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CAIRNS ZONING REPORT

GREAT BARRIER REEF MARINE PARK AUTHORITY

Third Edition

12 May 1982

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12 May, 1982.

Introduction

The Cairns Section of the Great Barrier Reef Marine Park was declared on 19 November 1981. The outer boundaries of the Cairns Section include the Cormorant Pass Section which was declared on 30 October 1981.

The Cairns Section does not include islands that form part of Queensland and are not owned by the Commonwealth.

This report summarises and discusses the issues relevant to the development of the zoning plan for the Cairns Section. Where appropriate, reference is made to more detailed source documents.

1. PHYSICAL GEOGRAPHY

1.1 Introduction

The Cairns Section lies off the coast adjacent to the towns of Tully, Innisfail, Cairns, Mossman, Port Douglas and Cooktown. (Figure 1.1)

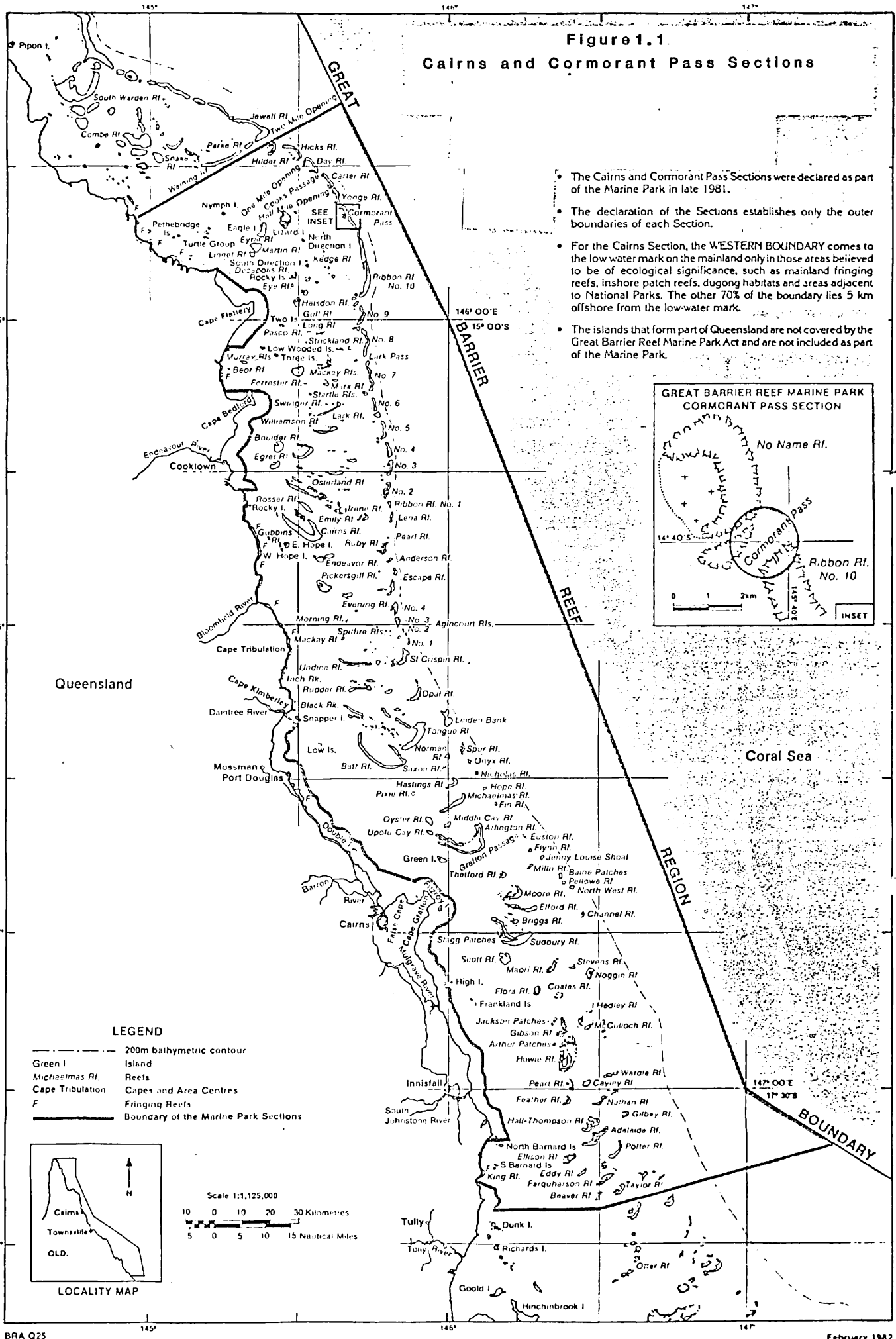
It covers an area of some 35,000 square kilometres. Within the outer boundaries of the Cairns Section there are approximately

- 25 banks, patches and shoals;
- 212 reefs - including coastal and island fringing reefs;
- 32 islands and rocks of continental origin with 10 fringing reefs surrounding 23 of the islands and rocks; and
- 18 low wooded islands and 19 sand and shingle cays of reefal origin.

(See Appendix One - Listing of Reefs and Islands.)

1.2 Geological History

The mainland adjacent to the Cairns Section consists dominantly of marine sediments and volcanics deposited in the Hodgkinson Basin. These rocks of Silurian to Early Carboniferous age (450-350 million years), were folded, metamorphosed and uplifted above the sea at the end of Early Carboniferous time. Late in the Carboniferous (330-300 million years) extensive sheets of continental acid volcanics were erupted over large aeas of the folded Hodgkinson Basin strata. This volcanic activity was accompanied by granite intrusion which continued into the mid-Permian (260 million years). The volcanics and granites form most of the high ranges and



This map is not to be used for navigational purposes.

plateau areas along the entire length of the Cairns Section, and Permian granite forms Lizard Island in the northern part of the Section. During Jurassic time (about 150 million years) the ancient land surface to the west of Cape Flattery and Cape Bedford began to sag initiating continental sedimentation in the Laura Basin. The sea invaded the basin in the Early Cretaceous (about 130 million years) and deposition ceased at beginning of Late Cretaceous time (about 100 million years) when the sea withdrew (de Keyser and Lucas, 1968).

The present shape of the coastline and continental shelf was determined by the opening of the Coral Sea as a rifted ocean basin 60 million years ago in Early Tertiary (Paleocene) time, and subsequently by continued subsidence of the continental margin through the mid-Tertiary. Immediately offshore from the continental shelf and parallel to it there is an elongate trough, the Queensland Trough, which is interpreted as a downfaulted basin (rift) separating the Australian continent from the submerged continental fragment, the Queensland Plateau to the east. Tertiary and Quaternary marine carbonate sediments (mid-Eocene to Pleistocene) were recovered from a drill hole on the Queensland Plateau, and record the gradual subsidence of this area during the last 50 million years. During subsidence, coral reefs grew on topographic highs within the plateau, and a few reefs are still actively growing today. A thicker sedimentary sequence of the same age is interpreted within the Queensland Trough from seismic reflection profiles. The history of the deposition on this section of the Australian continental shelf during most of this period is totally unknown, but may have been

similar to that on the Queensland Plateau, i.e. gradual subsidence, particularly of the eastern part of the shelf, possibly with continuous growth of coral reefs on topographic highs (Mutter and Karner, 1980).

Continental basaltic volcanics were erupted over large areas of the Cairns hinterland during the last 3 million years (Pliocene and Pleistocene). They are most widespread on the Atherton Tableland, but some volcanic flows poured down river gorges to the east and almost reached the present coastline near Innisfail (Stephenson, Griffin, and Sutherland, 1980).

Reef growth during the last 2 million years (Quaternary) was controlled by sea level fluctuations induced by episodic ice ages. The present Great Barrier Reef grew during the last 100,000 years (Holocene) as the sea rose and reached its present high sea level about 6,000 years ago. Individual reefs are located on pre-existing topographic highs which extended above the general level of the erosion surface formed when the shelf was emergent during the last Glacial period. The nature of these topographic highs is not known, but some at least may represent sites of previous reef growth. Except for a wedge of terrigenous sediments up to 17m thick immediately offshore from the present coastline, and accumulations of carbonate detritus within 2km of reefs, Holocene deposition on the continental shelf was minimal (Orme and Flood, 1980).

1.3 Geomorphology

The Section comprises four major zones of reefal development across the continental shelf. These are the ribbon reefs, patch reefs, reefal islands and fringing reefs. Their characteristics identified by Harvey and Hopley (1979) are outlined below. (see Figure 1.2 Geomorphology)

1.3.1 Ribbon Reefs

The ribbon reefs are a line of outer reefs close together forming a natural breakwater on the edge of the Continental Shelf. In places these are less than 600 m wide but individually up to 28 km long with narrow intervening passages, many of which contain small plug reefs. The southern limit of these is just north of Port Douglas, but a number of submerged ribbon features occur down to Wardle Reef in the south of the Section.

1.3.2 Patch Reefs

The mid-shelf zone consists of patch reefs up to 29 km long and 13 km wide, often with narrow intervening passages. In the same zone exist a number of smaller irregularly spaced reefs separated from others by up to 8 km of open water. These mid-shelf reefs are characterized by extensive reef flat development, algal rims and often a predominant orientation to the trade winds. On the leeside of a number of these reefs sand cays have developed, but only four are stable enough to maintain vegetation.

