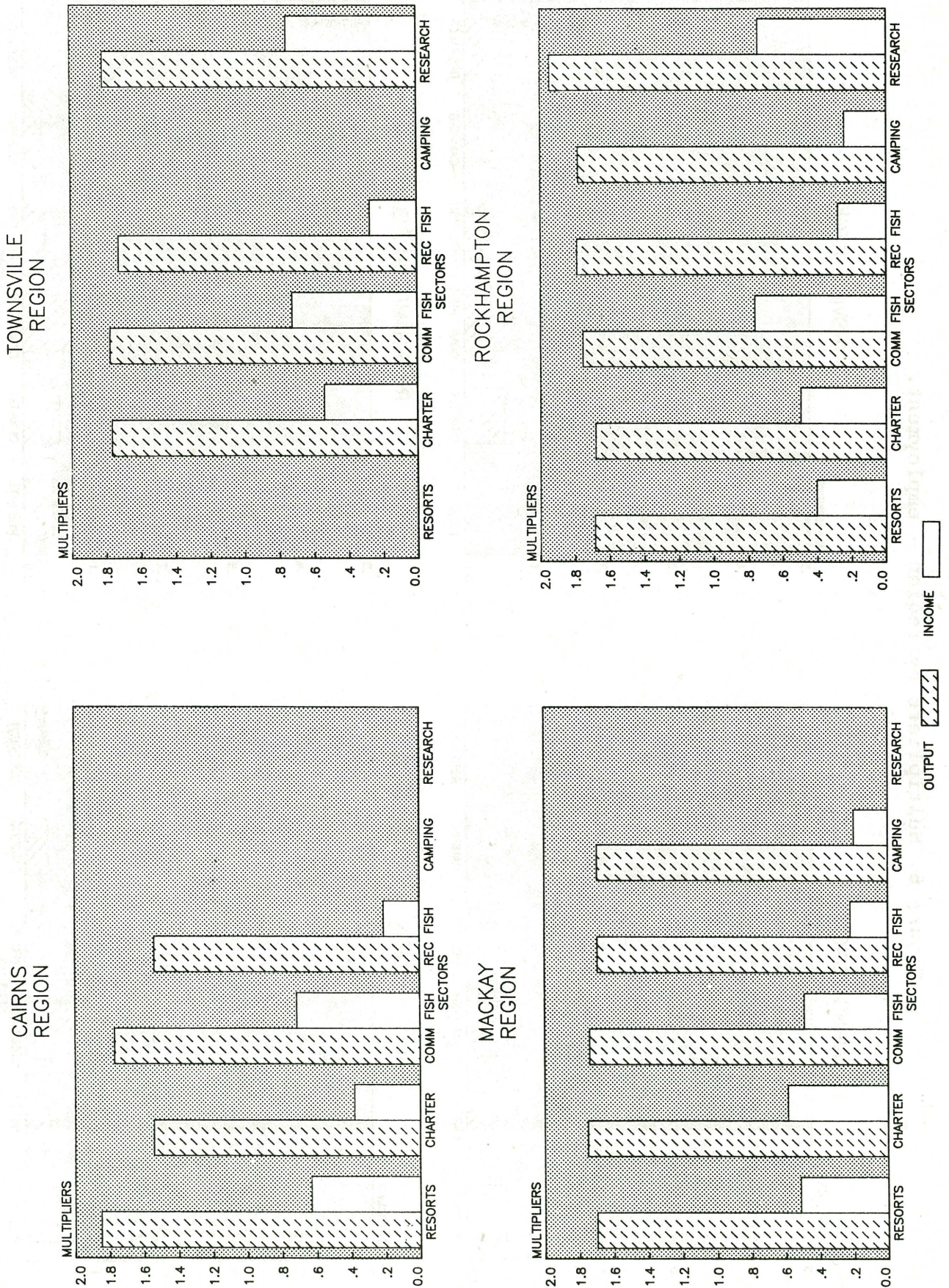


Figure 6. Multipliers by region - employment.



Figure 5 allows comparison of Reef-based sector output and income multipliers within each region and across regions. Output and income multipliers may be contrasted against each other as both represent total dollar output or income impacts for each \$1 change in output. Employment multipliers are measures of the total employment impacts of a \$1 000 change in output.

Therefore although employment multipliers may be compared against each other, they should not be compared with output and income effects and are shown separately in Figure 6.

The Cairns Region exhibits the greatest variability in output multipliers but in none of the regions are the variations large, and no region has markedly higher or lower output multipliers than other regions.

The variability between income multipliers is greater than that for output multipliers within and between regions reflecting wage rate differences and the peculiarities of the recreational and research sectors. These phenomena flow through the employment multipliers.

The comparison within and across sectors shown in Figures 7 and 8 is simply a reordering of the data illustrated in Figure 4 however, it is useful to observe again the relative uniformity of output multipliers. This figure emphasises the smaller size of income and employment multipliers for recreational fishing and island camping.

Figure 7. Multipliers by sector - output and income.

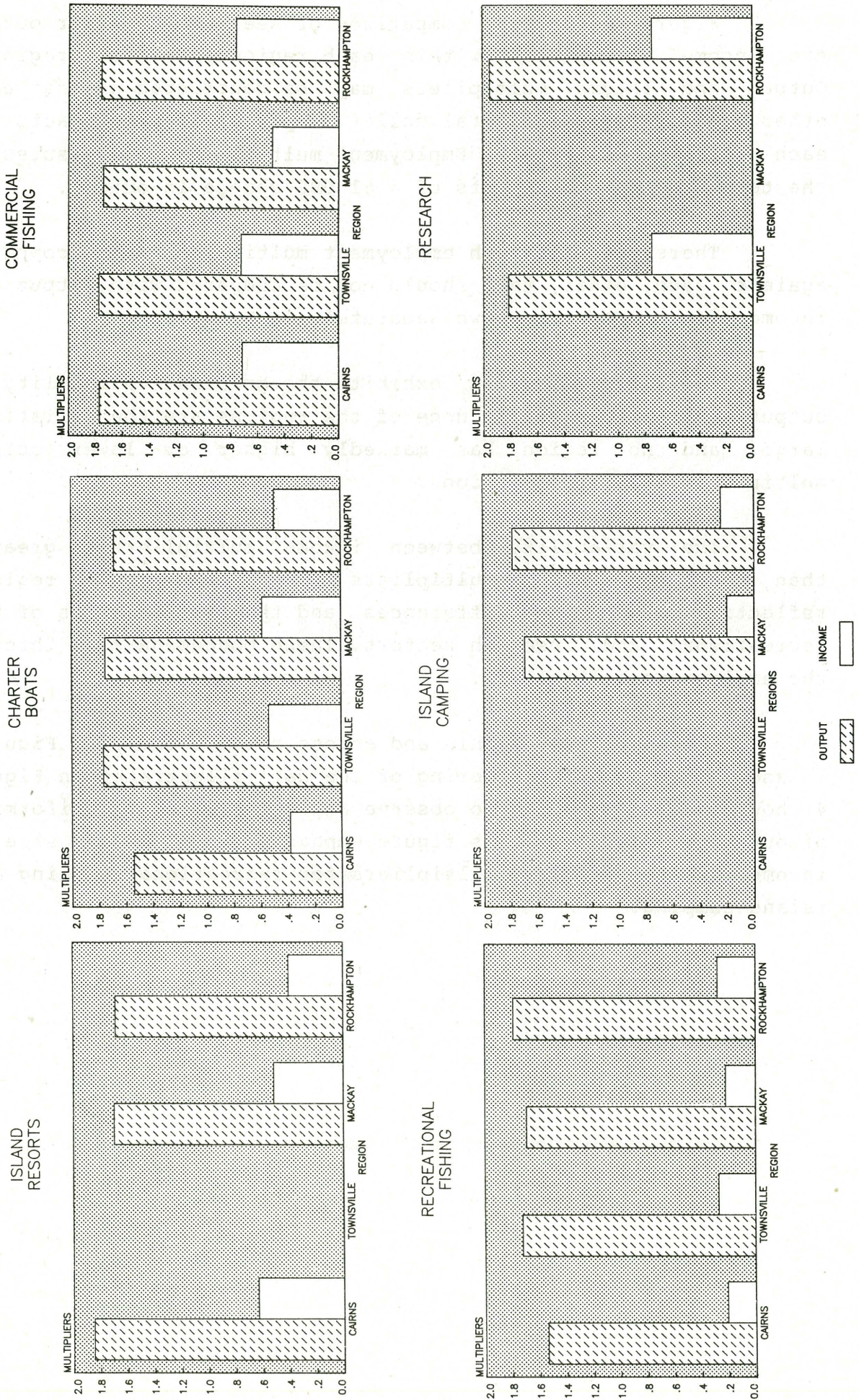
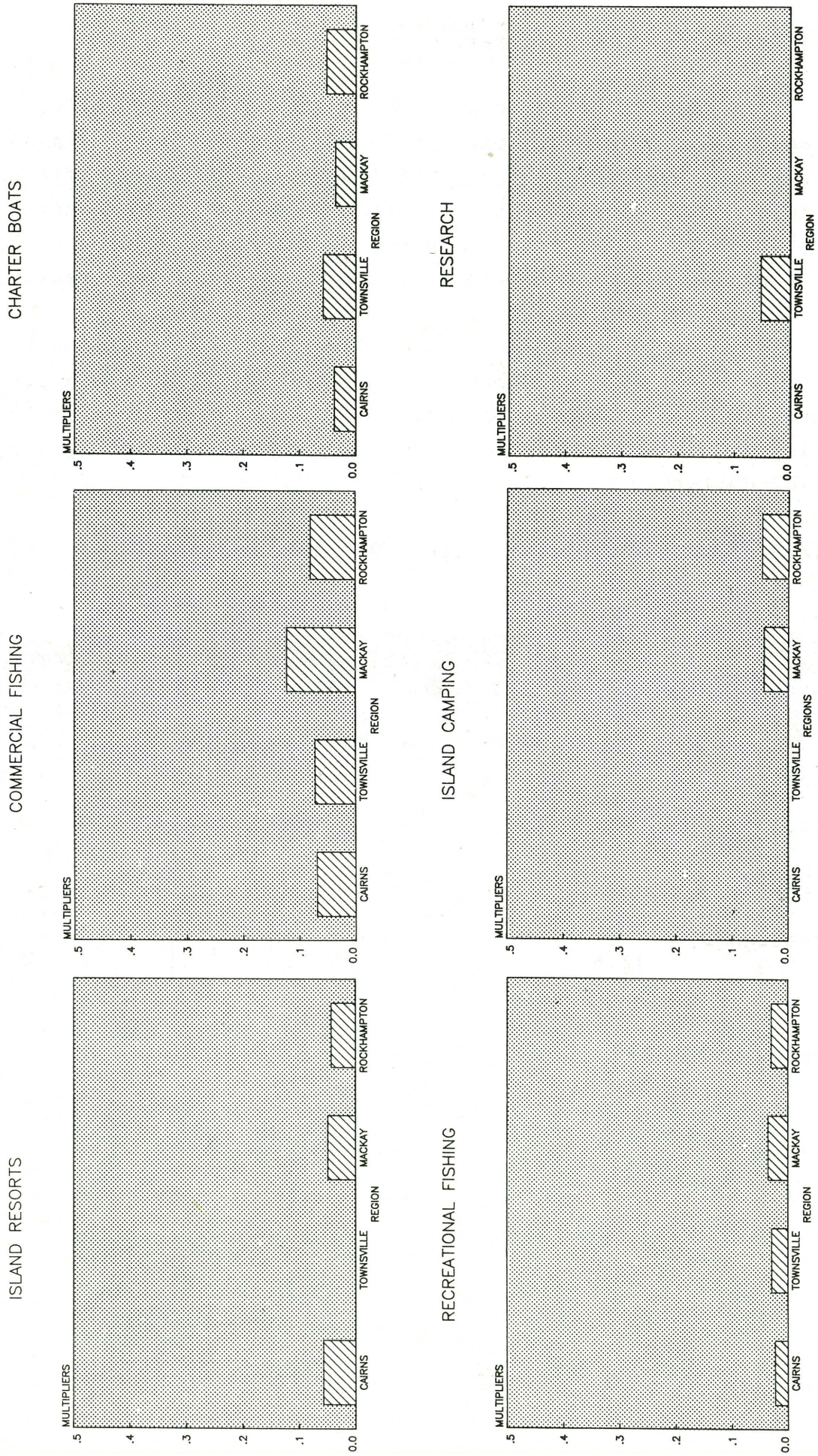


Figure 8. Multipliers by sector - employment.