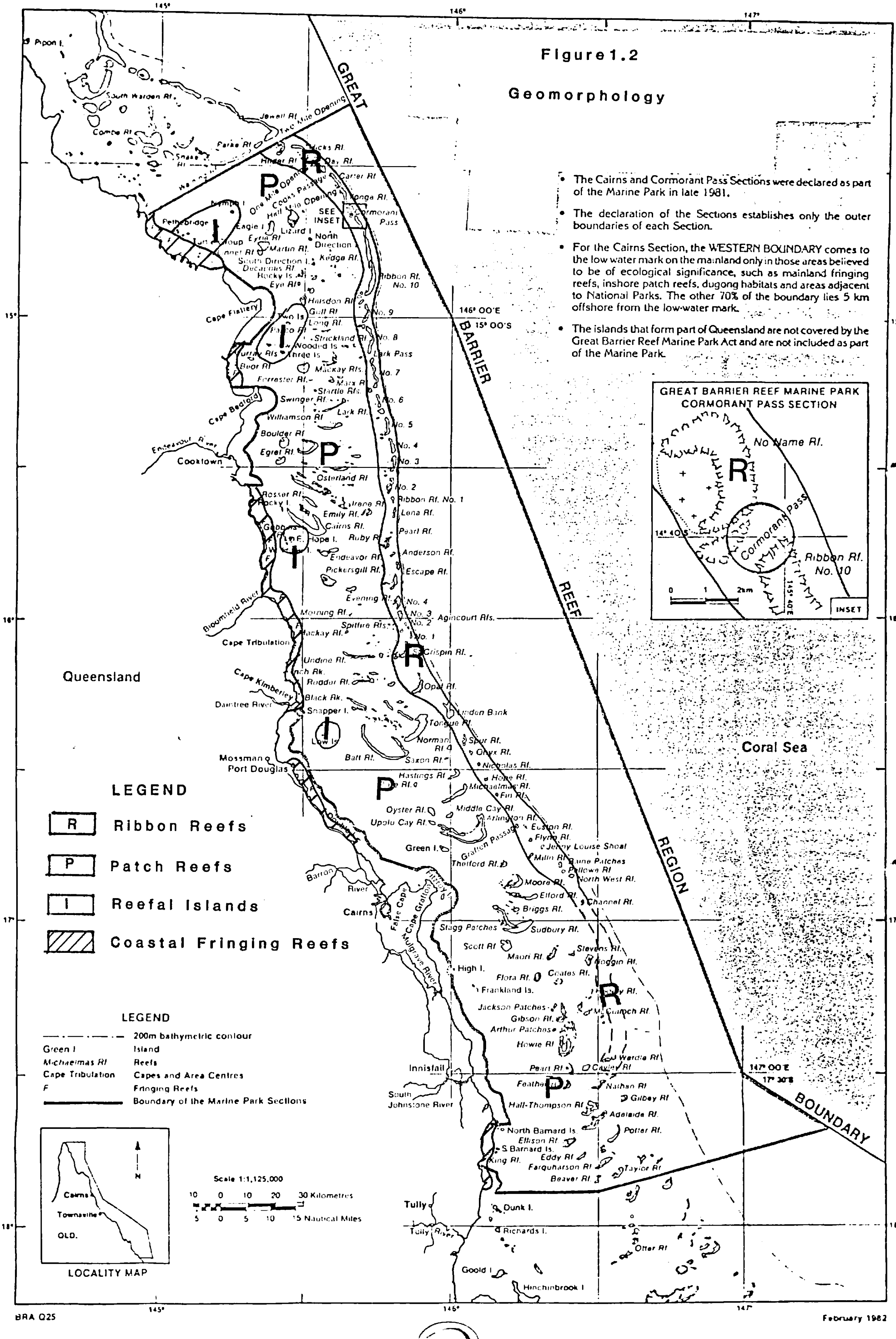


Figure 1.2
Geomorphology
• The Cairns and Cormorant Pass Sections were declared as part of the Marine Park in late 1981.
• The declaration of the Sections establishes only the outer boundaries of each Section.
• For the Cairns Section, the WESTERN BOUNDARY comes to the low water mark on the mainland only in those areas believed to be of ecological significance, such as mainland fringing reefs, inshore patch reefs, dugong habitats and areas adjacent to National Parks. The other 70% of the boundary lies 5 km offshore from the low-water mark.
• The islands that form part of Queensland are not covered by the Great Barrier Reef Marine Park Act and are not included as part of the Marine Park.
GREAT BARRIER REEF MARINE PARK
CORMORANT PASS SECTION
No Name Rf.
Cormorant Pass
Ribbon Rf. No. 10
INSET
GREAT BARRIER REEF REGION BOUNDARY
Coral Sea
Queensland
LEGEND
R Ribbon Reefs
P Patch Reefs
I Reefal Islands
Coastal Fringing Reefs
LEGEND
200m bathymetric contour
Green I Island
Michaelmas Rf Reefs
Cape Tribulation Capes and Area Centres
F Fringing Reefs
Boundary of the Marine Park Sections
Scale 1:1,125,000
30 Kilometres
15 Nautical Miles
LOCALITY MAP
Cairns
Townsville
QLD.
Cooktown
Cape Flattery
Cape Bedford
Endeavour River
Bloomfield River
Cape Tribulation
Cape Kimberley
Daintree River
Mossman
Port Douglas
Barron River
Cairns
Green I.
Innisfail
South Johnstone River
Tully
Tully River
Dunk I.
Richards I.
Goold I.
Hinchinbrook I.
Lizard I.
Grafton Passage
Agincourt Rfs.
Michaelmas Rf.
Arlington Rf.
Moore Rf.
Flora Rf.
Frankland Is.
North Barnard Is.
S.Barnard Is.
BRA Q25
February 1982

The patch reefs in the south of the section present a gradient of biological communities which is presumed to have been determined by the relative exposure of the reefs to wind and tidal water movements in the absence of the 'ribbon reef' protective barrier, and on their proximity to coastal influences.

1.3.3 Reefal Islands

This inner zone of low wooded island reefs and small reefs with sand cays, generally within 20 km of the coast, extends north from Low Isles. These islands, of reefal origin, generally include cemented deposits, extensive shingle ridges, spits or islets and vegetated sand cays, and often extensive mangrove development.

The low-wooded islands are a distinctive feature of the northern part of the Great Barrier Reef. They are of great interest scientifically and are important bird nesting sites.

1.3.4 Coastal Fringing Reefs

These vary in size and have an irregular distribution along the coastline, related to the local water quality and sediment budget. Fringing reefs also occur on a number of high islands.

The coastal fringing reefs have some corals which are peculiar to the onshore environments as well as most of the corals of the middle and outer zone.

In the Section and adjacent waters there are 31 coastal fringing reefs ranging in size from 0.5 to 12 kilometres in length. Most spectacular is a series of 12 reef masses totalling 44 kilometers in a section of 100 kilometers of coast north of the Daintree River, within the Section. These reefs show little evidence of human interference or natural degradation.

The largest mainland fringing or nearshore patch reefs are recorded

- from Lookout Point north
- between Cape Flattery and Cape Bedford
- from Archer Point to Yule Point including Weary Bay, Cape Tribulation and Trinity Bay
- at Murdering Point, south of Murdering Point and Clump Point.

Because they do not require a boat for access, the mainland fringing reefs are generally the most accessible reefs of the Great Barrier Reef Region.

1.4 Meteorology

The Great Barrier Reef area has a tropical climate influenced by two features of the southern hemisphere circulation i.e. the equatorial low pressure zone during the summer months and the sub-tropical high pressure zone during the winter. Due to its position between the Australian continent and the open South Pacific ocean, its climate is strongly influenced by both the adjacent land mass and oceanic effects. Source for meteorogical data is the Bureau of Meteorology, unless otherwise specified.

1.4.1 Winds

For most of the year the south east Trades dominate. Generally from April to November these winds are generated from high pressure cells which move from west to east across the southern part of the Australian continent. The strength of the wind varies according to the intensity of the pressure gradient from the high pressure cell in the south to the lower pressure of the warm tropical air mass.

From December to March, during summer, two influences may operate; the tropical monsoonal belt may cause a monsoon trough of low pressure bringing moderate to heavy rainfall, thunderstorms and generally light winds. Alternatively high pressure to the North can lead to periods of strong northerly winds. Thus the Cairns Section is subject to variable weather impacts as it is in the transition area between the trade-wind and monsoonal dominated airmasses.

1.4.2 Cyclonic Effects

Concern over cyclones relates to the vulnerability of upper level corals of coral reefs, of sand cays and poorly-vegetated small islands. Shipping, coastal, and island-based resorts, are also at risk. The floral and faunal communities of the Great Barrier Reef must be regarded as adapted to cyclones since occasional catastrophic cyclone damage is a feature of the Great Barrier Reef Region.

1.4.3 Cyclones

Most cyclones affecting the Queensland coast originate in the Inter-tropical Convergence Zone (ITCZ), between 8^{o} and $18^{o}S$ in the north Coral Sea. Generally they tend to track parallel to the coast, in a south-easterly direction, or travel south-west and cross

the coast north of Brisbane. The Cairns Section is in the area most frequently affected. Frequency and intensity decline to the north and south. The table below (Table 1.1) shows the total known crossings of tropical cyclones over units of coastline within the Cairns Section, each approximately 100 km in length, between 1909 and 1975. The area between Rattlesnake Point and Cairns appears to have experienced the most frequent water to land crossings.

Table 1.1

TOTAL KNOWN CROSSINGS OF TROPICAL CYCLONES OVER UNITS OF COASTLINE, EACH APPROXIMATELY 100KM IN LENGTH, JULY 1909 - JUNE 1975

AREA	WATER TO LAND CROSSING	LAND TO WATER CROSSING
Murdoch Point - Cape Bedford	3	0
Cape Bedford - Rattlesnake Point	1	3
Rattlesnake Point - Cairns	12	3
Cairns - Babinda	0	6
Babinda - Cardwell	6	0
	22	12 = 34

Source: Laurensz (1977)

Conditions associated with tropical cyclones are high winds (above), rough seas, heavy rain and flooding. The north-eastern coast of Queensland is susceptible to storm surges associated with the cyclones. A high cyclone gust was recorded in March 1952 at Cairns, when winds reached 146km/hr. Higher speeds may have been reached since then, as maximum gusts in north-east Australia have been recorded in the range 110 to 170km/hr. Coleman (1972) records the mean central pressure of cyclones in the area covering the Cairns Section as 995.5mb. Intense cyclones, below 960 mb, recorded since the late nineteenth century are limited in extent. In the Cairns Section, Innisfail experienced pressures of 946 mb in March 1918.

Whittingham (1964) has calculated gusts likely to be experienced over Australia for various return periods. At Cairns he estimated winds of up to 216km/hr for a 100yr return period (Table 1.2).

Table 1.2

ANTICIPATED WIND VELOCITIES FOR CAIRNS

FOR STATED RETURN PERIODS

	Return Period (Yrs)			
	5	25	50	100
Velocity (km/hr)	144	180	198	216

Source: Whittingham (1964)

Tropical cyclones are a summer phenomenon, occuring between November and April in the north-east of Australia. However, severe storms may occur outside of this season, when they will not usually show the warm-cored tropical cyclone structure typical of summer cyclones.

1.4.4 Storm surges

A storm surge may be defined as the short period rise or fall of sea level produced by a meteorological disturbance such as a cyclone or hurricane. Information on wave and surge characteristics of cyclones is generally not very well documented. Cyclonic surges are associated with every cyclone but the magnitude of the surge and therefore its potential hazard is dependent on a number of factors -

(i) the size and central pressure of the cyclonic eye,

(ii) the path and speed of the cyclonic depression,

(iii) the geographical features of the coastline and ocean bottom within the area of influence of the cyclone,

(iv) the 'astronomical' tide levels.

On the eastern coast of Australia the most cyclone prone area is the length of coast from Cooktown and Mackay. It appears that cyclonic depressions of the intensity measured in Townsville during "Althea" (976 mb) could occur at any point along this section of coast with a frequency of once every twenty years.

Details are available of some of the major cyclones with recorded storm surges along the Queensland coast. It should be noted that although no surges were recorded for some of these cyclones it is quite possible that significant surges have been overlooked at a time when high winds and substantial wave action masked the rise (or fall) in sea level. In many areas tidal gauges were not installed at the time of the cyclone, e.g. the 1940 Townsville cyclone.

The likelihood of a cyclonic surge becoming a threat or a potential disaster on a particular length of coast depends on the combined probabilities associated with the four factors outlined above. A cyclone which landfalls at or near high tide poses a significantly more dangerous threat than one that occurs at low tide.

1.4.5 Rainfall

The climate of East-coast tropical Queensland is typified by a wet season (January - March), caused by the shifting Inter-tropical Convergence Zone. Mean annual totals for Cooktown and Cairns respectively are 1784mm and 2001mm, 65% of which falls during the wet period. Higher levels are recorded between 17°20' to 18°S (Babinda-Tully) in the south of the Section where mean annual totals are 3600mm and 4400mm. Annual variations for the Cairns area are great, ranging from 40% to 19 times the regional average. Data is scarce on reef rainfall measurements, but there is little reason to doubt that it would be similar to precipitation on the adjacent coast (Bureau of Meteorology 1977). Mean monthly rainfall for selected weather stations is shown in Figure 1.3.

Local heavy rains often result from cyclonic phenomena. At Port Douglas 800mm of rain was recorded in a 24 hr period, although levels of about 250mm in the region are more frequent.

1.4.6 Air temperature

Maximum mean monthly air temperature cycles for selected weather stations in the Section are shown in Figure 1.3. Mean monthly maximum values, north of 19°S, vary little (30°-32°C); while mean monthly minimum values decrease from north to south (19°-14°C). Up to 1966 maximum temperatures recorded at Cairns and Cooktown were 40°C and 42°C respectively. The corresponding minima were 7°C and 6°C (Hydrographic Dept., 1973).

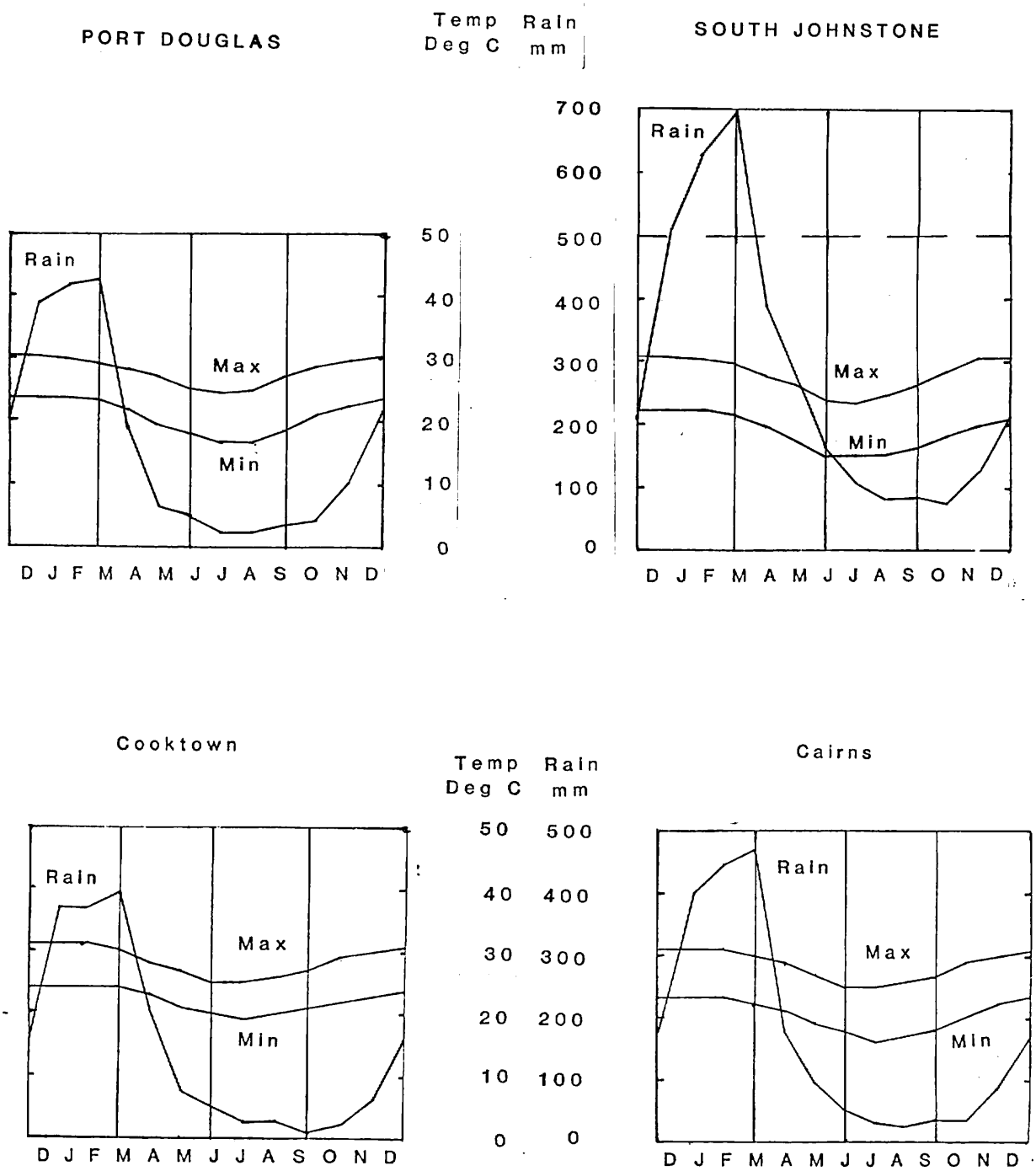


Figure 1.3 Rainfall and Temperature

1.5 Hydrology

Within the Great Barrier Reef is a lagoon which is broken up by extensive reefs and has a mean depth of 35m. Depths over 60m are uncommon.

1.5.1 River catchment and run-off

It has been estimated that rivers flowing into the lagoon contribute about half as much freshwater as direct rainfall and, as the run-off is highly localised, may be significant with respect to near shore salinity regimes.

1.5.2 Hydrography

The water in the lagoon is vertically well-mixed for most of the year, stratification resulting from freshwater input during January to March may occur for short periods affecting the upper 10m.

Pickard (1977) has reviewed most of the studies on hydrography for this region. Orr in 1933 made a systematic study of water columns of Great Barrier Reef waters at Low Isles as part of the 1928-29 Great Barrier Reef Expedition. Brandon (1973) has given an account of the general water properties of the area, but much of the data is scanty and covers only limited time periods.

1.5.3 Tides

Tides are generally semi-diurnal with diurnal inequality increasing towards the north, becoming almost diurnal in Torres Strait. Maxwell's charts (1968) suggest that tidal ranges on the reef over 10 to 20 minutes earlier than on the adjacent coast. Greater variation has been noted around Cairns, where tidal maxima at Low Isles and Trinity Opening have been noted 2 to 3 hours earlier than on the mainland.

Tides tend to be modified by the physical structure and layout of the reef openings. In open waters inside the reef, flow rates average 0.25 to 0.5m/second, with speeds up to 2m/second common in narrow passages and channels.

The maximum tide range, as shown by tide tables, at coastal ports in this part of the Great Barrier Reef Region is in the order of 3m.

1.5.4 Surface Currents

(Statement on surface currents will be added)

1.5.5 Water Properties

1.5.5.1 Temperature

In the Cairns Section, the monthly average of nearshore surface water temperatures ranges from 29.1° to 22.2°C. (Brandon 1973)

Temperature measurements were also made by Pearson (1974) in 1971-72 off the mouth of the Johnstone River. During the dry months he found temperatures in the water column vary by little more than 0.2°C, while during the wet season they may vary by several degrees, as there is less mixing due to the lighter winds common at that time.

Information on sub-surface temperatures has been collected by Orr (1933). The difference between surface temperatures and these at 28m was noted to be less than 0.2°C for 60% of his measurements. Greater ranges were noted during the summer when surface layers had low salinity and a thermocline produced stable upper water layers.

1.5.5.2 Salinity

For most of the year salinity is about 35°/00. Freshwater input during the summer wet season typically causes a drop to 32°00. Statification occurs near the mouth of major rivers during periods of high run-off but it is quickly broken down by wind driven mixing within the lagoon.

Pickard et al.(1977) concluded from density-temperature plots that changes in density of the surface waters was due to salinity changes from January to March and from changes in temperature between April and December. Outside the reef, changes may be attributed to temperature variations. Data is scarce on exchange of waters outside the reef and in the lagoon area.

Pearson (1974) observed that salinity was just over $35^{o}/00$ in the reef areas off Innisfail in the dry months, but with high freshwater runoff, values below $32^{0}/00$ were observed near the reefs in the area.

1.5.5.3 Dissolved oxygen

Orr (1933) found little variation in oxygen with time or depth in the area around Low Isles. Generally the water was found to be not saturated, being 95% at the surface with a slight decrease to 93% at 28m depth.

1.5.5.4 Other Properties

Pickard et al. (1977) reviews studies of various properties of the Great Barrier Reef Region waters.

Measurements of chemical properties by Orr (1933) and Brandon (1973) show no seasonal variations in pH values or dissolved phosphate levels.

Orr's (1933) study of turbidity at Low Isles indicated visibility ranges of 3.5 to 25 metres while Hedley (1925) measured visibility of 2.5 metres at Cairns jetty, and 5 to 33 metres in the lagoon. Orr also measured visibility of 11 to 30 metres in Trinity opening and 14 to 40 metres seaward of the outer reefs. All values are based on secchi disc measurements.

These variations were considered by Orr to be caused by the stirring up of the fine sediments characteristic of the inner lagoon passages, whereas the greater visibility of the outer edges of the lagoon was related to the coarser bottom sediments. This correlation was also observed by Pickard.

1.6 Drainage Basins

There are twelve river systems draining into the waters of the Cairns Section. They are listed in Table 1.3 which shows the catchment area and mean annual discharge (where known). The figures for mean annual discharge do not give a clear picture of stream flows, as periodic heavy rain storms and monsoonal rains result in short periods of heavy flows while for much of the year stream flows are very low. Figure 1.4 shows the rivers and the catchment areas they drain. (Australian Water Resources Council, ~~1975~~ 1976, 1978).

TABLE 1.3 DRAINAGE BASINS

River	Catchment Area (square kilometres)	Mean Annual Discharge (million cubic metres)
1. Starcke River	181	n.a.
2. McIvor River	194	n.a.
3. Endeavour River	315	n.a.
4. Annan River	313	n.a.
5. Bloomfield River	117	n.a.
6. Daintree River	824	n.a.
7. Mossman River	114	n.a.
8. Barron River	1940	819
9. Mulgrave River	554	899
10. Russell River	321	1128
11. North Johnstone River	958	1779
12. South Johnstone River	474	809

In addition there is a large amount of coastal drainage directly flowing into the sea, within and adjacent to the Section.

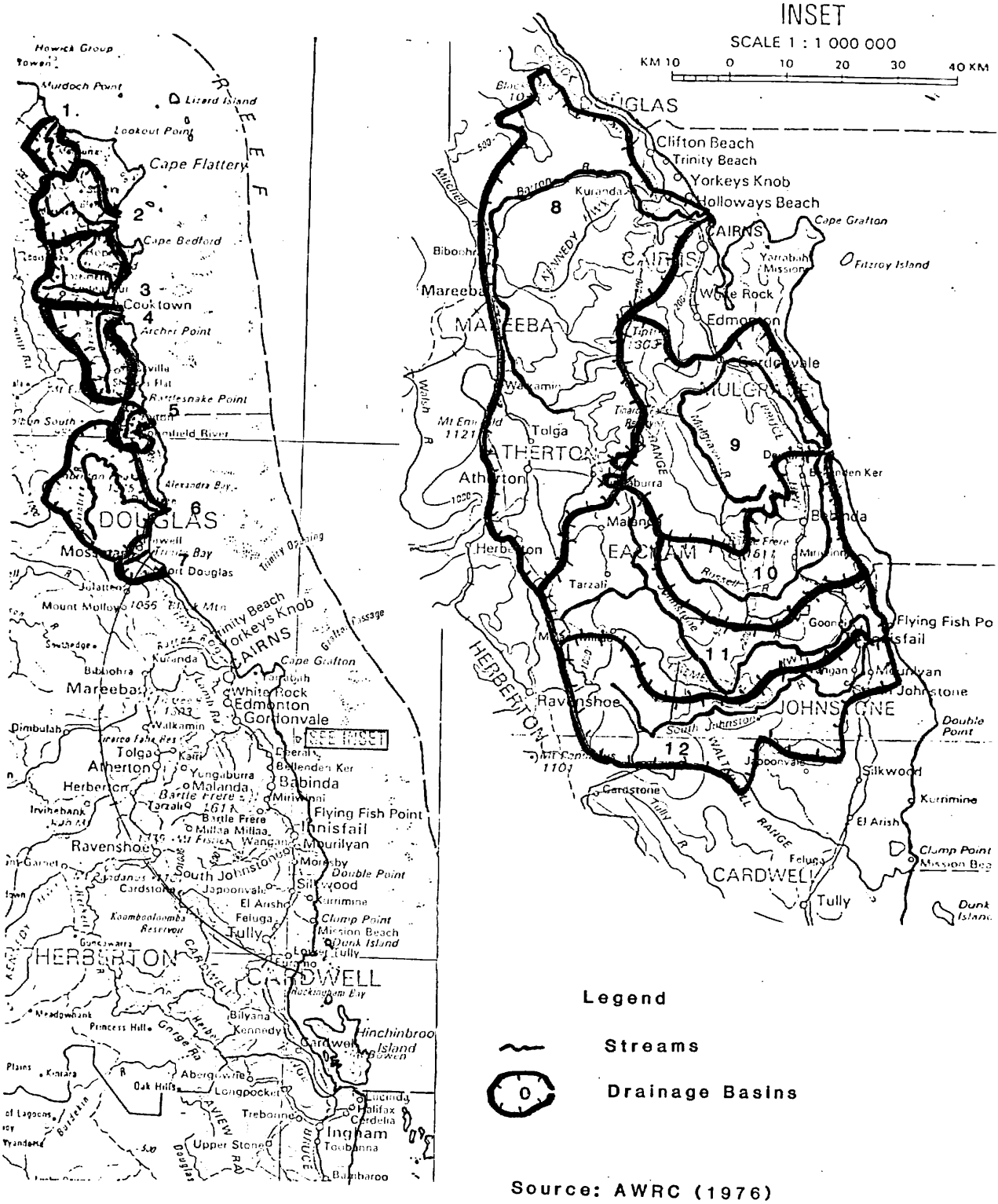


Figure 1.4

Drainage Basins

2. NATURAL RESOURCES

2.1 Biological communities

The flora and fauna within the outer boundaries of the Cairns Section are very diverse and include a number of terrestrial mainland species on the larger islands as well as species typical of isolated situations. The biological importance of this Section to the overall reef ecosystem arises from its location more or less in the middle of the latitudinal extent of the Great Barrier Reef. It lies between areas to the north and south that are further offshore, not so easily accessible and not so subject to run-off from continental watersheds.

The Section supports a highly diverse and abundant fauna of corals, shells and most groups of invertebrate marine animals.

Although some areas can be identified as of particular interest, the relationship and degree of interdependence of individual reefs is not known.