EMPLOYMENT

## 5.2 Impacts

It is in looking at total impacts that the differences between sectors and regions become evident. Variability amongst multipliers has been shown to be low (except for the difference in income and employment effects between the more traditional industries of commercial fishing and tourism and the less traditional ones of recreational fishing, camping and research).

The main determinant of differences in total impacts is therefore the size of output i.e. the value of production from a sector. The information from Table 1 is repeated here as Table 8, showing the initial output of all sectors in all four regions in 1981/82 dollars.

Table 8. Comparative total output 1981/82.

Sector	Cairns Region (\$M)	Townsville Region (\$M)	Mackay Region (\$M)	Rockhampton Region (\$M)	Total output (\$M)
Island Resorts	6.0	n.a.	27.7	12.2	45.9
Charter Boats	6.6	1.6	14.8	2.5	25.5
Commercial Fishing	11.8	9.4	3.3	11.8	36.3
Recreational Fishing	11.6	14.2	5.2	11.8	42.8
Island Camping	n.a.	n.a.	1.3	0.3	1.6
Research	n.a.	6.8	n.a.	0.1	6.9
<b>TOTAL(\$M)</b>	<b>36.0</b>	<b>32.0</b>	<b>52.3</b>	<b>38.7</b>	<b>159</b>

n.a. not applicable/available.

Table 9. Total output effects (a).

	Cairns	Townsville	Mackay	Rockhampton	Total	Initial	Flow-on
Island Resorts	11.08	-	47.03	20.56	78.67	45.89	32.78
Charter Boats	10.18	2.82	25.90	4.20	43.10	24.47	18.63
Commercial Fishing	20.91	16.69	5.74	20.72	64.06	36.30	27.76
Recreational Fishing	17.86	24.48	8.80	20.16	71.30	42.79	28.51
Island Camping	-	-	2.20	0.53	2.73	2.53	0.20
Research	-	12.32	-	-	12.32	6.80	5.52
<b>TOTAL</b>	<b>60.03</b>	<b>56.31</b>	<b>89.67</b>	<b>66.17</b>	<b>272.18</b>		
Initial	36.00	32.00	52.30	38.30	158.6		
Flow-on	24.03	24.31	37.37	27.87	114.24		

(a) rounding errors occur

Table 10. Total income effects (a).

	Cairns	Townsville	Mackay	Rockhampton	Total	Initial	Flow-On
Island Resorts	3.80	-	14.26	4.92	22.98	14.17	8.81
Charter Boats	2.51	0.86	8.67	1.24	13.28	8.03	5.35
Commercial Fishing	8.42	6.78	1.62	8.99	25.81	15.93	9.88
Recreational Fishing	2.41	3.86	1.15	3.30	10.72	0	10.72
Island Camping	-	-	0.26	0.07	0.33	0	0.33
Research	-	5.10	-	-	5.10	3.21	1.89
<b>TOTAL</b>	<b>17.14</b>	<b>16.60</b>	<b>25.96</b>	<b>18.52</b>	<b>78.22</b>		
Initial	8.41	7.74	16.54	8.65	41.38		
Flow-on	8.73	8.86	9.42	9.87	36.91		

(a) rounding errors occur

Table 11. Total employment effects (a).

	Cairns	Townsville	Mackay	Rockhampton	TOTAL	Initial	Flow-On
Island Resorts	342	-	1357	525	2224	1056	1168
Charter Boats	250	92	532	130	1004	332	672
Commercial Fishing	814	676	402	944	2836	1824	1012
Recreational Fishing	267	411	182	354	1214	0	1214
Island Camping	-	-	42	8	50	0	50
Research	-	353	-	-	353	177	176
<b>TOTAL</b>	<b>1673</b>	<b>1532</b>	<b>2515</b>	<b>1961</b>	<b>7696</b>		
Initial Flow-on	758	648	1043	939	3400		4296
	915	884	1472	1022			

(a) rounding errors occur

The data illustrated in Tables 9 and 10 and Figure 9 are derived by multiplying the value of production from the sectors (shown in Table 8) by the multipliers presented in Figure 4. The variation in size of total output, income and employment impacts is clearly illustrated in Figure 9. The dominance of the Mackay Region Island Resort sector may be compared to Island Camping and Research sectors which are barely evident at the scale of these graphs.

The impacts may be added to produce a total output effect (initial plus flow-on) for all sectors of \$272 million, total income effect of \$78 million and total employment effect of 7 700 people. Impacts may be compared across regions and across sectors. Figure 10 shows a comparison amongst regions. Here the output, income and employment impacts respectively for each sector in a region have been added together. The total impacts are portrayed in terms of initial impacts plus flow-ons.

According to the data, the Mackay Region is the most important in terms of output, income and employment generated by Reef-based activities. The Island Resort and Charter Boat sectors play the greatest roles in making up the Mackay Region output figure. The flow-on component is 42 percent of the total output impact figure of \$90 million for the Mackay Region. The Rockhampton, Cairns then Townsville Regions respectively follow the Mackay region in terms of size of impacts.

Total impacts for each sector are shown in Figure 11. This figure illustrates some interesting differences amongst the sectors. Island resorts contribute the most to the regional economies in terms of output, but with regard to income and employment generation, commercial fishing is the most important.

The explanation for this lies with both direct employment levels and flow-on effects producing together relatively high total income and employment impacts.

Direct employment in commercial fishing indicates a relatively high labour to capital ratio in production and this contributes, amongst other things, to the total income and employment effects.

Recreational fishing has the second highest output impact, despite low income and employment multipliers which are solely based on flow-on effects.

In summary, Figure 11 reveals that the output-producing sectors are, in descending order of magnitude: island resorts, recreational fishing, commercial fishing, charter boats, research and island camping. This order correlates with the magnitude of initial value of production (Table 8) and it does this because there are no great differences in output multipliers (Figure 4). There are no sectors which vary much from the others in terms of dependence on the regional economy.

Because of initial employment levels and flow-on effects, income impacts, in descending order of magnitude, are; commercial fishing, island resorts, charter boats, recreational fishing, research and island camping. The order of recreational fishing and charter boats is reversed when it comes to employment generation.

Figure 9. Total impacts - output, income and employment.

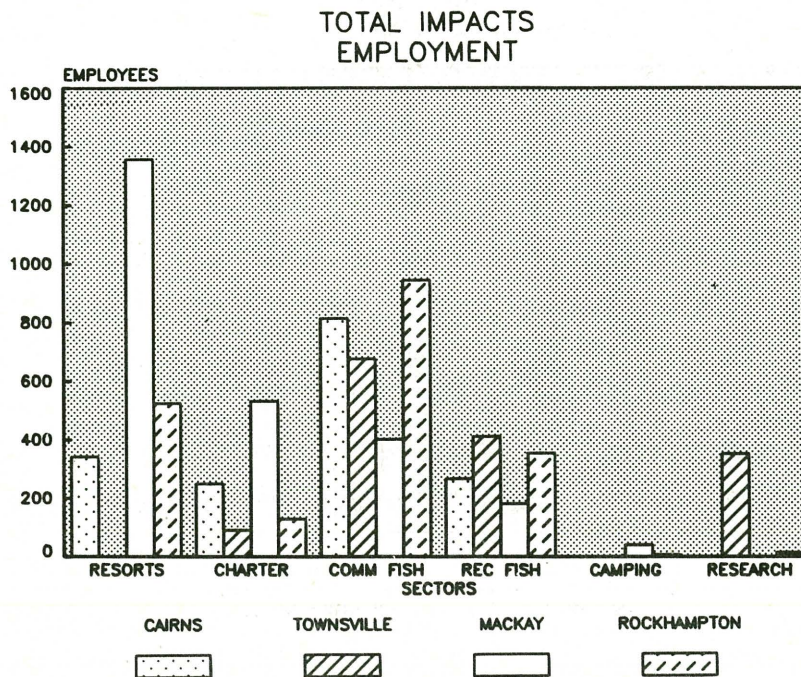
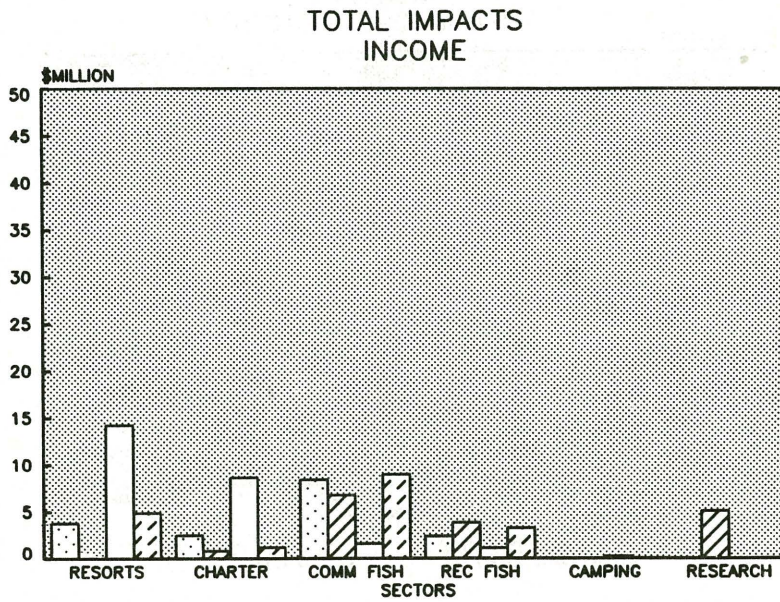
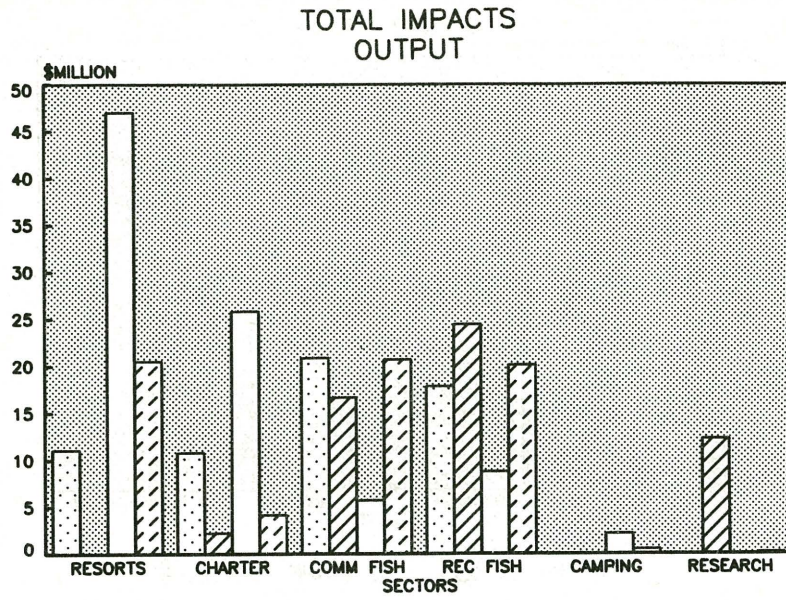


Figure 10. Impacts by Region.