In tropical subtidal waters, wherever water clarity and salinity are generally high and wherever a suitable substrate exists some animals and plants have the ability to deposit calcium carbonate skeletons. As a result of this phenomenon some onshore areas and continental islands have developed substantial fringing reefs. These onshore reefs have both some of the corals found on the outer reefs of the Great Barrier Reef and some corals peculiar to onshore environments.

2.2 Turtles

Five species of turtle have been recorded for the area. They are the green, flatback, loggerhead, hawksbill and pacific ridley turtles. The only eastern Australian records of the pacific ridley turtle are as immature specimens in Trinity Inlet. The Cairns Section is relatively unimportant for sea turtle nesting compared to areas of the Great Barrier Reef to the north and south.

2.3 Birds

At least 94 species of birds have been recorded from the reefs and islands of the area. Of these, 37 are known to breed in the area. 23 maritime species of birds have been recorded, with 10 of these known to breed in the Section.

Important seabird nesting sites within the outer boundaries of the Cairns Section are Lizard Island (8 species), Eagle Island, Low Isles, Michaelmas Cay (5 species each), Upolu Cay and the Barnard Islands (4 species each). Although not important as nesting sites, Green Island (13 species) and the Pethebridge Islands (10 species) are also significant non-nesting localities for seabirds. Lizard Island (11 species), Low Isles (10 species), Green Island and the Barnard Islands (8 species each) are nesting sites for land and water birds. These islands plus Nymph Island are also important land and water bird resting sites.

The relative importance for seabirds of islands within the outer boundaries in the Section is indicated in Table 2.1 (Lavery and Grimes, 1971; Australian Environmental Research Foundation, 1978; Kikkawa, 1976; G.B.R.C., 1979).

TABLE 2.1 BIRD NESTING AND RESTING SITES

	Seabirds Recorded (Nesting)	Land and Water Birds Recorded (Nesting)
Lizard Island	14 (8)	31 (11)
Palfrey Island	2 (-)	8 (2)
Eagle Island	7 (5)	11 (5)
Nymph Island	5 (-)	13 (1)
Pethebridge Island	11 (1)	14 (7)
Decapolis Reef	2 (-)	1 (-)
Rocky Islets	4 (1)	1 (-)
Three Isles	2 (1)	10 (7)
Hope Isles	5 (3)	9 (7)
Gubbins Reef	4 (-)	1 (-)
Low Isles	10 (5)	23 (10)
Low Wooded Isles	6 (3)	5 (2)
Pickersgill Reef	4 (2)	-
Michaelmas Cay	10 (5)	2 (-)
Green Island	13 (-)	38 (8)
Upolu Cay	4 (4)	-
Frankland Islands	1 (1)	9 (5)
Barnard Islands	5 (4)	13 (8)
Arlington Reef	1 (-)	-

2.4 Dugong

The seagrass beds and sheltered bays from Lookout Point north provide a feeding area for significant numbers of dugong, which is listed as an endangered species in the International Union for the Conservation of Nature and Natural Resources (IUCN) Red Book, and in Appendix 2 of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Australia has an international obligation to conserve such habitats.

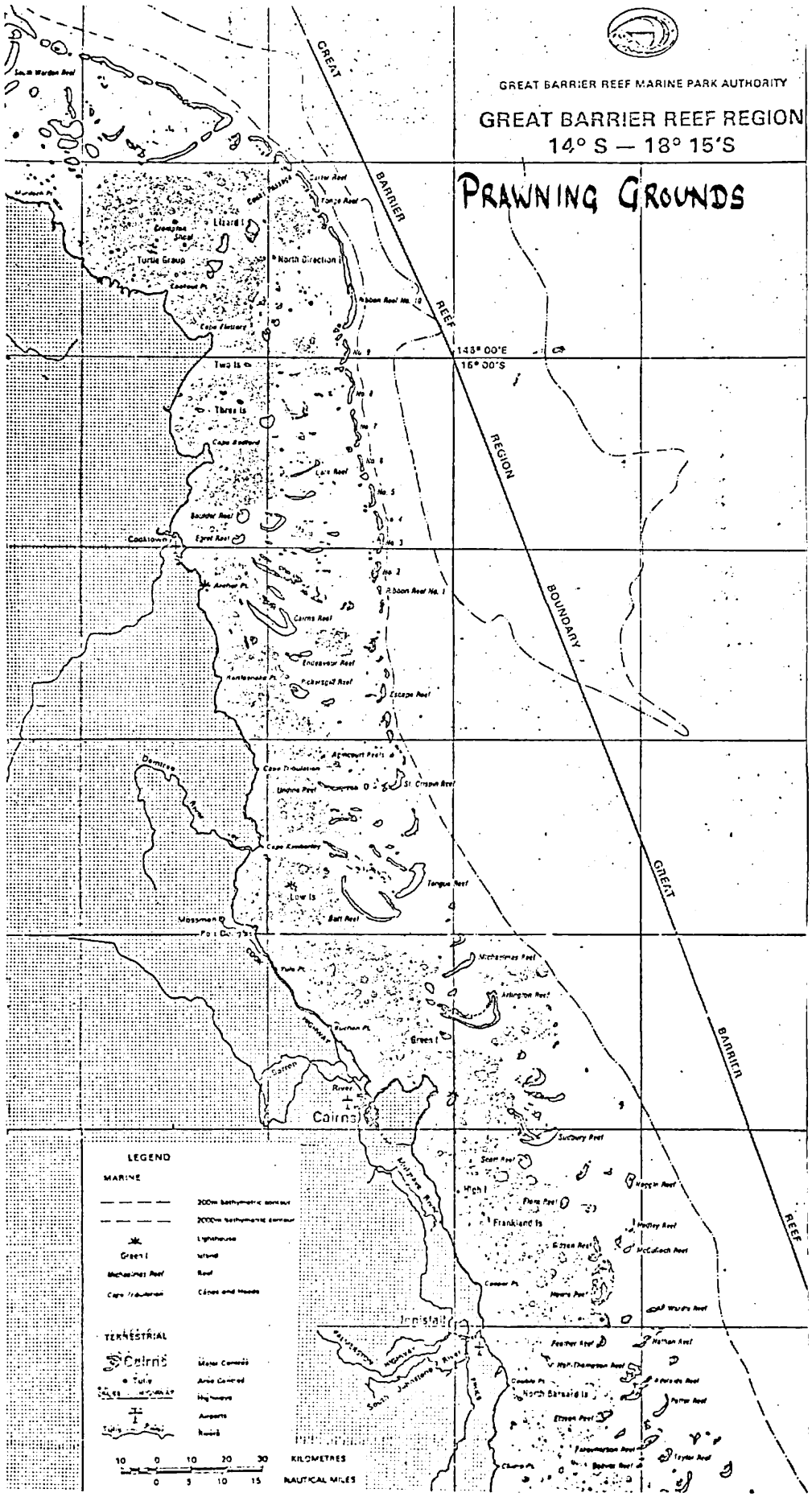
Dugong are long lived, females attaining 40 to 50 years and males up to 35 years. Sexual maturity is reached at 9 years of age, and a single calf is produced perhaps once every 3 years (Heinsohn et al., 1976). Mating and courtship occur from May to August and calves are born from September to December. Preferred breeding areas are shallow, well protected coastal regions, away from disturbance. During daylight hours dugong tend to remain offshore (Jonklass, 1960; Jarman, 1960) and have been found feeding up to 3km offshore at low tides. Occasionally dugong have been sighted well offshore.

2.5 Fisheries resources

About 850 species of fishes have been identified within the area, many of which are intimately associated with the coral reefs. Some of these constitute an important commercial and recreational resource.

2.5.1 Prawns and other trawled species

Prawning grounds within the Section generally lie from the mainland to the inner edge of the reef, to about 20 fathoms. Certain areas are known as particularly productive prawning grounds but any "trawlable" ground, whether amongst the general reef complex or inshore, and now possibly in southern areas of the Section outside the Reef, is regarded as potentially productive. General locations of known prawn trawling areas are shown on Map 2.1.


GREAT BARRIER REEF MARINE PARK AUTHORITY
GREAT BARRIER REEF REGION
14° S — 18° 15'S
PRAWNING GROUNDS
GREAT BARRIER REEF REGION
GREAT BARRIER REEF BOUNDARY
145° 00'E
16° 00'S
Lizard I
Turtle Group
North Direction I
Two Is
Three Is
Cooktown
Cairns
Low Is
Green I
Frankland Is
Innisfail
LEGEND
MARINE
TERRESTRIAL
KILOMETRES
NAUTICAL MILES

Tiger prawns (Penaeus esculentus) and endeavour prawns (Metapenaeus endeavouri) are the main species landed at ports adjacent to the Section, with smaller quantities of banana prawns (Panaeus merguinsis) also being landed.

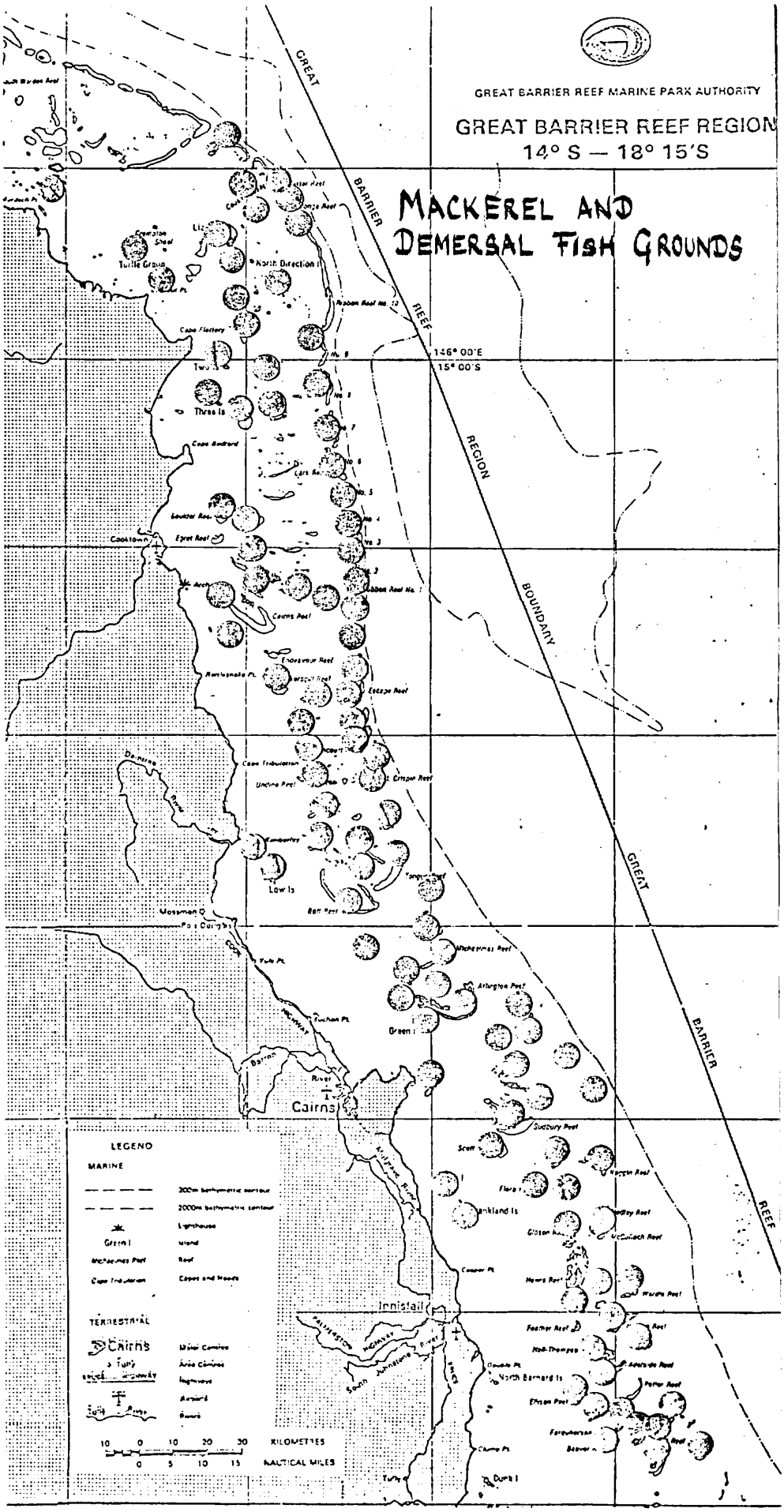
Nursery areas (in October-December) for tiger prawns have been identified by fishermen inshore from the north of the Section south to Cape Bedford.

Scallops (Amusium pleuronectes) are also found within the Section. They move randomly over short distances.

Moreton Bay bugs (Thenus orientalis) are found in the Section, in similar areas to prawns, and crayfish (Panulirus spp.) are found around the base of reefs. The Barnard Islands are believed to be a good source of crayfish.

2.5.2 Pelagic species

The narrow-barred Spanish mackerel Scomberomorus commersoni is the main pelagic species caught in the Section. Other pelagic species include Queensland school mackerel (S. queenslandicus), broad-barred Spanish mackerel (S. semifasciatus), black king fish (Pachycentron canadus), barracuda (Agrioposphyraena barracuda) and trevally (Carangidae).


GREAT BARRIER REEF MARINE PARK AUTHORITY
GREAT BARRIER REEF REGION
14° S — 18° 15'S
MACKEREL AND
DEMERSAL FISH GROUNDS
GREAT BARRIER REEF REGION
BOUNDARY
146° 00'E
15° 00'S
Cairns
Innisfail
LEGEND
MARINE
TERRESTRIAL
KILOMETRES
NAUTICAL MILES

Mackerel are migratory and inconsistent in the locations in which they can be found. Generally they are caught where currents and eddies cause food to accumulate and where there are steep drop-offs. Primary mackerel grounds are near Lizard Island and Cormorant Pass and between Low Isles and Sudbury Reef.

Each year mackerel undertake a breeding migration. In May to June the breeding migration commences and the individuals begin to congregate around the reefs in the Capricornia Section. As the schools increase in size they move northwards and by October they reach the reef waters east of Townsville and Cairns where they spawn. After spawning the mackerel lose condition and after a short resting period scatter and return to southern Queensland waters. S. commersoni reach sexual maturity when they are about three years old.

Main spawning areas tend to be around reefs on the inner edge of the Barrier Reef. Tag returns within the Lizard Island to Townsville region, have shown that fish remain in the same general reef area until the end of their second year. In the third year, the majority migrate southwards, in December, at the end of the spawning season. A return migration of larger fish usually becomes evident during September each year. The bulk of the fishery on the east coast is linked to the northward migration and spring spawning season (McPherson, 1981).

Bait fish (mainly garfish) are caught off beaches and in estuaries. High Island, the Franklands, north side of Green Island, Low Isles, Cape Bedford, Cape Flattery, Lizard Island. Baitfish may also be caught along the outside of the outer Barrier Reef. The main season is May - June.

In addition to light game fish such as mackerel, wahoo, sailfish etc., big game in the form of black marlin (Makaira indica) are also found in the Section. Black marlin are found from reefs off Cairns, from Sudbury Reef in the south to beyond Cape Flattery in the north. Big marlin are found in deep water on the outer edge of the Great Barrier Reef off the ribbon reefs. Because of the number of large female marlin caught, it has been suggested that this area is an important breeding area for black marlin.

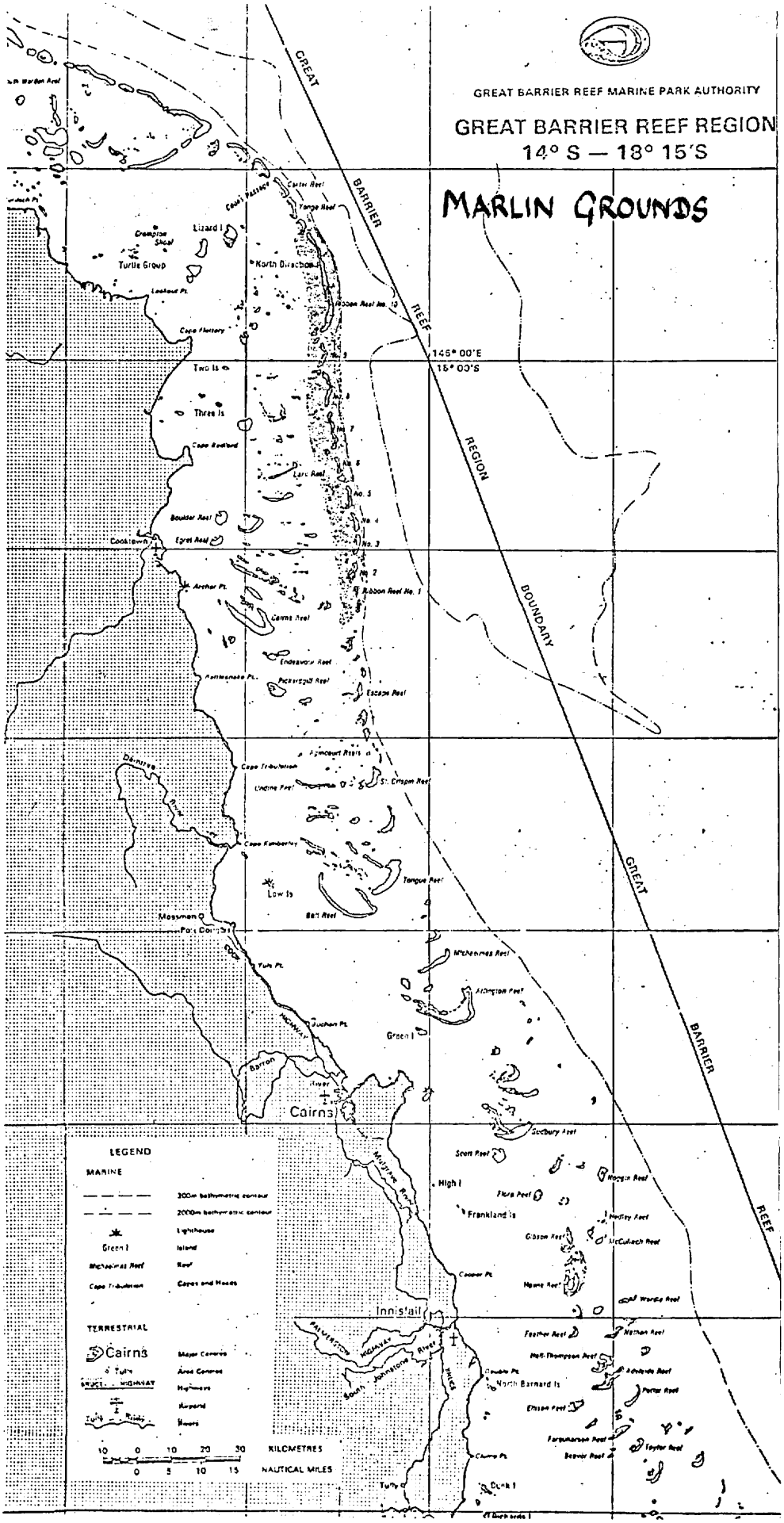
Black marlin are wide-ranging fish with no apparent single migratory path.

Blue marlin (Makaira nigricans) may be found in the waters towards the Coral Sea at the eastern edge of the Section off the ribbon reefs.

2.5.3 Reef fishes

The main species making up the reef fish catch are coral trout (Plectropomus spp.) sweetlip (Lethrinus spp.), red emperor (Lutjanus sebae), cod (Epinephelus spp.), and other Lutjanids. Relative to pelagic fish they are believed to be more restricted in their movements. Coral trout, like many other reef fish, undergo a sex change from female to male when they reach about 30 to 35cm total length (Goeden, 1978). The minimum size limit for this species is 35cm.

Reef fishes are found in the vicinity of reefs and submerged shoals. Little is known about their biology.


GREAT BARRIER REEF MARINE PARK AUTHORITY
GREAT BARRIER REEF REGION
14° S — 18° 15'S
MARLIN GROUNDS
GREAT BARRIER REEF
REGION BOUNDARY
146° 00'E
16° 00'S
Lizard I
Turtle Group
North Direction I
Two Is
Three Is
Cooktown
Cairns
Innisfail
Low Is
Green I
High I
Frankland Is
North Barnard Is
LEGEND
MARINE
TERRESTRIAL
KILOMETRES
NAUTICAL MILES

2.5.4 Aquarium species

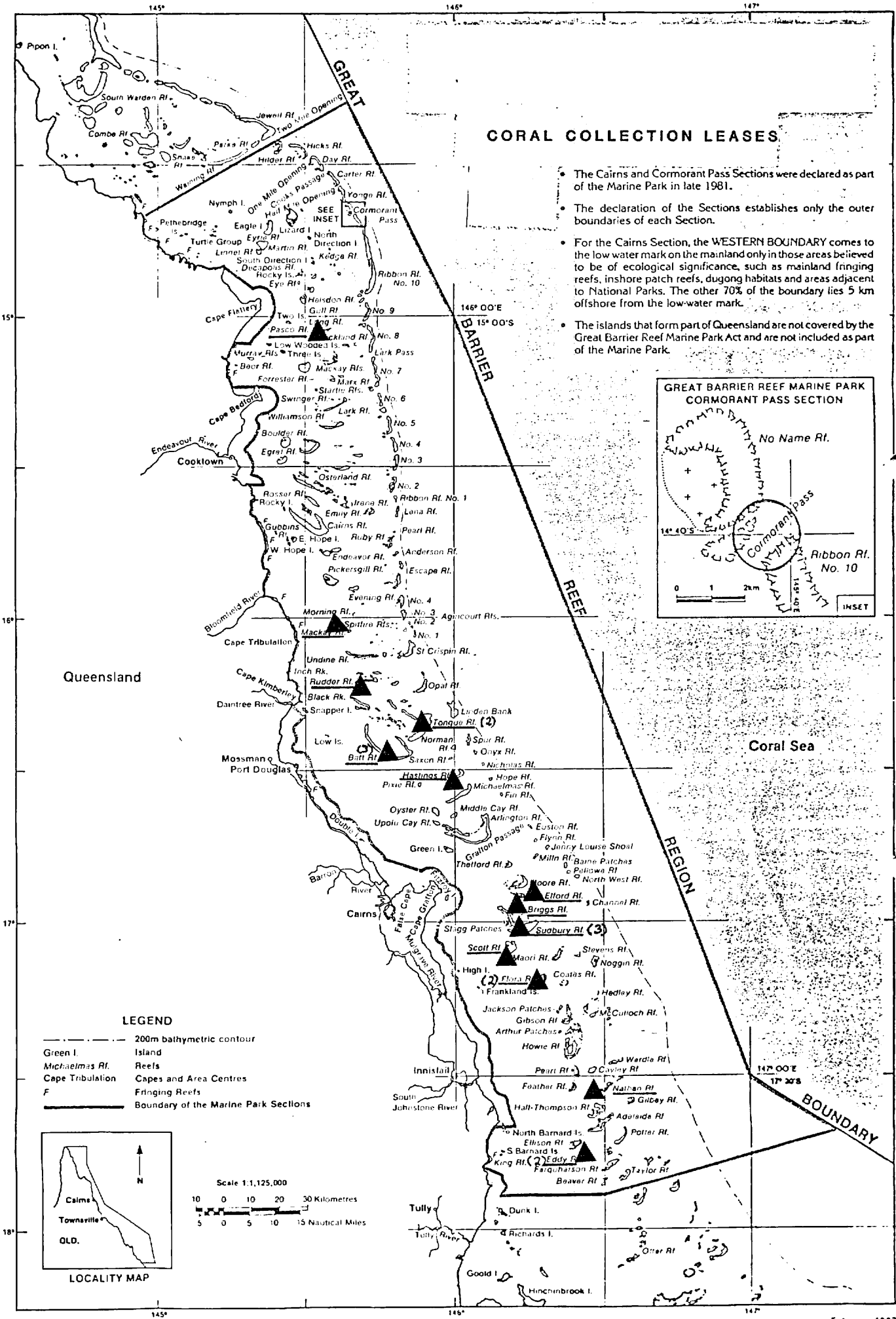
Small, colourful species of fishes e.g. surgeon fishes (Acanthuridae), anemone fishes (Amphiprionidae), butterfly fishes (Chaetodontidae), wrasses (Labridae) etc. are found in most reef areas in the Section. Little is known about the biology of these species other than that they are found in relatively shallow water, some restrict their movements to a fairly small area (and may be territorial) and some may live for considerable periods in captivity.