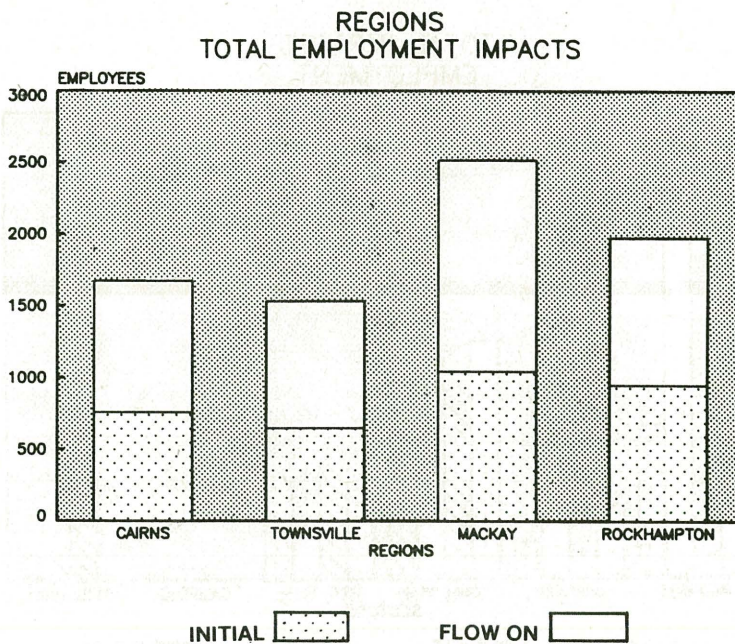
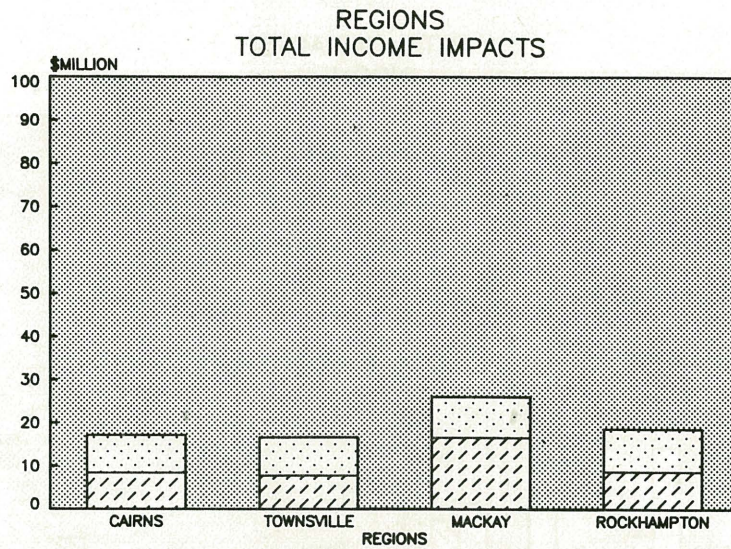
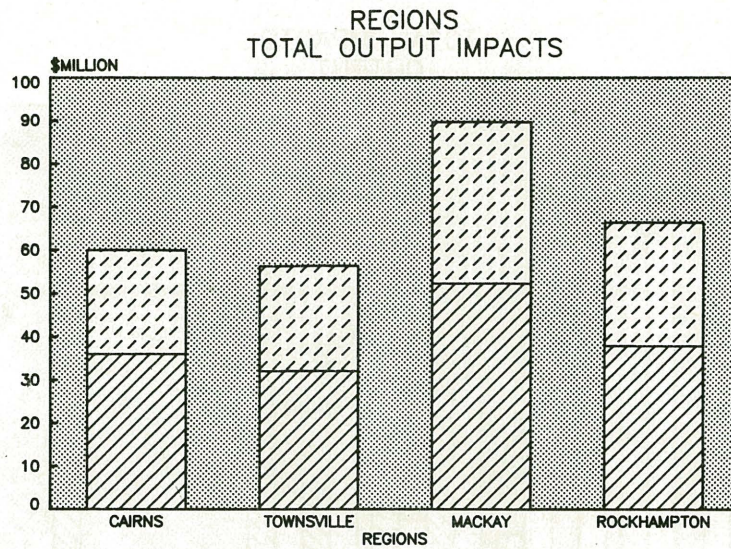
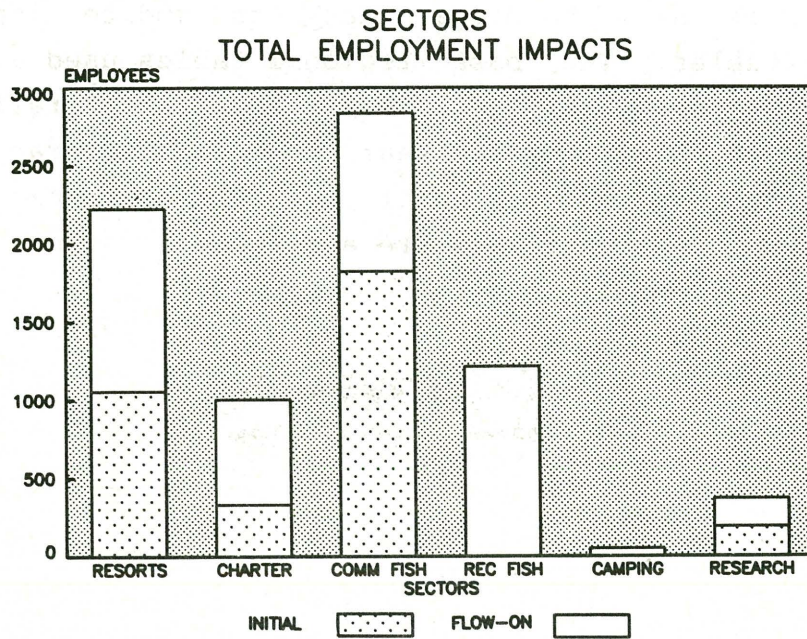
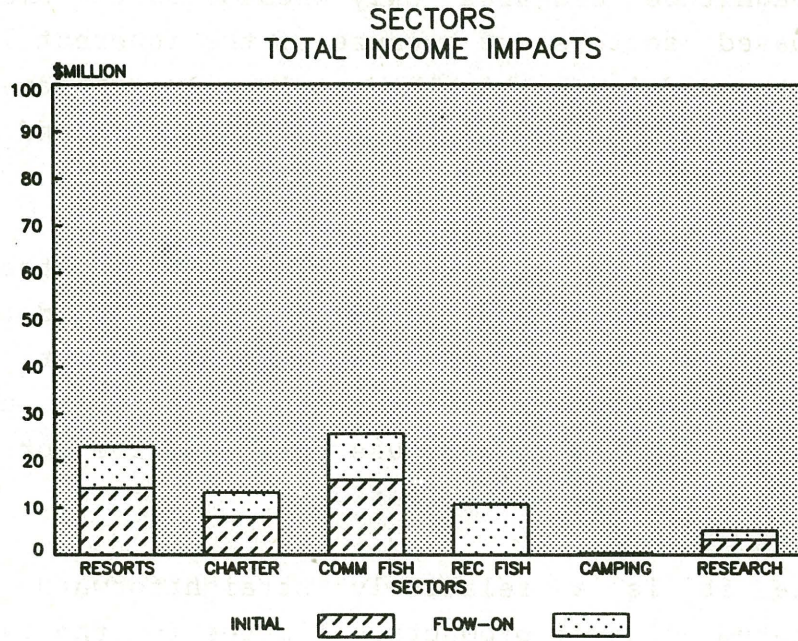
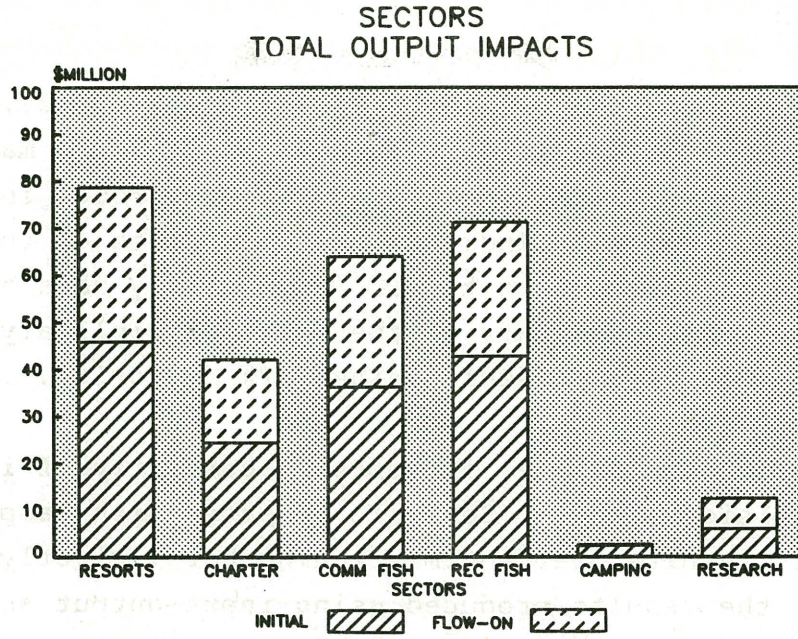


Figure 11. Impacts by sector.



## 6. CONCLUSION

This report has presented (in section 2), original information on the economic characteristics of major Great Barrier Reef-based activities. In addition, through input-output analysis, the regional and state-wide impacts of the economic activities were able to be traced. The primary data and results of analysis have become part of the multi-disciplinary data base used by the Great Barrier Reef Marine Park Authority.

Any data must be interpreted correctly if it is to be used in decision-making. Several caveats with respect to the input-output results warrant mentioning here. Firstly, as noted in the text, the results produced using input-output analysis are order of magnitude measures only because of the small size of some Reef-based sectors and because of the inherent limitations in trying to model something as complex as a regional economy. Comparisons amongst these estimates for sectors and regions is however considered to be valid.

Secondly, much of the original data gathered is now somewhat dated. Nevertheless the comparison of all data based on 1981/82 dollars represents the most recent available comprehensive data. Over time, these data will acquire an historical role and will be of use as a baseline for monitoring economic activity in the Marine Park.

While it is a relatively straightforward matter to collect updated value of production figures for the various Reef sectors, it is a much larger task to update input-output transaction tables. The base regional tables used are derived from tables for Australia. The latest available Australian tables are for the 1977/78 financial year. Conventional practice is to use multipliers for a period of time that could extend for a number of years, until new ones are available.

It is probably an acceptable proposition that the multipliers presented in this report will hold relatively constant over a number of years. However if major structural change occurs in a sector, ideally the transactions table should be updated and new multipliers should be derived.

It must be emphasised that all sectors in all economies have flow-on effects. This is not a phenomenon unique to Great Barrier Reef based sectors and this must be remembered in interpreting the results of this input-output analysis. Other mainland-based sectors in a regional economy may have, for instance, higher employment multipliers than Reef-based sectors. Sectors with high employment multipliers should be favoured, for example, in government-funded schemes to reduce unemployment.

Finally, the point must be reiterated that economic impact analysis using the input-output analysis technique is only one of a number of approaches to economic analysis of industries. It does not estimate the net economic benefits of economic activities.

To summarize the results of data collection and analysis, it is best to turn to three sets of data, the value of production of Great Barrier Reef-based sectors, the multipliers for Reef-based sectors and the total output, income and employment effects generated using input-output analysis. The first data set is shown in Table 8 and the other two in the following Tables 12 and 13.

Economic impact analysis using the input-output technique can trace the effects of changes in output of any sector throughout defined economies and thus provide information useful for understanding the widespread consequence of decisions which may affect output. This information, plus the initial descriptive data required for analysis are a useful input into processes such as Marine Park planning and monitoring.

Table 12. Total multipliers - summary table.

	CAIRNS	TOWNSVILLE	MACKAY	ROCKHAMPTON
<u>A. OUTPUT MULTIPLIERS</u>				
1. Island Resorts	1.848	-	1.698	1.686
2. Charter Boats	1.543	1.765	1.750	1.682
3. Island Camping	-	-	1.695	1.783
4. Recreational Fishing	1.540	1.724	1.694	1.709
5. Commercial Fishing	1.772	1.776	1.740	1.756
6. Research	-	1.812	-	1.946
<u>B. INCOME MULTIPLIERS</u>				
1. Island Resorts	.633	-	.515	.404
2. Charter Boats	.382	.540	.586	.496
3. Island Camping	-	-	.201	.244
4. Recreational Fishing	.208	.272	.221	.280
5. Commercial Fishing	.714	.722	.491	.762
6. Research	-	.750	-	.745
<u>C. EMPLOYMENT MULTIPLIERS</u>				
1. Island Resorts	.057	-	.049	.043
2. Charter Boats	.038	.058	.036	.052
3. Island Camping	-	-	.032	.026
4. Recreational Fishing	.023	.029	.035	.030
5. Commercial Fishing	.069	.072	.122	.073
6. Research	-	.052	-	.149

Table 13. Total impacts - summary table.

	CAIRNS	TOWNSVILLE	MACKAY	ROCKHAMPTON	TOTAL
<b>A. OUTPUT IMPACTS (\$m)</b>					
1. Island Resorts	11.08	-	47.03	20.56	78.67
2. Charter Boats	10.18	2.82	25.90	4.20	43.10
3. Island Camping	20.91	16.69	5.74	20.72	64.06
4. Recreational Fishing	17.86	24.48	8.80	20.16	71.30
5. Commercial Fishing	-	-	2.20	.53	2.73
6. Research	-	12.32	-	-	12.32
TOTAL	60.03	56.31	89.67	66.17	272.18
<b>B. INCOME IMPACTS (\$m)</b>					
1. Island Resorts	3.80	-	14.26	4.92	22.98
2. Charter Boats	2.51	.86	8.67	1.24	13.28
3. Island Camping	8.42	6.78	1.62	8.99	25.81
4. Recreational Fishing	2.41	3.86	1.15	3.30	10.72
5. Commercial Fishing	-	-	.26	.07	.33
6. Research	-	5.10	-	-	5.10
TOTAL	17.14	16.60	25.96	18.52	78.22
<b>C. EMPLOYMENT IMPACTS (employees)</b>					
1. Island Resorts	342	-	1 357	525	2 224
2. Charter Boats	250	92	532	130	1 004
3. Island Camping	814	676	402	944	2 836
4. Recreational Fishing	267	411	182	354	1 214
5. Commercial Fishing	-	-	42	8	50
6. Research	-	353	-	-	353
TOTAL	1 673	1 532	2 515	1 961	7 696

## 7. REFERENCES

- Australian Bureau of Statistics, 1980. Australian National Accounts, Input-Output Tables 1974-75 (Advance Release), Canberra.
- Driml, S.M, 1980. Recreational Fishing in the Capricornia Section, Marine Park - An Input-Output Study, Fifth meeting of the Australia and New Zealand Section Regional Science Association, Tanunda.
- Driml, S.M; Hundloe, T.; Hundson, D. and McGinnity, P., 1982. Great Barrier Reef Economic Impact Study: Townsville and Rockhampton Regions. Report to the Great Barrier Reef Marine Park Authority, Townsville.
- Hundloe, T.; Driml, S.; Shaw, S. and Trigger, J., 1981. Proposed Cairns Section Economic Impact Study. Report to the Great Barrier Reef Marine Park Authority, Townsville.
- Hundloe, T.J. 1985. Fisheries of the Great Barrier Reef, Great Barrier Reef Marine Park Authority, Townsville.
- Jensen, R.C.; Mandeville, T.D. and Karunaratne, N.D. 1977. Generation of regional Input-Output Tables for Queensland, Report to the Co-ordinator General's Department and the Department of Commercial and Industrial Development, Department of Economics, University of Queensland, Brisbane.
- Jensen, R.C. 1979. An Assessment of the Economic Impact of Selected Activities Associated with the Capricornia Section of the Reef on the Coastal Region and the State of Queensland, Report to the Great Barrier Reef Marine Park Authority, Townsville.
- McGinnity, P. 1981. Whitsunday Area Economic Impact Study, Report to the Great Barrier Reef Marine Park Authority, Townsville.
- Mandeville, T.D. and Jensen, R.C. 1979. Economic Impact of Industrial Developments at Gladstone, Department of Commercial and Industrial Development and Comalco Limited.

- Morison, J.B.; West, G.R. and Jensen, R.C. 1982. Regional Input-Output Tables for Queensland '1978/79', Report to the Queensland Department of Commercial and Industrial Development.
- West, G.R.; Wilkinson, J.T. and Jensen R.C. 1979. Generation of Regional Input-Output Tables for the State and Regions of South Australia, Report to the Treasury Department, the Department of Urban and Regional Affairs and the Department of Trade and Industry, Department of Economics, University of Queensland, Brisbane.
- Wilkinson, J.T. 1980. Economic Significance of Tourism in Queensland, Report to the Queensland Tourist and Travel Corporation, Brisbane.

**APPENDICES**

**APPENDIX I: CAIRNS REGION**

**APPENDIX II: TOWNSVILLE REGION**

**APPENDIX III: MACKAY REGION**

**APPENDIX IV: ROCKHAMPTON REGION**

Appendix Ia. Cairns Region: Multipliers, regional level<sup>(c)</sup>.

MULTIPLIERS

RATIOS

SECTOR	MULTIPLIERS					RATIOS				
	Initial Impact (1)	First Round (2)	Indust. Support (3)	Consump. Induced (4)	Total (5)	Flow on (6)	Type IA (7)	Type IB (8)	Type IIA (9)	Type IIB (10)
<b>A. OUTPUT MULTIPLIERS (\$)(a)</b>										
1. Island Resorts	1.000	.285	.125	.438	1.848	.848	-	-	-	-
2. Charter Boats	1.000	.206	.072	.265	1.543	.543	-	-	-	-
3. Island Camping	-	-	-	-	-	-	-	-	-	-
4. Recreational Fishing	1.000	.316	.079	.144	1.540	.540	-	-	-	-
5. Commercial Fishing	1.000	.219	.059	.495	1.772	.772	-	-	-	-
6. Research	-	-	-	-	-	-	-	-	-	-
<b>B. INCOME MULTIPLIERS (\$)(a)</b>										
7. Island Resorts	.348	.087	.040	.158	.633	.285	-	1.819	.819	-
8. Charter Boats	.190	.074	.023	.095	.382	.192	-	2.012	1.012	-
9. Island Camping	-	-	-	-	-	-	-	-	-	-
10. Recreational Fishing	-	.131	.025	.156	.208	.208	-	-	-	-
11. Commercial Fishing	.430	.087	.018	.178	.714	.284	-	1.659	.659	-
12. Research	-	-	-	-	-	-	-	-	-	-
<b>C. EMPLOYMENT MULTIPLIERS (b)</b>										
13. Island Resorts	.029	.009	.004	.015	.057	.028	-	1.980	.980	-
14. Charter Boats	0.17	.009	.002	.009	.038	.021	-	2.157	1.157	-
15. Island Camping	-	-	-	-	-	-	-	-	-	-
16. Recreational Fishing	-	.015	.003	.018	.023	.023	-	-	-	-
17. Commercial Fishing	.040	.010	.002	.017	.069	.029	-	1.716	.716	-
18. Research	-	-	-	-	-	-	-	-	-	-

(a) Per dollar of output

(b) Employees per thousand dollars of output

(c) Rounding errors occur.

Appendix Ib. Cairns Region: Multipliers, Queensland level (c).

RATIOS

MULTIPLIERS

SECTOR	MULTIPLIERS						RATIOS			
	Initial Impact (1)	First Round (2)	Indust. Support (3)	Cons. Induced (4)	Total (5)	Flow-on (6)	Type IA (7)	Type IB (8)	Type IIA (9)	Type IIB (10)
<b>A. OUTPUT MULTIPLIERS (\$)(a)</b>										
1. Island Resorts	1.000	.437	.319	.759	2.514	1.514	-	-	-	-
2. Charter Boats	1.000	.269	.184	.420	1.874	.874	-	-	-	-
3. Island Camping	-	-	-	-	-	-	-	-	-	-
4. Recreational Fishing	1.000	.579	.280	.346	2.208	1.208	-	-	-	-
5. Commercial Fishing	1.000	.235	.110	.742	2.088	1.088	-	-	-	-
6. Research	-	-	-	-	-	-	-	-	-	-
<b>B. INCOME MULTIPLIERS (\$)(a)</b>										
7. Island Resorts	.348	.115	.087	.242	.792	.444	-	2.278	1.278	-
8. Charter Boats	.190	.066	.049	.134	.439	.249	-	2.311	1.311	-
9. Island Camping	-	-	-	-	-	-	-	-	-	-
10. Recreational Fishing	-	.179	.073	.252	.363	.363	-	-	-	-
11. Commercial Fishing	.430	.077	.030	.237	.774	.344	-	1.799	.799	-
12. Research	-	-	-	-	-	-	-	-	-	-
<b>C. EMPLOYMENT MULTIPLIERS(b)</b>										
13. Island Resorts	.029	.011	.009	.023	.072	.043	-	2.504	1.504	-
14. Charter Boats	.017	.007	.005	.013	.042	.025	-	2.392	1.392	-
15. Island Camping	-	-	-	-	-	-	-	-	-	-
16. Recreational Fishing	-	.019	.007	.026	.037	.037	-	-	-	-
17. Commercial Fishing	.040	.008	.003	.011	.073	.033	-	1.836	.836	-
18. Research	-	-	-	-	-	-	-	-	-	-

(a) Per dollar of output

(b) Employees per thousand dollars of output

(c) Rounding errors occur.

Appendix Ic. Cairns Region: Spatial distribution of flow-on effects<sup>(c)</sup>.

SECTOR	PART A. MULTIPLIERS (B)		PART B. AMOUNTS (E)		PART C. PROPORTIONS		
	Output (\$) (1)	Income (\$) (2)	Output (\$'M) (4)	Income (\$'M) (5)	Output (%) (7)	Income (%) (8)	Employment (%) (9)
<u>Island Resorts</u>							
1. State Level	1.514	.444	9.08	2.66	100.0	100.0	100.0
2. Cairns Region	.848	.285	5.08	1.71	57.0	64.3	65.1
3. Rest of Queensland	.666	.159	4.00	0.95	43.0	35.7	34.9
<u>Charter Boats</u>							
4. State Level	.874	.249	5.76	1.64	100.0	100.0	100.0
5. Cairns Region	.543	.192	3.58	1.26	62.1	76.8	83.6
6. Rest of Queensland	.331	.057	2.18	0.38	37.9	23.2	16.4
<u>Island Camping</u>							
7. State Level	-	-	-	-	-	-	-
8. Cairns Region	-	-	-	-	-	-	-
9. Rest of Queensland	-	-	-	-	-	-	-
<u>Recreational Fishing</u>							
10. State Level	1.208	.363	14.01	4.21	100.0	100.0	100.0
11. Cairns Region	.540	.208	6.26	2.41	44.6	57.2	62.2
12. Rest of Queensland	.668	.155	7.75	1.80	55.4	42.8	37.8
<u>Commercial Fishing</u>							
13. State Level	1.088	.344	12.83	4.06	100.0	100.0	100.0
14. Cairns Region	.772	.284	9.11	3.35	71.0	82.5	87.9
15. Rest of Queensland	.316	.060	3.72	0.71	28.9	17.5	12.1
<u>Research</u>							
16. State Level	-	-	-	-	-	-	-
17. Cairns Region	-	-	-	-	-	-	-
18. Rest of Queensland	-	-	-	-	-	-	-

(a) Per dollar of output  
 (b) Employees per thousand dollars of output  
 (c) Rounding errors occur  
 (d) Drawn from Tables A.1 and A.2  
 (e) Calculated by application of multipliers to sector output levels  
 (shown in Table 2.1) 1981/82 dollars

Appendix Id. Cairns Region: Total impacts<sup>(a)</sup>.