2.5.5 Shells

Cowries, volutes, cones and spider shells are popularly collected shells in the Cairns Section. Coastal fringing reefs at Fourmile Beach and Cape Tribulation, Michaelmas No. 2 sand bank, the northern end of Michaelmas, Hastings and Arlington Reefs are good shell sites in the Cairns area. Some reefs e.g. Low Isles are seasonally variable. Reef flats and rubble bank areas are generally good areas for collecting, but much depends on the species. Little is known about the biology of collected species.

2.5.6 Coral and shellgrit

Acropora and Pocillopora are important genera for commercial coral collectors. Some species display rapid growth but little is documented about recovery rates over larger collected areas. The distribution of species obviously varies between reefs through the Section. Detailed description of communities can only be achieved through specialist coral survey.



This map is not to be used for navigational purposes.

2.5.7 Trochus, beche-de-mer, clams

Trochus are collected for mother of pearl shell. They are found on reefs within the Section but no distributional data for this area are available. Research into the biology and distribution of trochus will commence in the near future.

Species of beche-de-mer suitable for collection are Thetenota ananus (prickly redfish) and Microthele nobilis (mama teatfish). Surveys to date suggest existing stocks are inadequate to support commercial exploitation.

Many outer reefs exhibit the effects of clam (Tridacna spp.) removal by foreign (mainly Taiwanese) fishermen. The long-term effects of this activity are largely unknown. These fishermen were also known to remove large numbers of birds eggs from nesting colonies on sand cays. This activity is believed to have reduced in intensity since the declaration of the Australian Fishing Zone.

2.6 Recreational resources

2.6.1 Birds

Birds are discussed in paragraph 2.3.

2.6.2 Fishes

Many of the species of fishes recorded in the Section, particularly the small colourful species, are closely associated with coral reefs and are thus an important attraction for snorkellers, divers and those in glass-bottom boats. Sheltered areas with diverse coral communities or large coral outcrops often support diverse fish communities accessible to divers.

2.6.3 Coral

Coral formations e.g. Ribbon Reef drop-offs and diverse coral communities form an attraction to divers, snorkellers and those in glass-bottom boats. Accessible reefs with these features in relatively shallow water are most popular. Coral surveys have identified a number of areas which are particularly aesthetically pleasing.

2.6.4 Shells

Shells are discussed in paragraph 2.3.

3. HUMAN USAGE

3.1. Fisheries

The Cairns Section is an important area for both commercial and recreational fisheries. Commercial fisheries include trawling for prawns, Moreton Bay bugs and scallops, mackerel fishing, handline fishing and gill netting. Recreational fisheries include handline fishing, light game (including mackerel) fishing, and big game fishing. Spearfishing is believed to be undertaken by both commercial and recreational fishermen. Commercial spearfishing is illegal.

It is difficult to provide an accurate estimate of the total fish catch from the Cairns Section for several reasons. A quantity of the commercial catch does not pass through the Queensland Fish Board or licensed processors, some of the commercial catch caught in the Section is landed at ports outside the Section and vice versa, and the recreational fishery is hard to quantify. However, the commercial catch from otter trawlers and other licensed commercial fishermen in 1979-80 has been estimated to be in the order of 1,100,000-1,700,000 kg (Driml et al 1981, 142,189,195) (made up of approximately 700,000-800,000 kg trawled product passing through the major processors; up to 500,000 kg have been estimated to pass through non-local processors and "private sales", 180,000 kg mackerel and 265,000 kg reef fish) and the recreational catch from speed boats in excess of 2,000,000 kg (Driml et al., 1981). The total number of

fishermen is likewise difficult to estimate but, in 1981, 378 commercial vessels were registered at ports adjacent to the Cairns Section: employing some 706 people (not all fulltime). The 1981 market value of vessels engaged in commercial fishing in the Cairns Section is approximately $25,795,000. Some 3530 privately owned registered motor boats are believed to have fished in the Section in 1980-81 (Driml et al., 1981).

These figures do not include estimates for relatively small scale fisheries in which aquarium fish, shells, trochus etc are collected; and which are also undertaken by commercial operators and at least in the case of the first two by non-commercial fishermen.

3.1.1 Otter Trawling

Otter trawling is the major commercial fishery in the Section. The fishery has expanded greatly in the last 10 to 15 years. In 1966 there were 12 trawlers licenced in the Townsville area and 2 in Cairns (Purnell-Webb, 1978). In 1981 there were 196 otter trawlers operating out of ports adjacent to the Cairns Section out of a total of 361 registered in ports between Clairview (north of Rockhampton) and Cooktown. These boats may also operate in the Section (Driml et al., 1981). There has also been a change in the nature of the fleet. The traditional small east coast brine trawler (wet boat), with limited facilities for preserving the catch has been replaced with larger, steel, dry refrigerated, double rigged otter trawlers fitted with sophisticated electronic and navigational aids which have a greatly extended area of operation (Purnell-Webb, 1978).

The mean length of otter trawlers currently registered in ports adjacent to the Section is 12.6 m, mean "horsepower" 109 kw and the current market values of vessels averages $110,481 (Driml et al., 1981). Most trawlers tow 2 nets, though from 1 to 4 nets are towed. Annual expenditure by trawlers in 1979-80 was approximately $7,886,000, of which ninety percent is spent in the Cairns region.

The entire otter trawl catch does not pass through the Queensland Fish Board. A significant portion passes through private processing establishments. The total volume of trawled product from boats registered at ports adjacent to the Section (including bugs, scallops etc) has been estimated in 1979-80 to be in the order of 700,000-1,300,000 kg, (Driml, et al, 1981; 189, 195). About 700,000-800,000 kg pass through the major processors; up to 50% more are estimated to pass through non-local processors and private sales (189,142). At $4.43/kg this is worth a maximum of approximately $7 million to the fishermen, and it is worth $10 million on the export market (Driml et al, 1981; 189, 195). Less than eighteen percent of the catch goes to local markets through the Queensland Fish Board. (DPI, 1980). Over 80% of the prawns landed are exported to Japan and the USA (DPI, 1980).

Tiger prawns form the basis of the commercial fishery. They are non-schooling and are trawled at night by twin-rigged vessels averaging around 15 metres in length. Catches normally range between 50 to 150 kilograms per night, but occasional large catches are made (to 400 kilograms per night). Endeavour prawns are caught while fishing for tiger prawns. Banana prawns are caught during the day in isolated pockets close to shore. King Prawns make up a very small percentage of the catch.

The majority of prawn trawler fishermen undertake no other type of fishing. For all of Queensland (east coast plus the Gulf of Carpentaria), Williams (1980) estimates that 65.5% of otter trawlers confine their fishing solely to prawns. In the Cairns Section, approximately 75% of trawlers do no other fishing than trawling for prawns. The difference in the percentages is partly explained by the fact that the Queensland percentage is influenced by substantial scallop trawling in southern areas.

Incidental catches made by otter trawlers include scallops, squid and Moreton Bay bugs. The scallop fishery has expanded somewhat in the last six years. In 1976 only six boats were involved, but in 1978, at least forty boats landed scallops. Landings of scallops at the Cairns and Innisfail Fish Boards increased from 1kg in 1977 to 886 kg in 1979 (Queensland Fish Board Annual Reports).

3.1.2 Commercial fishing other than otter trawling

Some 157 commercial vessels registered in ports adjacent to the Cairns Section undertook some type of commercial fishing, other than otter trawling in 1981 (Driml et al.). Total landings are estimated to be in the order of 450,000 kg, (DPI, 1980:189). Most of these operators engaged in 2 or 3 fishing methods, with gill netting, trolling and handlining in that order, being the three most popular. Mean vessel length is considerably smaller than otter trawlers at 7.7 m, with an average "horsepower" of 68.7 kw. Current market value of these vessels averages $26,000. Annual expenditure (1979-80) by vessels engaged in commercial fishing other than otter trawling is approximately $1,481,000 of which ninety percent is spent in the Cairns region. (Driml et al., 1981).

3.1.3 Pelagic fishery

This fishery is exploited by both commercial and recreational fishermen.

Commercial fishermen based in Cairns, Innisfail and Port Douglas travel as far south as Townsville and north to Lizard Island in vessels around 9 metres in length. Preferred vessels are low-powered diesel driven boats, which troll around three to four knots. They usually start work at first light and troll until mid-morning, or when the fish "go off the bite" (D.P.I., 1980).

Trolling gear, comprising heavy breaking-strain lines using baits and lures, produces the bulk of landings in northern Queensland. Lighter tackle such as rods and reels, is also used to great effect, either by trolling or drifting. Very small quantities are taken by gill nets. The quality of such product is generally inferior to the troll-caught fish.

Mackerel is the major fin fishery in the Section, comprising some 50% of the total landings in Cairns and 45% in Innisfail. Mean annual mackerel landings (1973-1977) at the Cairns and Innisfail Fish Board depots are 130,346 kg and 57,180 kg respectively. Landings of mackerel peak in July, September and October-December in Cairns.

Estimates based on the above Fish Board landings of pelagic fish gives a yearly average of 180 tonnes whole weight worth approximately $350,000. This figure is a fair indication of the total catch in the year prior to 1980, as very little mackerel was sold privately by fishermen. However increasing numbers of amateurs are catching mackerel and selling to private buyers (D.P.I., 1980) and numbers of commercial fishermen in the mackerel fishing are declining (Williams, 1980).

Ninety-eight percent of pelagic fish caught in the Section is narrow barred Spanish Mackerel (Scomberomorus commersoni). This catch constitutes 27.4% of the total Queensland landings of S. commersoni (D.P.I., 1980).

3.1.4 Demersal Reef Fishery

This fishery is exploited mainly by amateur fishermen using baited handlines and spearguns. The substantial recreational fishery includes a large quasi-commercial segment.

Both charter boat fishermen and speed boat fishermen are involved in this recreational fishery. Fishing parties made up from deep sea fishing clubs or by individuals who charter vessels for a multi-purpose trip may spend considerable time fishing. Some parties fish directly off the boat; whereas others take small dinghies to enable them to fish closer to reefs.

The commercial fishery and to a lesser extent, the charter boat fishery probably range fairly extensively throughout the Section.

Fishing from privately-owned speedboats is a major component of the fishery, and it can be expected that at least some fishing is undertaken on most speedboat trips to the Section. The main points of access are various ramps near Tully, Mourilyan, Cairns, Port Douglas, and Cooktown. Trip frequency depends on weather and seasonal activities such as cane harvesting. The most popular reefs off Innisfail are Gibson, Howie, Feather, and Peart, Reefs and Arthurs Patches; off Cairns - Green Island, Sudbury, Michaelmas, Oyster, Upolu and Arlington Reefs; off Port Douglas - Batt and Tongue Reefs and Low Isles; and off Cooktown Boulder, Egret and Osterland Reefs.

Throughout the Cairns Section, in 1980-81 3530 boat owners averaged 14.5 fishing trips to the Section per year, carrying an average of 2.6 fishermen per boat. Trip length averaged 12 hours, boat length 5.1 m and mean horsepower 70hp. Mean catch per boat/trip averaged 45 kg made up of 16.8 fish on average i.e. an average of 6.6 fish/man/day.

The recreational fish catch from speedboats in 1981 was estimated to be in the order of 2,000,000 kg. Reef fish make up about 8% of total landings through the Queensland Fish Board at Cairns and about 25% of total landings through the Queensland Fish Board at Innisfail.

The examination of catch records for all reef fish caught at reefs in the Cairns and Innisfail areas has shown that there is a direct relationship between catch (kg, no. fish) and distance of the reef from port.

It has been estimated that within an 80km radius of Cairns, coral trout populations have been reduced to one-tenth of their former abundance. A "density index" of coral trout per hectare for the Cairns-Innisfail area was calculated to be 5.6 compared with about 40.0 for an unfished area (Goeden, 1979). Records from reefs off Innisfail also show a decline in the number of fish per man being caught over the last 5 to 6 years (Craik, 1979).

Catch composition from speedboats recorded in a survey in August 1980 showed coral trout comprised 20 to 70% of the catch at individual reefs. Overall coral trout made up 37% of the catch, sweetlip 9%, red emperor 17% and cod 7%.

Composition of demersal fish landed through the Queensland Fish Board in 1979 was:

Coral trout (Plectropomus spp.)	- 33.8%
Sweetlip (Plectorhynchus spp.)	- 11.3%
Emperor (Lethrinus spp.)	- 8.3%
Cod (Epinephelus spp.)	- 5.3%
Dart (Carangidae)	- 4.3%
Mixed Fish	- 37.1%

(Queensland Fish Board Annual Report, 1979)

Relative angler success is shown in the table below. In terms of fish per angler day, the top 10% of fishermen take a mean of 13 fish compared with 2.5 or fewer for the bottom 50% of anglers.