	<u>Output</u> (\$'m)	<u>Income</u> (\$'m)	<u>Employment</u> (employees)
<u>Island Resorts</u>			
State Level	15.08	4.75	432
Cairns Region	11.08	3.80	342
Rest of Queensland	4.00	0.95	90
<u>Charter Boats</u>			
State Level	12.36	2.89	277
Cairns Region	10.18	2.51	250
Rest of Queensland	2.18	0.38	27
<u>Island Camping</u>			
State Level	-	-	-
Cairns Region	-	-	-
Rest of Queensland	-	-	-
<u>Recreational Fishing</u>			
State Level	25.61	4.21	429
Cairns Region	17.86	2.41	267
Rest of Queensland	7.75	1.80	162
<u>Commercial Fishing</u>			
State Level	24.63	9.13	861
Cairns Region	20.91	8.42	814
Rest of Queensland	3.72	0.71	47
<u>Research</u>			
State Level	-	-	-
Cairns Region	-	-	-
Rest of Queensland	-	-	-
<u>Total</u>			
State Level	77.68	20.98	1999
Cairns Region	60.03	17.14	1673
Rest of Queensland	17.65	3.84	326

(a) All values are in 1981/82 dollars.

Appendix Ie. Cairns Region: Disaggregated flow-on impacts<sup>(a)</sup>.

SECTOR	OUTPUT IMPACTS				EMPLOYMENT IMPACTS			
	Charter Boats		Recreational Fishing		Charter Boats		Recreational Fishing	
	Region State (1) (n.a.)	Region State (2) (n.a.)	Region State (3) (n.a.)	Region State (4) (n.a.)	Region State (7) (n.a.)	Region State (8) (n.a.)	Region State (9) (n.a.)	Region State (10) (n.a.)
1. Animal Industries	-	-	-	-	-	-	-	-
2A. Other Agriculture	-	-	-	-	-	-	-	-
2B. Forestry, Fishing	-	-	-	-	-	-	-	-
3A. Coal Mining	-	-	-	-	-	-	-	-
3B. Other Mining	-	-	-	-	-	-	-	-
4A. Food Manufacturing	14.1	-	-	10.2	-	-	-	-
4B. Wood & Paper Manufact.	-	-	-	-	-	-	-	-
4C. Machinery, etc.	15.6	-	19.3	11.1	22.1	23.9	15.7	-
4D. Metal Products	-	-	-	-	-	-	-	-
4E. Non-metallic Minerals	-	-	-	-	-	-	-	-
4F. Other Manufacturing	-	-	-	-	-	-	-	-
5. Elect., Gas & Water	-	-	-	-	-	-	-	-
6. Building & Construction	-	-	-	-	-	-	-	-
7. Trade	10.6	-	32.1	18.0	13.7	36.3	23.2	-
8. Transport, Communication	-	-	-	-	-	-	-	-
9. Finance	14.1	-	-	14.6	12.6	-	13.0	-
10. Public Admin.	-	-	-	-	-	-	-	-
11A. Community Services	-	-	-	-	-	-	-	-
11B. Entertainment	10.2	-	-	13.3	10.7	-	13.9	-

(a) This table includes only the "main" disaggregated flow-on effects, defined as those of 10.0 percent or over.

Appendix If. Cairns Region: Transactions table (\$ 000).

SECTOR	1	2A	2B	3A	3B	4A	4B	4C	4D	4E	4F	5	6	7
1	1966	0	0	0	0	32506	0	0	0	0	0	0	0	0
2A	1134	2195	12	0	5	87786	0	0	0	0	0	0	0	0
2B	37	0	20	0	40	372	1064	0	2	5	4	27	30	0
3A	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3B	0	0	0	0	724	0	0	0	0	1108	0	0	723	0
4A	973	578	185	0	58	23829	1	3	3	1	0	11	14	131
4B	0	490	81	0	494	92	2992	170	63	69	2	1	6696	299
4C	24	81	0	0	602	161	19	148	38	27	1	37	262	433
4D	10	148	34	0	1971	448	88	910	4283	513	17	49	5498	141
4E	0	0	95	0	514	35	23	6	36	923	0	3	11382	9
4F	0	0	11	0	6	3	3	0	2	2	2	3	4	55
5	868	3358	33	0	4542	3323	406	155	704	446	5	9674	466	2382
6	154	559	143	0	815	1168	102	39	67	122	1	636	233	829
7	1111	4815	656	0	2780	11032	1245	716	940	1121	20	816	7030	14741
8	1038	2252	240	0	5379	12922	984	338	1034	2621	41	1167	4203	4403
9	4	49	0	0	2275	1684	390	153	242	248	5	202	1780	10901
10	19	189	0	0	53	10	0	0	0	0	0	0	0	0
11A	206	148	0	0	675	79	2	0	1	0	0	4	3	29
11B	32	7	2	0	460	74	37	12	5	7	0	217	7	447
12A	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12B	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12D	0	0	0	0	0	13	0	0	0	0	0	0	0	13
12E	0	0	0	0	0	9464	0	0	0	0	0	0	0	0
12G	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W & S	16166	54416	981	0	23018	35842	8096	5552	2567	1717	195	9990	16359	10336
OVA	12851	63089	2234	0	57123	18517	4506	3286	7481	8149	49	24664	18630	42014
IMPORTS \$186		22516	135	0	22651	22596	2806	2389	5691	2865	184	15739	16489	27992
TOTAL	39779	153890	4862	0	124685	261956	22764	13877	23379	19944	526	63240	99909	175155

Appendix If. Continued.

SECTOR	8	9	10	11A	11B	12A	12B	12D	12E	12F	12G	H-H	OFD	EXPORTS	TOTAL
1	0	0	0	0	0	0	0	0	0	0	0	0	0	5307	39779
2A	0	3	24	8	84	0	0	0	0	0	0	3289	2500	56850	153890
2B	71	0	2	3	68	0	0	0	0	0	0	511	2304	302	4862
3A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3B	0	0	0	0	0	0	0	0	0	0	0	0	3793	118337	124685
4A	12	59	41	68	417	356	145	0	0	0	83	33712	0	201173	261956
4B	204	104	331	693	376	7	0	0	103	0	0	1914	620	7065	22764
4C	1338	13	82	74	0	134	316	614	0	0	169	4425	3552	490	13877
4D	61	6	71	100	112	23	0	39	837	0	15	720	2112	6010	23379
4E	71	0	3	13	5	3	0	0	0	0	1	0	6822	0	19944
4F	1	3	4	35	0	13	115	79	0	0	14	0	92	78	526
5	1278	2158	926	2565	5818	2	0	1	1	0	5	7806	11235	5058	63240
6	4215	617	1198	581	105	150	0	0	27	0	34	7318	79017	0	99910
7	5025	1259	289	2083	1444	219	41	826	0	0	235	26449	86923	2705	175156
8	3069	1209	1288	2508	736	461	16	0	646	0	51	7017	37956	1484	92665
9	1158	4492	1714	239	2180	43	145	105	248	0	73	28154	13148	1109	71217
10	1	25	7	26	0	0	0	120	424	0	0	4239	37183	0	42021
11A	197	239	100	74	108	0	51	9	149	0	0	19843	62806	7028	91596
11B	228	1823	227	207	1526	2	0	0	3	0	57	53500	465	518	59860
12A	0	0	0	0	0	0	0	0	0	0	0	65	0	4830	4895
12B	0	0	0	0	0	0	0	0	0	0	0	119	0	3901	4020
12D	0	0	0	0	13	0	0	0	0	0	0	13	6269	0	6321
12E	0	0	0	0	0	26	0	205	0	0	1	1293	0	130	11119
12G	0	0	0	0	0	0	0	0	0	0	0	156	0	2174	2330
W & S	36344	24717	30459	63819	27204	1702	763	0	0	0	812	0	0	0	43561
OVA	18251	30374	888	10441	18101	702	1793	0	0	0	341	71574	0	0	415820
IMPORTS	21161	4115	4566	6683	1085	1097	635	4324	0	0	438	123210	0	0	325066
TOTAL	92665	71216	42020	91596	59858	4895	4020	6321	0	0	2330	395318	356786	424549	0
1	Animal Industries			4C machinery, appliances			8	Transport, Communication	12C		Island Camping		H-H Households		
2A	Other Agriculture			4D Metals, metal Products			9	Finance	12D		Recreational Fishing		OFD Other Final Demands		
2B	Forstry, Hunting			4E Non-metallic minerals			10	Public Administration	12E		Commercial Fishing		Employ		
3A	Coal, Crude petroleum	Mining		4F Other manufacturing			11A	Community Service	12F		Research		Number employed		
3B	Other Mining			5 Electricity, etc.			11B	Entertainment	12G		Day Trips				
4A	Food manufacturing			6 Building Construction			12A	Island Resorts	W&S		Wages and Salaries				
4B	Wood and Paper manufacturing			7 Trade			12B	Charter Boats	OVA		Other Value Added				

Appendix I Ia. Townsville Region: Multipliers, regional level (c).

MULTIPLIERS

MULTIPLIERS

RATIOS

SECTOR	MULTIPLIERS				RATIOS					
	Initial Impact (1)	First Round (2)	Indust. Support (3)	Consump. Induced (4)	Total (5)	Flow on (6)	Type IA (7)	Type IB (8)	Type IIA (9)	Type IIB (10)
<b>A. OUTPUT MULTIPLIERS (\$) (a)</b>										
1. Island Resorts	1.000	.281	-.069	.415	1.765	.765	-	-	-	-
2. Charter Boats	-	-	-	-	-	-	-	-	-	-
3. Island Camping	1.000	.404	.111	.209	1.724	.724	-	-	-	-
4. Recreational Fishing	1.000	.177	.043	.555	1.776	.776	-	-	-	-
5. Commercial Fishing	1.000	.177	.059	.577	1.812	.812	-	-	-	-
6. Research	-	-	-	-	-	-	-	-	-	-
<b>B. INCOME MULTIPLIERS (\$) (a)</b>										
7. Island Resorts	.258	.112	.023	.146	.540	.282	1.435	1.525	2.091	1.091
8. Charter Boats	-	-	-	-	-	-	-	-	-	-
9. Island Camping	-	.160	.039	.074	.272	.272	-	-	-	-
10. Recreational Fishing	.439	.073	.014	.195	.722	.283	1.167	1.200	1.645	.645
11. Commercial Fishing	.471	.057	.019	.203	.750	.279	1.122	1.162	1.594	.594
12. Research	-	-	-	-	-	-	-	-	-	-
<b>C. EMPLOYMENT MULTIPLIERS (b)</b>										
13. Island Resorts	.031	.011	.002	.014	.058	.027	1.360	1.434	1.884	.884
14. Charter Boats	-	-	-	-	-	-	-	-	-	-
15. Island Camping	-	.018	.004	.007	.029	.029	-	-	-	-
16. Recreational Fishing	.045	.007	.001	.018	.072	.027	1.167	1.199	1.610	.610
17. Commercial Fishing	.026	.006	.002	.019	.052	.026	1.214	1.283	2.020	1.020
18. Research	-	-	-	-	-	-	-	-	-	-

(a) Per dollar of output

(b) Employees per thousand dollars of output

(c) Rounding errors occur.