Cairns area speed boats: Relative angler success

	Top % of fishermen				
	10	20	30	40	50
Percent of catch	32	49	63	73	82

3.1.5 Gamefishing

Big gamefishing for black marlin (Makaira indica) has developed as a leading recreational fishery between September and November out of Cairns, and light tacklefishing out of Innisfail and Cairns has also become an important recreational activity.

The black marlin fishery has developed since 1966 when the first black marlin over 1,000lb was landed by the then only game boat in Cairns. Since then over 300 black marlin over 1,000lb have been weighed in including 44 over 1,000lb in 1980 (International Angler, 1980). Between 1974-75 and 1978-79, 615 black marlin were weighed in of which almost 40% were over 1,000lb. The number of marlin actually

weighed in represents a small percentage of those hooked. In 1978-79, 573 marlin were tagged and released and 85 weighed in (C.G.F.C. Annual Report 1978-79).

The main fishing ground off Cairns extends about 200km from Cairns to beyond Cape Flattery. Marlin are also caught around reefs off Cairns, south to about Sudbury. Big marlin are caught in deep water on the outer edge of the Great Barrier Reef. Some boats return to port at night, others work off a "mother ship" anchored in sheltered waters behind the reef and others work from the Lizard Island Resort. Because of the number of large female marlin caught, it has been suggested that this area is an important breeding area for black marlin.

During the 1979 marlin season, the Cairns marlin fleet comprised about 32 game boats and about 7 mother ships. The fishery is believed to bring considerable economic benefit to Cairns. The 1979 replacement value of vessels and equipment was about $10,000,000, annual expenditure about $2,000,000 and annual income from charter boat fees about $2,640,000 (Hundloe et al, 1981).

Japanese longliners (for tuna) working in an area of some 600,000 square kilometres adjacent to the North Queensland coast, are believed to have caught an average of about 2,400 black marlin each year (range 661-3,500) over the last 6 years up to about 1980. These are not the large game fish, but smaller individuals.

In an agreement with the Japanese Government, following the introduction of the Australian Fishing Zone, the Japanese longline fishery has been excluded from the Great Barrier Reef Region to the east of an area running approximately parallel to and 180 kilometres beyond the outer edge of the Great Barrier Reef.

3.1.6 Crab Fishery

The major sites for the crab fishery (mud and sand crabs) in the Section are Cairns and Innisfail. Recent years have shown an increase in landings at these sites, which is illustrated by the landings for the period 1977-1979:

Landings of crabs at Cairns and Innisfail

Year	Weight of Crabs (kg)	Value ($)
1977	34	220.6
1978	143	1,014.5
1979	275	1,807.9

(Queensland Fish Board Annual Reports)

3.1.7 Coral Collection

Leases for commercial coral collection exist at 13 reefs in the Section: Mackay, Batt, Hastings, Sudbury, Tongue, Scott, Elford, Flora, Briggs, Nathan, Eddy, Rudder and Pasco Reefs. The volumes of coral collected are unknown at present. New leases are under consideration for Howie and Cayley Reefs.

Leases usually extend for 400 m of reef frontage, and a depth limitation of 6 m is sometimes included in lease conditions.

Effects of commercial coral collecting to date are believed to be negiligible, however the ban on exporting coral from the Philippines may alter the situation.

Amateur coral collection undoubtedly occurs at popular dive reefs and reef walking sites.

3.1.8 Aquarium Fish Collection

Four commercial collectors are known to operate in the Section. Reefs close to Cairns and Port Douglas are most heavily collected because of ease of access. Handnets are the preferred method of collection. Collectors prefer juveniles of collected species because of greater ease of feeding, maintenance and transport.

Effects of collecting are largely unknown but operators report that numbers of species of collected fish (particularly juveniles) appear to increase after collection.

Amateur aquarium fish collection is undertaken in the Section, presumably at accessible reefs, but the extent of the activity is unknown.

3.1.9 Spearfishing

Spearfishing for demersal and some pelagic species is undertaken throughout the Section - generally from charter boats and speed boats. Spearfishing is prohibited in the Green Island Marine Park declared by Queensland in 1974.

The volume of fish speared in the Section is unknown; and the effects on fish communities, and effects relative to line fishing are also unknown.

3.2 Visitor Use

Visitors to the Cairns Section of the Marine Park range from commercial and amateur fishermen (discussed in the previous section) to residents, resort and maintenance staff and scientists working and living on islands. However the majority are domestic and international tourists and day visitors from the mainland who visit and make use of the Marine Park in their leisure time.

3.2.1 Visitor Numbers

The comprehensive and recently completed ATIA report, entitled "Review of Data on Reef Related Tourism: 1946-1980" revealed that little information is available on the tourist and recreational use of the Great Barrier Reef Region. The report showed that the limited amount of data that is published comes from different sources of varying reliability and is often incomplete, contradictory or lacks comparability.

The limited data that is available clearly indicates a large increase in the number of visitors to Queensland, the Great Barrier Reef and the adjacent mainland and the Cairns Section of the Great Barrier Reef since 1946.

3.2.1.1 Domestic Tourists

It has been estimated in the Domestic Tourism Monitor that the Great Barrier Reef Region as a whole currently attracts total visitor trips approaching 2,000,000 per year (ATIA, 1980).

Information gathered on domestic tourists revealed tremendous growth in reef-related tourism over the period 1946-1980. "Not only has the rate of growth kept pace with the rest of Queensland and Australia as a whole, but, in some areas, it has exceeded it" (ATIA, 1980 p.3).

Whilst the information on growth of visitor traffic in the Cairns Section since 1946 is not available, some indication can be obtained from figures for the Whitsunday area (see Table 3.1). The Whitsunday area is not in the Cairns Section and is thought to have experienced less growth in visitor traffic than the Great Barrier Reef coast as a whole.

TABLE 3.1 EXAMPLE OF INCREASE IN VISITOR TRAFFIC SINCE 1946

Whitsunday Area

Year Data Available	Visitor Numbers
1947	5 000
1962	28 000
1969	69 000
1979	182 000

Source: ATIA, 1980.

The most broadly based sources of information on domestic tourists are the "Domestic Tourism Monitor" (Australian Standing Committee on Tourism - ASCOT, 1979, 1980 and 1981) and the state-wide supplement "Domestic Travel In Queensland" (QTTC, 1979, 1980 and 1981).

These sources must be treated with caution since Tourism and Destination Regions defined in these on-going omnibus surveys do not coincide with the Great Barrier Reef Region or the Cairns Section (see Figure 3.1). Further, the small sample size makes the data on Region 44 (The Whitsunday Islands) and Region 47 (The Northern Barrier Reef Islands) unreliable. Moreover, in common with many such surveys, a number of aspects of the methodology limit the value of extrapolations based on the results.

Nevertheless the Domestic Tourism Monitor is one of the most comprehensive and the only continuing survey of domestic travel yet undertaken in Australia. Two other studies (Gibbings' 1969-70 study and the Survey of Australian Travel 1973-74) also reveal trends in domestic tourist traffic to the coastal areas adjacent to the reef and the nearby island resorts between 1969 and 1981 (See Table 3.2).

TABLE 3.2 VISITOR TRIPS TO REGIONS CONNECTED WITH THE GREAT BARRIER REEF IN QUEENSLAND

Region	1969	1973	Increase 69-73	1978	Increase 73-78	1979-80	1980-81
Rockhampton/ Gladstone	107 702	154 000	42%	387 000	151%	440 000	508 000
Mackay	81 284	86 000	6%	290 000	237%	321 000	194 000
Townsville	113 440	161 000	43%	490 000	204%	433 000	394 000
Cairns	154 440	191 000	24%	495 000	159%	461 000	520 000
Island Resorts*	69 000	49 000	29%				
Northern G.B.R. Islands				81 000	-	135 000	68 000
Whitsunday Islands				106 000	-	47 000	78 000

Source: ATIA, 1980 p.17; Hundloe et al., 1981, p. 17; QTTC, 1979, 1980 and 1981.

* Disaggregated figures for Island Resorts are available from 1978 and differentiat Region 47 (Northern Barrier Reef Islands) from Region 44 (Whitsunday Islands).

From data on a range of other aspects of reef-related tourism in the Domestic Tourism Monitor it is possible to describe tourist industry in the Tourism Regions closest to the Cairns Section (Regions 46 and 47 in Figure 3.1). Table 3.3 shows the Origin of domestic tourists visiting the Cairns region and the Northern Barrier Reef Islands.

TABLE 3.3 ORIGIN OF DOMESTIC TOURISTS VISITING CAIRNS AND THE NORTHERN BARRIER REEF ISLANDS

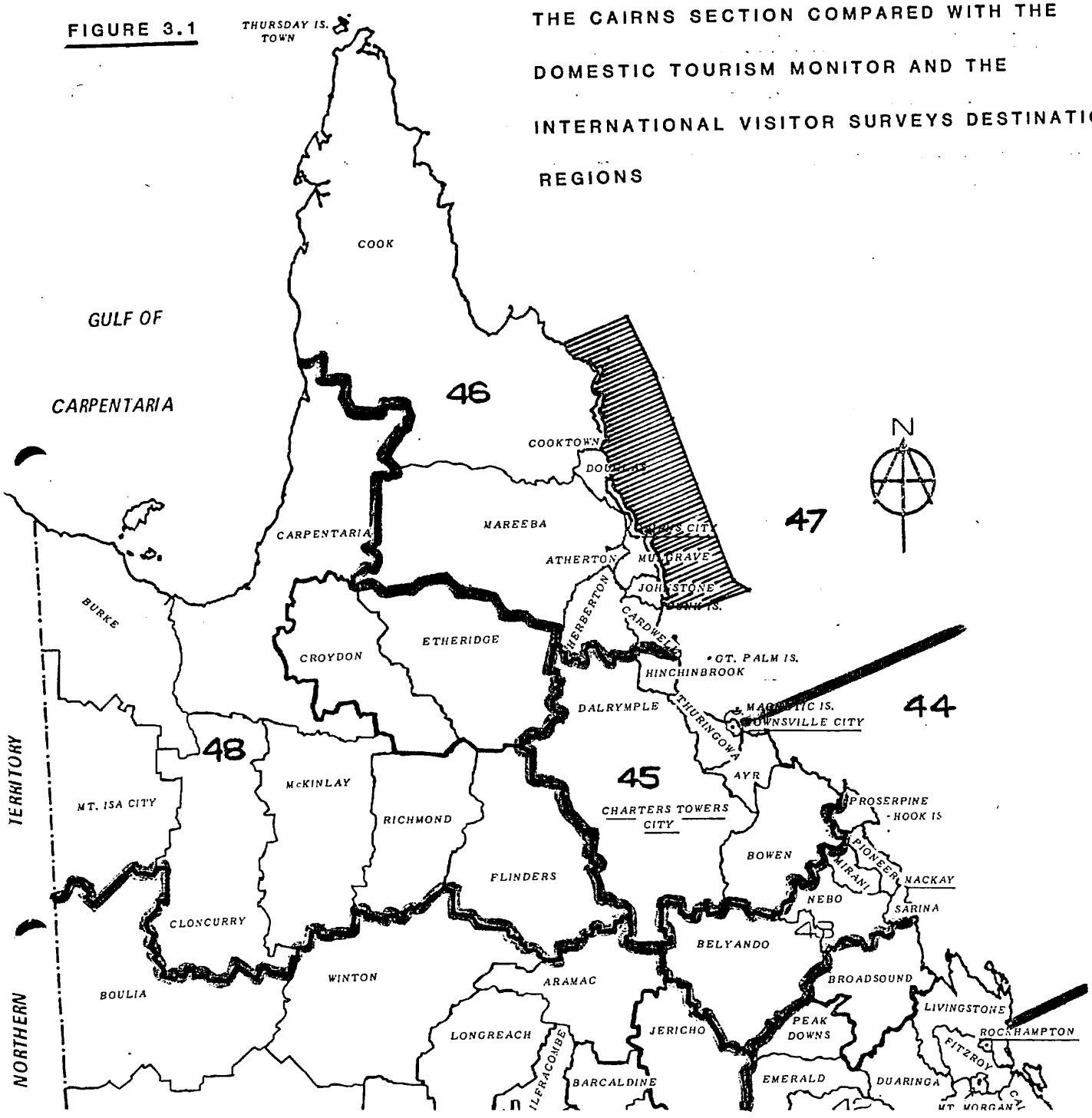
Tourism Region	From Queensland (Total trips)	%	From Interstate (Total trips)	%
Cairns				
1978/79	420 000	85	71 000	15
1979/80	406 000	88	55 000	21
1980/81	434 000	83	86 000	17
Northern Barrier Reef Islands				
1978/79	35 000	70	15 000	30
1979/80	34 000	72	13 000	28
1980/81	67 000	86	11 000	14
TOTAL				
1978/79	455 000	84	86 000	16
1979/80	440 000	87	68 000	13
1980/81	501 000	84	97 000	16

Source: ATIA, 1980 and QTTC 1979, 1980 and 1981.