Appendix IIB. Townsville Region: Multipliers, Queensland level<sup>(c)</sup>.

SECTOR	MULTIPLIERS					RATIOS				
	Initial Impact (1)	First Round (2)	Indust. Support (3)	Cons. Induced (4)	Total (5)	Flow-on (6)	Type IA (7)	Type IB (8)	Type IIA (9)	Type IIB (10)
<b>A. OUTPUT MULTIPLIERS (\$) (a)</b>										
1. Island Resorts	-	-	-	-	-	-	-	-	-	-
2. Charter Boats	1.000	.336	.152	.569	2.057	1.057	-	-	-	-
3. Island Camping	-	-	-	-	-	-	-	-	-	-
4. Recreational Fishing	1.000	.470	.181	.333	1.984	.984	-	-	-	-
5. Commercial Fishing	1.000	.206	.100	.733	2.039	1.039	-	-	-	-
6. Research	1.000	.234	.118	.799	2.151	1.151	-	-	-	-
<b>B. INCOME MULTIPLIERS (\$) (a)</b>										
7. Island Resorts	-	-	-	-	-	-	-	-	-	-
8. Charter Boats	.258	.112	.042	.181	.594	.334	1.433	1.597	2.299	1.299
9. Island Camping	-	-	-	-	-	-	-	-	-	-
10. Recreational Fishing	-	.186	.055	.106	.348	.348	-	-	-	-
11. Commercial Fishing	.439	.066	.026	.234	.765	.326	1.150	1.210	1.742	.742
12. Research	.475	.073	.031	.254	.833	.358	1.153	1.219	1.755	.755
<b>C. EMPLOYMENT MULTIPLIERS (b)</b>										
13. Island Resorts	-	-	-	-	-	-	-	-	-	-
14. Charter Boats	.031	.011	.004	.017	.063	.032	1.358	1.496	2.064	1.064
15. Island Camping	-	-	-	-	-	-	-	-	-	-
16. Recreational Fishing	-	.021	.006	.010	.037	.037	-	-	-	-
17. Commercial Fishing	.045	.007	.003	.022	.076	.031	1.151	1.209	1.710	.710
18. Research	.026	.007	.003	.024	.061	.035	1.270	1.389	2.324	1.324

(a) Per dollar of output  
 (b) Employees per thousand dollars of output  
 (c) Rounding errors occur.

Appendix IIC. Townsville Region: Spatial distribution of flow-on effects (c).

SECTOR	PART A. MULTIPLIERS (a)		PART B. AMOUNTS (e)		PART C. PROPORTIONS		
	Output (\$) (1)	Income (\$) (2)	Output (\$'M) (4)	Income (\$'M) (5)	Output (%) (7)	Income (%) (8)	Employment (%) (9)
<u>Island Resorts</u>							
1. State Level	-	-	-	-	-	-	-
2. Townsville Region	-	-	-	-	-	-	-
3. Rest of Queensland	-	-	-	-	-	-	-
<u>Charter Boats</u>							
4. State Level	1.057	.334	1.69	0.53	100.0	100.0	100.0
5. Townsville Region	.765	.282	1.22	0.45	72.4	84.1	81.4
6. Rest of Queensland	.292	.052	0.47	0.08	27.6	15.9	18.6
<u>Island Camping</u>							
7. State Level	-	-	-	-	-	-	-
8. Townsville Region	-	-	-	-	-	-	-
9. Rest of Queensland	-	-	-	-	-	-	-
<u>Recreational Fishing</u>							
10. State Level	.984	.348	13.97	4.94	100.0	100.0	100.0
11. Townsville Region	.724	.272	10.28	3.86	73.5	78.3	78.1
12. Rest of Queensland	.026	.076	3.69	1.08	26.5	21.7	21.9
<u>Commercial Fishing</u>							
13. State Level	1.039	.326	9.76	3.06	100.0	100.0	100.0
14. Townsville Region	.776	.283	7.29	2.66	74.6	86.9	86.0
15. Rest of Queensland	.263	.043	2.47	0.40	25.4	13.1	14.0
<u>Research</u>							
16. State Level	1.151	.358	7.82	2.43	100.0	100.0	100.0
17. Townsville Region	.812	.279	5.52	1.89	70.6	78.0	76.5
18. Rest of Queensland	.339	.079	2.30	0.54	29.4	22.0	23.5

(a) Per dollar of output  
 (b) Employees per thousand dollars of output  
 (c) Rounding errors occur  
 (d) Drawn from Tables B.1 and B.2  
 (e) Calculated by application of multipliers to sector output levels  
 (shown in Table 2.1) 1981/82 dollars

Appendix IId. Townsville Region: Total impacts<sup>(a)</sup>.

	<u>Output</u> (\$'m)	<u>Income</u> (\$'m)	<u>Employment</u> (employees)
<u>Island Resorts</u>			
State Level	-	-	-
Townsville Region	-	-	-
Rest of Queensland	-	-	-
<u>Charter Boats</u>			
State Level	3.29	0.95	100
Townsville Region	2.82	0.86	92
Rest of Queensland	0.47	0.09	8
<u>Island Camping</u>			
State Level	-	-	-
Townsville Region	-	-	-
Rest of Queensland	-	-	-
<u>Recreational Fishing</u>			
State Level	28.17	4.94	525
Townsville Region	24.48	3.86	411
Rest of Queensland	3.69	1.08	114
<u>Commercial Fishing</u>			
State Level	19.16	7.19	714
Townsville Region	16.69	6.78	676
Rest of Queensland	2.47	0.41	36
<u>Research</u>			
State Level	14.62	5.66	414
Townsville Region	12.32	5.10	353
Rest of Queensland	2.30	0.56	61
<u>Total</u>			
State Level	65.24	18.74	1753
Townsville Region	56.31	16.60	1532
Rest of Queensland	8.93	2.14	221

(a) All values are in 1981/82 dollars.



Appendix IIf. Townsville Region: Transactions table (\$ 000).

SECTOR	1	2A	2B	3A	3B	4A	4B	4C	4D	4E	4F	5	6	7
1	2737	0	0	0	0	28848	0	0	0	0	0	0	0	0
2A	508	1940	5	0	0	100383	0	0	0	0	1	0	0	0
2B	14	0	3	6	1	1068	973	0	7	2	32	78	45	0
3A	0	0	0	0	0	63	0	0	4	640	924	6239	0	0
3B	0	0	0	128	309	0	0	0	5269	2950	0	0	1968	0
3C	0	0	0	0	0	0	0	0	0	0	38	13	3	34
4A	168	73	4	0	1	5229	1	1	4	0	69	1	3361	2038
4B	0	1703	16	17	33	1376	1378	60	198	609	19	25	111	445
4C	31	37	39	16	19	113	12	378	87	32	247	88	3725	165
4D	25	144	6	30	102	369	78	536	14964	284	247	7	10410	50
4E	0	0	40	11	129	64	8	1	311	1868	12	155	329	7921
4F	1031	1944	49	22	101	752	168	35	1431	169	3021	10295	554	3841
5	1630	3418	8	234	488	4202	334	159	5831	1637	727	723	220	1087
6	292	444	44	21	108	1237	75	27	288	309	92	1186	8755	24061
7	2352	4912	129	113	338	14574	1740	480	5394	1127	1646	1466	4398	6538
8	2117	2036	88	159	555	15355	870	233	6584	2247	970	221	1833	15215
9	10	44	17	107	295	1731	275	81	833	213	171	0	0	0
10	17	138	9	4	4	16	0	13	0	0	01	0	0	0
11A	525	135	0	13	58	111	2	0	12	3	2	4	3	0
11B	92	9	1	12	42	204	57	43	32	6	3	284	7	621
12B	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12D	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12E	0	0	0	0	0	4460	0	0	0	0	0	0	0	0
12F	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MHS	11964	43358	941	9635	4710	40857	6802	8821	27323	4453	2248	14701	20103	92736
O.V.A.	25943	58256	1303	1884	5364	21510	2875	3186	24439	4338	2751	32026	19677	61760
IMPORTS	6973	14860	943	1292	1913	61493	5655	4148	58273	1320	6376	21111	32851	34740
TOTAL	56429	133429	3645	13794	14570	304015	21303	18202	151275	22207	19350	88623	108353	244118
EMPLOY: 1247	4593	60	476	336	3694	727	916	2078	431	243	1197	2660		

TOWNVILLE REGION



Appendix IIIa. Mackay Region: Multipliers, regional level (c).

MULTIPLIERS

RATIOS

SECTOR	MULTIPLIERS					RATIOS			
	Initial Impact (1)	First Round (2)	Indust. Support (3)	Consump. Induced (4)	Total on (6)	IA (7)	IB (8)	Type IIA (9)	Type IIB (10)
<b>A. OUTPUT MULTIPLIERS (\$) (a)</b>									
1. Island Resorts	1.000	.200	.064	.434	1.698	.698	-	-	-
2. Charter Boats	1.000	.208	.049	.493	1.750	.750	-	-	-
3. Island Camping	1.000	.404	.122	.169	1.695	.695	-	-	-
4. Recreational Fishing	1.000	.498	.009	.187	1.694	.694	-	-	-
5. Commercial Fishing	1.000	.265	.062	.413	1.740	.740	-	-	-
6. Research	-	-	-	-	-	-	-	-	-
<b>B. INCOME MULTIPLIERS (\$) (a)</b>									
7. Island Resorts	.352	.052	.015	.096	.515	.163	-	1.463	0.463
8. Charter Boats	.390	.073	.014	.109	.586	.196	-	1.503	0.503
9. Island Camping	-	.133	.030	.037	.201	.201	-	-	-
10. Recreational Fishing	-	.145	.035	.041	.221	.221	-	-	-
11. Commercial Fishing	.281	.116	.003	.091	.491	.210	-	1.747	0.747
12. Research	-	-	-	-	-	-	-	-	-
<b>C. EMPLOYMENT MULTIPLIERS (b)</b>									
13. Island Resorts	.023	.003	.009	.014	.049	.026	-	2.130	1.130
14. Charter Boats	.007	.010	.003	.016	.036	.029	-	5.143	4.143
15. Island Camping	-	.020	.006	.006	.032	.032	-	-	-
16. Recreational Fishing	-	.024	.005	.006	.035	.035	-	-	-
17. Commercial Fishing	.092	.016	-	.014	.122	.030	-	1.326	0.326
18. Research	-	-	-	-	-	-	-	-	-

(a) Per dollar of output  
 (b) Employees per thousand dollars of output  
 (c) Rounding errors occur.

Appendix IIIb. Mackay Region: Multipliers, Queensland level<sup>(c)</sup>.

MULTIPLIERS

RATIOS

SECTOR	MULTIPLIERS						RATIOS			
	Initial Impact (1)	First Round (2)	Indust. Support (3)	Cons. Induced (4)	Total (5)	Flow-on (6)	Type IA (7)	Type IB (8)	Type IIA (9)	Type IIB (10)
<b>A. OUTPUT MULTIPLIERS (\$) (a)</b>										
1. Island Resorts	1.000	.349	.145	.638	2.131	1.131	-	-	-	-
2. Charter Boats	1.000	.254	.084	.670	2.007	1.007	-	-	-	-
3. Island Camping	1.000	.660	.251	.336	2.247	1.247	-	-	-	-
4. Recreational Fishing	1.000	.558	.239	.317	2.114	1.114	-	-	-	-
5. Commercial Fishing	1.000	.340	.118	.575	2.003	1.003	-	-	-	-
6. Research	-	-	-	-	-	-	-	-	-	-
<b>B. INCOME MULTIPLIERS (\$) (a)</b>										
7. Island Resorts	.358	.121	.009	.174	.656	.298	-	-	1.832	0.832
8. Charter Boats	.393	.092	.024	.183	.689	.296	-	-	1.753	0.753
9. Island Camping	-	.214	.040	.091	.345	.345	-	-	-	-
10. Recreational Fishing	-	.186	.051	.087	.327	.327	-	-	-	-
11. Commercial Fishing	.281	.126	.028	.157	.592	.311	-	-	2.107	1.107
12. Research	-	-	-	-	-	-	-	-	-	-
<b>C. EMPLOYMENT MULTIPLIERS (b)</b>										
13. Island Resorts	.023	.001	.010	.021	.057	.034	-	-	2.478	1.478
14. Charter Boats	.007	.008	-	.022	.040	.033	-	-	5.714	4.714
15. Island Camping	-	.015	.009	.011	.043	.043	-	-	-	-
16. Recreational Fishing	-	.018	.006	.010	.036	.036	-	-	-	-
17. Commercial Fishing	.092	.010	.002	.019	.126	.034	-	-	1.370	0.370
18. Research	-	-	-	-	-	-	-	-	-	-

(a) Per dollar of output

(b) Employees per thousand dollars of output

(c) Rounding errors occur.

Appendix IIIc. Mackay Region: Spatial distribution of flow-on effects (c).

SECTOR	PART A. MULTIPLIERS (d)		PART B. AMOUNTS (a)		PART C. PROPORTIONS		
	Output (\$) (1)	Income (\$) (2)	Output (\$'M) (4)	Income (\$'M) (5)	Output (%) (7)	Income (%) (8)	Employment (%) (9)
<u>Island Resorts</u>							
1. State Level	1.131	.298	31.32	8.25	100.0	100.0	100.0
2. Mackay Region	.698	.163	19.33	4.42	61.7	53.5	76.5
3. Rest of Queensland	.433	.135	11.99	3.83	38.3	46.5	23.5
<u>Charter Boats</u>							
4. State Level	1.007	.296	14.90	4.38	100.0	100.0	100.0
5. Mackay Region	.750	.196	11.10	2.90	74.5	66.2	87.9
6. Rest of Queensland	.257	.100	3.80	1.48	25.5	33.8	12.1
<u>Island Camping</u>							
7. State Level	1.247	.345	1.62	0.45	100.0	100.0	100.0
8. Mackay Region	.695	.201	0.90	0.26	55.5	57.7	75.0
9. Rest of Queensland	.552	.144	.72	0.19	45.5	42.3	25.0
<u>Recreational Fishing</u>							
10. State Level	1.114	.327	5.79	1.70	100.0	100.0	100.0
11. Mackay Region	.694	.221	3.60	1.15	62.0	67.6	97.3
12. Rest of Queensland	.420	.106	2.19	0.55	38.0	32.4	2.7
<u>Commercial Fishing</u>							
13. State Level	1.033	.311	3.40	1.02	100.0	100.0	100.0
14. Mackay Region	.740	.210	2.44	0.69	71.7	67.6	88.4
15. Rest of Queensland	.293	.101	0.96	0.33	28.3	32.4	11.6
<u>Research</u>							
16. State Level	-	-	-	-	-	-	-
17. Mackay Region	-	-	-	-	-	-	-
18. Rest of Queensland	-	-	-	-	-	-	-

(a) Per dollar of output  
 (b) Employees per thousand dollars of output  
 (c) Rounding errors occur  
 (d) Drawn from Tables C.1 and C.2  
 (e) Calculated by application of multipliers to sector output levels  
 (shown in Table 2.1) 1981/82 dollars

Appendix IIId. Mackay Region: total impacts<sup>(a)</sup>.

	Output (\$'m)	Income (\$'m)	Employment (employees)
<u>Island Resorts</u>			
State Level	59.02	18.17	1 578
Mackay Region	47.03	14.26	1 357
Rest of Queensland	11.99	3.91	221
<u>Charter Boats</u>			
State Level	29.70	10.20	592
Mackay Region	25.90	8.67	532
Rest of Queensland	3.80	1.53	60
<u>Island Camping</u>			
State Level	2.92	0.45	56
Mackay Region	2.20	0.26	42
Rest of Queensland	0.72	0.19	14
<u>Recreational Fishing</u>			
State Level	10.99	1.70	187
Mackay Region	8.80	1.15	182
Rest of Queensland	2.19	0.55	5
<u>Commercial Fishing</u>			
State Level	6.70	1.95	416
Mackay Region	5.74	1.62	402
Rest of Queensland	0.96	0.33	14
<u>Research</u>			
State Level	-	-	-
Mackay Region	-	-	-
Rest of Queensland	-	-	-
<u>Total</u>			
State Level	109.33	32.47	2 829
Mackay Region	89.67	25.96	2 515
Rest of Queensland	19.66	6.51	314

(a) All values are in 1981/82 dollars.

Appendix IIIe. Mackay Region: Disaggregated flow-on impacts (a).

SECTOR	OUTPUT IMPACTS		EMPLOYMENT IMPACTS	
	Island Resorts	Charter Boats	Island Resorts	Charter Boats
	Region State (1) (2)	Region State (3) (4)	Region State (7) (8)	Region State (9) (10)
1. Animal Industries	-	-	-	-
2A. Other Agriculture	16.5	1.48	1.54	11.0
2B. Forestry, Fishing	-	-	-	-
3A. Coal Mining	-	-	-	-
3B. Other Mining	-	-	-	-
4A. Food Manufacturing	27.9	24.4	7.6	8.8
4B. Wood & Paper Manufact.	-	-	-	-
4C. Machinery, etc.	-	-	-	6.6
4D. Metal Products	-	-	-	-
4E. Non-metallic Minerals	-	-	-	-
4F. Other Manufacturing	-	6.5	-	-
5. Elect., Gas & Water	-	-	-	-
6. Building & Construction	-	-	-	-
7. Trade	21.7	22.4	38.5	32.3
8. Transport, Communication	6.5	-	15.4	8.8
9. Finance	7.5	15.6	7.6	11.7
10. Public Admin.	-	-	-	-
11A. Community Services	-	-	-	8.8
11B. Entertainment	-	-	7.6	5.8
				27.0
				8.1
				16.2
				8.1
				5.4

(a) This table includes only the "main" disaggregated flow-on effects, defined as those of 5.0 percent or over.

Appendix III f. Mackay Region: Transactions table (\$ 000).

Sector	1	2A	2B	3A	3B	4A	4B	4C	4D	4E	4F	5	6	7
1	0	0	0	0	0	13200	0	0	0	0	0	0	0	0
2A	3352	14550	0	0	0	102640	2	0	0	0	2	0	0	0
2B	0	0	0	2553	0	6	395	0	0	2	2	5	2	0
3A	0	0	0	0	0	92	0	0	0	125	37	1355	92	112
3B	0	4	2	1806	0	36	0	0	0	205	15	0	891	0
4A	1873	202	0	5	0	2138	10	2	0	0	187	2	5	83
4B	2	1131	26	859	0	32	614	41	2	19	15	0	8454	204
4C	320	648	43	1192	231	36	58	94	11	72	94	197	1572	90
4D	0	2	0	112	0	30	5	15	2	2	8	8	917	5
4E	0	0	0	898	0	17	5	5	10	0	0	0	4160	0
4F	2004	4704	30	13	99	80	34	32	5	50	644	2	68	39
5	457	1576	0	5397	21	1922	116	84	15	186	446	472	660	506
6	770	1684	13	2713	21	316	165	41	11	203	267	1153	0	985
7	2657	6688	0	5567	603	3863	870	339	55	436	569	470	3132	5485
8	648	2742	30	3040	126	4867	354	191	28	566	181	854	3832	1426
9	13	113	0	234	139	1669	90	47	5	47	58	34	309	3396
10	0	0	0	5	0	68	0	0	0	0	0	0	0	0
11A	97	0	0	63	2	168	0	0	0	0	0	0	0	0
11B	5	0	0	0	0	503	0	0	0	2.0	0	8	19	187
12A	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12B	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12C	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12D	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12E	0	0	0	0	0	1486	0	2	0	0	0	0	0	371
WES	2848	16922	0	13460	333	22322	4899	2883	435	1895	2123	7031	54290	19348
QWA	29853	73347	2866	60776	484	25468	2356	870	205	2088	2386	13312	21276	24671
IMPORTS	4888	13961	0	27846	2035	46983	4747	2986	724	3014	4574	1801	61824	10985
TOTAL	49782	139274	3010	126629	4127	227042	14720	7630	1498	8922	11503	26704	169503	77795

Appendix III.F. Continued.

	8	9	10	11A	11B	12A	12B	12C	12D	12E	H-H	OFD	Exports Total
1	0	0	0	0	0	0	0	0	0	0	535	0	36059
2A	0	0	0	0	12	0	0	0	0	0	8393	0	9323
2B	34	0	0	0	0	0	0	0	0	0	0	11	0
3A	81	0	2	34	66	0	0	0	0	0	0	0	124633
3B	2	0	0	0	2	0	0	0	0	0	0	0	1164
4A	0	2	8	221	0	1205	220	97	123	47	89412	65	131135
4B	0	0	230	352	0	92	0	0	0	0	1061	1586	0
4C	32	13	99	26	0	67	34	3	101	20	959	1615	0
4D	361	0	8	5	0	6	0	0	0	0	12	0	0
4E	2	0	0	2	0	0	0	0	0	0	1480	2244	0
4F	0	2	11	120	0	62	58	6	15	2	1397	2026	0
5	11	1142	228	923	782	478	0	0	0	25	4510	7647	0
6	155	1014	2026	1266	58	0	0	0	0	0	2275	154372	0
7	762	2039	144	1253	0	1957	1130	159	1196	379	26260	1782	0
8	63	230	97	163	0	720	220	57	8	9	3050	483	1446
9	950	1112	322	26	0	332	9840	0	78	166	17194	5067	3759
10	0	0	0	0	0	0	115	0	120	67	773	16201	0
11A	0	24	157	8	0	0	0	0	5	1	3937	28037	0
11B	0	13	0	5	0	0	12	64	0	0	11410	0	4381
12A	0	0	0	0	0	0	34	0	0	0	1449	0	23544
12B	0	0	0	0	0	0	0	70	0	0	3857	0	9446
12C	0	0	0	0	0	0	0	0	0	0	103	0	1041
12D	0	0	0	0	2	0	0	0	0	0	4234	0	0
12E	0	0	0	0	371	87	18	6	83	5	30	0	266
W&S	3935	14047	11165	20306	11449	8857	5219	0	0	765	0	0	0
OVA	15901	13188	278	4658	3467	1639	334	30	1264	617	0	0	0
IMPORTS	3242	3174	2574	3121	0	9616	2039	652	1245	620	138077	0	0
TOTAL	25431	36000	17349	32489	16609	25127	13373	1144	4238	2723	320396	221136	346297

1	Animal Industries	4C	machinery, appliances	8	Transport, Communication	12C	Island Camping	H-H	Households
2A	Other Agriculture	4D	Metals, metal Products	9	Finance	12D	Recreational Fishing	OFD	Other Final Demands
2B	Forstry, Hunting	4E	Non-metallic minerals	10	Public Administration	12E	Commercial Fishing	Employ	Number employed
3A	Coal, Crude petroleum	4F	Other manufacturing	11A	Community Service	12F	Research		
3B	Other Mining	5	Electricity, etc.	11B	Entertainment	12G	Day Trips		
4A	Food manufacturing	6	Building Construction	12A	Island Resorts	W&S	Wages and Salaries		
4B	Wood and Paper manufacturing	7	Trade	12B	Charter Boats	OVA	Other Value Added		

Appendix IVa. Rockhampton Region: Multipliers, regional level (c).

MULTIPLIERS

RATIOS

SECTOR	MULTIPLIERS					RATIOS				
	Initial Impact (1)	First Round (2)	Indust. Support (3)	Consump. Induced (4)	Total (5)	Flow on (6)	Type IA (7)	Type IB (8)	Type IIA (9)	Type IIB (10)
<b>A. OUTPUT MULTIPLIERS (\$) (a)</b>										
1. Island Resorts	1.000	.297	.114	.275	1.686	.686	-	-	-	-
2. Charter Boats	1.000	.268	.077	.337	1.682	.682	-	-	-	-
3. Island Camping	1.000	.442	.175	.166	1.783	.783	-	-	-	-
4. Recreational Fishing	1.000	.422	.097	.190	1.709	.709	-	-	-	-
5. Commercial Fishing	1.000	.184	.053	.519	1.756	.756	-	-	-	-
6. Research	1.000	.324	.115	.507	1.946	.946	-	-	-	-
<b>B. INCOME MULTIPLIERS (\$) (a)</b>										
7. Island Resorts	.184	.087	.034	.098	.404	.220	1.476	1.663	2.198	1.198
8. Charter Boats	.239	.110	.026	.121	.496	.257	1.463	1.570	2.074	1.074
9. Island Camping	0	.120	.065	.059	.244	.244	-	-	-	-
10. Recreational Fishing	0	.178	.034	.068	.280	-	-	-	-	-
11. Commercial Fishing	.492	.067	.017	.185	.762	.270	1.137	1.172	1.549	.549
12. Research	.462	.101	.036	.181	.745	.283	1.236	1.321	1.746	.746
<b>C. EMPLOYMENT MULTIPLIERS (b)</b>										
13. Island Resorts	.020	.009	.004	.009	.043	.023	1.448	1.623	2.083	1.083
14. Charter Boats	.027	.011	.003	.012	.052	.025	1.410	1.509	1.943	.943
15. Island Camping	0	.014	.007	.006	.026	.026	-	-	-	-
16. Recreational Fishing	0	.020	.003	.007	.030	.030	-	-	-	-
17. Commercial Fishing	.046	.007	.002	.018	.073	.027	1.150	1.188	1.570	.570
18. Research	.118	.010	.004	.017	.149	.031	1.085	1.117	1.264	.264

(a) Per dollar of output  
 (b) Employees per thousand dollars of output  
 (c) Rounding errors occur.

Appendix IVb. Rockhampton Region: Multipliers, Queensland level (c).

MULTIPLIERS

RATIOS

SECTOR	MULTIPLIERS						RATIOS			
	Initial Impact (1)	First Round (2)	Indust. Support (3)	Cons. Induced (4)	Total (5)	Flow-on (6)	Type IA (7)	Type IB (8)	Type IIA (9)	Type IIB (10)
<b>A. OUTPUT MULTIPLIERS (\$) (a)</b>										
1. Island Resorts	1.000	.478	.309	.542	2.330	1.330	-	-	-	-
2. Charter Boats	1.000	.328	.170	.550	2.048	1.048	-	-	-	-
3. Island Camping	1.000	.688	.415	.433	2.536	1.536	-	-	-	-
4. Recreational Fishing	1.000	.450	.170	.326	1.946	.946	-	-	-	-
5. Commercial Fishing	1.000	.201	.104	.800	2.105	1.105	-	-	-	-
6. Research	1.000	.397	.254	.820	2.471	1.471	-	-	-	-
<b>B. INCOME MULTIPLIERS (\$) (a)</b>										
7. Island Resorts	.189	.122	.081	.173	.566	.377	1.647	2.078	2.992	1.992
8. Charter Boats	.239	.113	.047	.175	.573	.334	1.471	1.667	2.400	1.400
9. Island Camping	0	.190	.124	.138	.451	.451	-	-	-	-
10. Recreational Fishing	0	.184	.052	.104	.340	.340	-	-	-	-
11. Commercial Fishing	.492	.060	.027	.255	.834	.342	1.122	1.177	1.695	.695
12. Research	.426	.102	.066	.261	.855	.429	1.238	1.393	2.005	1.005
<b>C. EMPLOYMENT MULTIPLIERS (b)</b>										
13. Island Resorts	.020	.012	.008	.017	.057	.037	1.597	1.999	2.810	1.810
14. Charter Boats	.027	.011	.005	.017	.059	.032	1.409	1.586	2.218	1.218
15. Island Camping	0	.021	.012	.013	.047	.047	.047	-	-	-
16. Recreational Fishing	0	.020	.005	.010	.036	.036	-	-	-	-
17. Commercial Fishing	.046	.006	.003	.024	.080	.034	1.132	1.190	1.717	.717
18. Research	.118	.010	.007	.025	.159	.041	1.082	1.139	1.352	.352

(a) Per dollar of output

(b) Employees per thousand dollars of output

(c) Rounding errors occur.

Appendix IVC. Rockhampton Region: Spatial distribution of flow-on effects (c) .

SECTOR	PART A. MULTIPLIERS (3)			PART B. AMOUNTS (6)			PART C. PROPORTIONS		
	Output (\$) (1)	Income (\$) (2)	Employment (employees) (3)	Output (\$'M) (4)	Income (\$'M) (5)	Employment (employees) (6)	Output (%) (7)	Income (%) (8)	Employment (%) (9)
<u>Island Resorts</u>									
1. State Level	1.330	.377	.037	16.23	4.60	451	100.0	100.0	100.0
2. Rockhampton Region	.686	.220	.023	8.37	2.68	280	51.6	58.5	59.9
3. Rest of Queensland	.644	.157	.014	7.86	1.91	170	48.4	41.5	40.1
<u>Charter Boats</u>									
4. State Level	1.048	.334	.032	2.62	0.83	80	100.0	100.0	100.0
5. Rockhampton Region	.682	.257	.025	1.70	0.64	62	65.2	76.8	76.5
6. Rest of Queensland	.366	.077	.007	9.15	0.19	17	34.8	23.2	23.5
<u>Island Camping</u>									
7. State Level	1.536	.451	.047	4.60	0.14	14	100.0	100.0	100.0
8. Rockhampton Region	.783	.244	.026	2.35	0.07	8	51.1	54.7	58.3
9. Rest of Queensland	.753	.207	.021	2.26	0.06	6	48.9	45.3	41.7
<u>Recreational Fishing</u>									
10. State Level	.946	.340	.036	11.16	4.00	425	100.0	100.0	100.0
11. Rockhampton Region	.709	.280	.030	8.37	3.30	354	75.0	82.4	84.8
12. Rest of Queensland	.237	.060	.006	2.79	0.71	70	25.0	17.6	15.2
<u>Commercial Fishing</u>									
13. State Level	1.105	.342	.034	13.04	4.03	401	100.0	100.0	100.0
14. Rockhampton Region	.756	.270	.027	8.92	3.18	318	68.5	79.0	79.5
15. Rest of Queensland	.349	.072	.007	4.12	0.85	82	31.5	21.0	20.5
<u>Research</u>									
16. State Level	1.471	.429	.041	0.15	0.04	4	100.0	100.0	100.0
17. Rockhampton Region	.946	.283	.031	0.94	0.03	3	64.0	75.9	66.7
18. Rest of Queensland	.525	.146	.010	0.52	0.01	1	36.0	24.1	33.3

(a) Per dollar of output  
 (b) Employees per thousand dollars of output  
 (c) Rounding errors occur  
 (d) Drawn from Tables D.1 and D.2  
 (e) Calculated by application of multipliers to sector output levels  
 (shown in Table 2.1) 1981/82 dollars

Appendix IVd. Rockhampton region: Total impacts<sup>(a)</sup>.

	<u>Output</u> (\$'m)	<u>Income</u> (\$'m)	<u>Employment</u> (employees)
<u>Island Resorts</u>			
State Level	28.42	6.84	696
Rockhampton Region	20.56	4.92	525
Rest of Queensland	7.86	1.92	171
<u>Charter Boats</u>			
State Level	6.82	1.43	148
Rockhampton Region	4.20	1.24	130
Rest of Queensland	2.62	0.19	18
<u>Island Camping</u>			
State Level	0.76	0.14	14
Rockhampton Region	0.53	0.07	8
Rest of Queensland	0.23	0.07	6
<u>Recreational Fishing</u>			
State Level	22.96	4.25	425
Rockhampton Region	20.16	3.30	354
Rest of Queensland	2.80	0.95	71
<u>Commercial Fishing</u>			
State Level	24.84	9.83	1027
Rockhampton Region	20.72	8.99	944
Rest of Queensland	4.12	0.84	83
<u>Research</u>			
State Level	0.25	0.08	16
Rockhampton Region	0.19	0.07	15
Rest of Queensland	0.06	0.01	1
<u>Total</u>			
State Level	84.05	22.57	2326
Rockhampton Region	66.36	18.59	1976
Rest of Queensland	17.69	3.98	350

(a) All values are in 1981/82 dollars.

Appendix IVe. Rockhampton Region: Disaggregated flow-on impacts (a).

SECTOR	OUTPUT IMPACTS				EMPLOYMENT IMPACTS							
	Island Resorts		Recreational Fishing		Island Resorts		Recreational Fishing					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1. Animal Industries	-	-	-	-	-	-	-	-	-	-	-	-
2A. Other Agriculture	-	-	-	-	-	-	-	-	-	-	-	-
2B. Forestry, Fishing	-	-	-	-	-	-	-	-	-	-	-	-
3A. Coal Mining	-	-	-	-	-	-	-	-	-	-	-	-
3B. Other Mining	-	-	-	-	-	-	-	-	-	-	-	-
4A. Food Manufacturing	7.8	11.0	-	-	9.2	10.8	-	5.9	-	-	-	5.3
4B. Wood & Paper Manufact.	-	-	-	-	-	-	-	-	-	-	-	-
4C. Machinery, etc.	6.2	7.8	-	-	11.1	11.1	7.6	6.6	-	-	12.4	8.6
4D. Metal Products	-	-	-	-	-	-	-	-	-	-	-	-
4E. Non-metallic Minerals	-	-	-	-	-	-	-	-	-	-	-	-
4F. Other Manufacturing	-	7.0	-	-	-	-	-	-	-	-	-	-
5. Elect., Gas & Water	-	-	-	-	6.0	5.9	-	-	-	-	-	-
6. Building & Construction	18.9	11.6	-	-	-	-	15.1	8.9	-	-	-	-
7. Trade	10.2	10.4	54.3	44.7	16.4	14.5	15.3	17.5	61.9	55.4	22.7	22.5
8. Transport, Communication	10.9	11.5	-	-	6.4	6.0	12.7	13.7	-	-	6.9	6.7
9. Finance	10.3	9.1	12.2	12.2	13.4	12.8	10.7	10.7	9.5	10.6	12.8	13.9
10. Public Admin.	-	-	-	-	-	-	-	-	5.4	-	-	-
11A. Community Services	-	-	-	-	5.0	-	5.5	5.3	-	-	8.4	8.4
11B. Entertainment	9.6	8.0	5.9	6.0	14.2	12.1	10.8	9.3	5.0	5.2	14.7	13.0

(a) This table includes only the "main" disaggregated flow-on effects, defined as those of 5.0 percent or over.