WANG ID: 0713A
12 May, 1982.

FIGURE 3.1

THE CAIRNS SECTION COMPARED WITH THE DOMESTIC TOURISM MONITOR AND THE INTERNATIONAL VISITOR SURVEYS DESTINATION REGIONS



Key:

Cairns and Cormorant Pass Sections of G.B.R.

46 Cairns Destination Region

47 Northern Barrier Reef Islands Destination Region

Scale

0 100 200 300
Km

Source: 1.Tourism Regions-Q.T.T.C., 1981 2.Cairns Section-G.B.R.M.P.A.,1981

Table 3.4 also shows other main reasons that were given for travel to the Cairns region and the nearby island resorts.

TABLE 3.4: MAIN PURPOSE OF TRAVEL TO THE CAIRNS REGION AND THE NORTHERN BARRIER REEF ISLANDS GIVEN BY DOMESTIC TOURISTS

Tourism Region	Main Purpose of Travel					
	Pleasure/ Holiday	Visiting Friends/ Relatives	Private Reasons	Business Conference	Other Business	Other
	(% of total nights)					
Cairns						
1978/79	64.0	16.2	1.7	1.7	12.0	4.4
1979/80	56.7	18.7	4.3	0.7	17.2	2.4
1980/81	55.3	16.5	3.0	1.1	18.4	5.7
Northern Barrier Reef Islands						
1978/79	68.8	-	6.4	-	5.0	19.8
1979/80	41.2	11.5	2.1	-	16.9	28.3
1980/81	46.7	31.6	0.7	-	18.4	2.6

Source: QTTC, 1979, 1980 and 1981.

3.2.1.2 Overseas Visitors

An indication of the number and type of overseas visitors to Australia, its various States and regions and in particular to the North Queensland is provided by the Australian Tourist Commission through its International Visitor Surveys conducted in 1971/72, 1974/75 and 1979/80 onwards. Table 3.5 illustrates the number of visitors to the Cairns Region and the Great Barrier Reef Region and their countries of origin.

Unfortunately, as with the Domestic Tourism Monitor, the regions surveyed do not coincide with the Great Barrier Reef Region and therefore do not separately identify people who stayed overnight in the Great Barrier Reef Region or visited the Cairns Section of the Reef. Moreover the figures refer to the number of visitors who indicated that Queensland was the State of their main intended destination rather than the number of international visitors who actually visited Queensland. Nevertheless, the figures provide a general picture of overseas visitors in the immediate vicinity of the Cairns Section of the Great Barrier Reef Marine Park.

Despite the increase in total overseas visitor traffic over the period, the proportion of total visitors to Australia travelling to the mainland adjacent to the northern half of the Great Barrier Reef Region has fluctuated around 5 percent (Table 3.5).
The proportion visiting the Barrier Reef appears to be declining (Table 3.5).

TABLE 3.5

GREAT BARRIER REEF REGION
VISITORS FROM OVERSEAS
(1971-72 to 1974-75 and April 1979 to March 1980)
(Based on A.T.C. International Visitors Surveys)

Year	Total short-term overseas visitors to Australia	Region visited, Number of visitors (% of total Australia)	Composition of visitors (% by country of residence) USA	CANADA	N.Z.	PNG	JAPAN	U.K.	EUROPEAN OTHER THAN U.K.	OTHER	COMMENT
1971/72	402,328	Cairns 26,622 (7%)	31%	6%	15%	26%	5%	6%	6%	5%	
		Barrier Reef 21,483 (5)	41%	8%	17%	8%	4%	8%	7%	7%	
1972/73	444,957	Cairns 24,738 (5.6%)	29.1%	6.6%	18.5%	21.2%	3.5%	8.2%	6.6%	6.3%	
		Barrier Reef 19,882 (4.5%)	37.2%	8.4%	19.6%	5.5%	3.4%	11.9%	8.4%	5.6%	
1973/74	505,854	Cairns 24,946 (4.9%)	24.3%	7.1%	23.2%	n.a.	5.2%	9.4%	7.3	23.5%	("Other" category is inflated due to absence of P.N.G. figures)
		Barrier Reef 19,824 (3.9%)	29.9%	8.9%	25.9%	n.a.	4.3%	11.1%	10.2%	9.7%	
1974/75	519,546	Cairns 28,993 (5.6%)	22.24%	7.1%	22.1%	16.9%	3.2%	8.8%	9.7%	9.8%	
		Barrier Reef 20,334 (3.9%)	25.6%	10.0%	23.2%	5.2%	3.9	10.9%	13.3%	7.9%	
1979/80	601,760	Cairns 31,893 (5.3%)	20.3% (North America)		34.5%	n.a.	2.5%	21.9%	9.5%		
		Northern Barrier Reef 5,416 (0.9%)	15.0% (North America)		59,7%	n.a.	.9%	10.1%	3.5%		
		Islands 7,822 (1.3%)									
		Green Island 25,340 (4.2%)	21.7%	8.3%	30.2%	n.a.	2.3%	14.7%	17.1%*	5.7%	*(Of the European countries, Germany constitutes about half).

Note "Barrier Reef" is not defined, but presumably relates to area in North Queensland, South of Cairns.
Source: ATIA, 1980, Appendix 1.

TABLE 3.6 MAIN PURPOSE OF VISIT GIVEN BY OVERSEAS VISITORS

Tourism Region	Pleasure/ Holiday	Visiting Friends/ Relatives	Business	Convention	Other
	(% of total nights)				
Cairns	46.1	38.9	2.8	0.2	12.0
Northern Barrier Reef Islands	30.2	6.0	7.7	0.8	55.3

Source: QTTC, 1980a.

The segment of overseas visitors consisting of "European other than U.K." has expanded significantly over the period. Visitors from Western Germany constitute a substantial component of this segment. For example 8.3% of the visitors to Green Island during the period April 1979 to March 1980 were West Germans (ATC, 1980).

It is worth noting that there has been a considerable increase in the number of Japanese visitors coming into the Cairns area via Port Moresby (P.N.G.). The Survey of International Visitors, which covers the period up to March 1980, would not have taken this additional traffic into consideration (ATIA, 1980, p. 23)

As far as the main purpose for their visit to Australia is concerned (Table 3.6), more foreigners visiting Northern Queensland specified holidays than other reasons.

3.2.1.3 Day Visitors

A significant group of visitors which has not been taken into account in tourism surveys such as the Domestic Tourism Monitor and the International Visitors Survey is the day visitor or day-tripper. Day visitors, who visit but do not stay in the Cairns Section of the Great Barrier Reef Marine Park overnight, often use the same facilities and services as domestic and overseas tourists (with the exception of accommodation).

Data on day visitors does not exist in any meaningful form at present. The few studies that refer to day visitors in the Great Barrier Reef Region have tended to use limited definitions of 'day visitor'.

In UK and US studies, day visitors or day trippers are usually defined as local residents or visitors from outside the local area who do not stay away from their usual place of residence overnight. Thus, if domestic tourists (who, by definition, stayed away from home for at least a night) who visit the Cairns Section for a day are counted as day visitors, they will be double-counted if domestic tourism and day visitor figures are combined. For this reason such figures on day visitors as do exist should be treated with caution.

Nevertheless, figures for visitors carried on day visits to sites within the Cairns Section of the Great Barrier Reef Marine Park describe the actual use of the Section. Thus the "Green Island Management Plan", which examined day visitors with regard to their destinations not their usual place of residence, reported that about 130,000 day visits are made to Green Island each year. Ninety-five percent of "the island's visitors are day-trippers who travel on the commercial ferry services and spend about four hours on the island" (Green Island Management Committee, 1980, p.35).

A study of Lizard Island (Goldman, 1979), also loosely referred to day visitors, estimating that in 1977-78, 2230 day-trippers visited the island.

3.2.2 Recreational Activities

For many visitors the major attraction is relaxing and "getting away from it all". Nevertheless, there is a wide range of activities that can be carried out by visitors to the Cairns Section of the Great Barrier Reef and can be divided into reef-based and reef-enhanced activities.

3.2.2.1 Reef-based Activities

Some recreational activities are so closely related to the reef that they cannot be enjoyed without the reef and surrounding waters.

These activities include:

glass-bottom boat viewing

underwater observatory

reef walking

snorkelling and swimming

diving

underwater photography

marine life observations

shell collecting - amateur and commercial

coral collecting - amateur and commercial

aquarium fish collecting - amateur and commercial

spearfishing - amateur and commercial

boat fishing - amateur and commercial (demersal)

scenic reef flights

reef cruising

3.2.2.2 Reef-enhanced Activities

Some recreational activities are enhanced by, but not dependent on the reef and surrounding waters. Several tend to be island resort and mainland-based.

Reef-enhanced activities include:

camping

island and bush walking

sightseeing

picnicking

photography

nature study (bird; turtle watching)

resort swimming

sunbaking

golf, tennis and other outdoor sports

indoor sports

horse-riding

fishing

powerboating

water skiing

jet skiing

sailing

windsurfing

man-made displays/exhibits

souvenir sales

The reef-enhanced activities which occur within the boundaries of the Cairns Section and are thus of particular interest to the GBRMPA are:

fishing

sailing

power boating

water skiing

windsurfing

3.2.3 Recreation Sites Visited

3.2.3.1 Sites Within the Cairns Section

A number of sites in and around the Cairns Section are the focus for reef-based and reef-related activities.

Those reefs, islands and surrounding waters within the Cairns Section that are known sites for recreational activities are listed in Table 3.7.

TABLE 3.7 REEFS, CAYS AND ISLANDS WITHIN THE CAIRNS SECTION MOST HEAVILY USED FOR RECREATIONAL ACTIVITIES OTHER THAN FISHING

Name	Type of Activity/Facilities
Green Island Reef	Reef walking, snorkelling, diving, coral viewing, glass bottom boat viewing, nature study
Michaelmas Reef	Scenic reef flights, diving, snorkelling
Arlington Reef	Scenic reef flights, diving, snorkelling
King Reef	Diving, snorkelling, glass bottom boat viewing
Beaver Reef	Reef walking, snorkelling, glass bottom boat viewing
Michaelmas Cay	Scenic Reef flight, snorkelling, diving, swimming, picnicking, nature study
Upolu Cay	Scenic Reef flight, snorkelling, diving, swimming
Low Isles	Reef walking, snorkelling, diving, swimming, sunbaking, picnicking.
Lizard Island	Snorkelling, diving, glass bottom boat viewing, bush walking, camping, resort facilities, nature study
Green Island	Reef walking, snorkelling, diving, swimming, glass bottom boat viewing, underwater observatory, bushwalking, nature study, picnicking, sunbaking, Marineland Melanesia, Castaway Theatre, Coral Cay Hotel, resort facilities.

Islands form a focus for recreation. Of these Green Island, Low Isles and Lizard Island warrant special mention.

Green Island

Green Island is a vegetated sand cay of approximately 12 hectares, 27 kilometres offshore from Cairns, and is surrounded by a well-developed reef which was declared a Queensland marine national park in 1974.

"Because Green Island is... readily accessible from the mainland it has emerged as the most popular tourist destination on the Reef. About 130,000 people visit Green Island each year. At least 95% of these are day-trippers, half of whom are from interstate and overseas. The peak visitor seasons are May, July/September and December/January. It is estimated that the economic impacts generated by tourism on Green Island is currently between $2.6 and $4 million." (Green Island Management Committee, 1980, p(iv)).

Tourism on the island dates back to the late nineteenth century. The island became a national park in 1937 and Hayles Ltd. established a tourist resort there during the 1940s. About one-third of the island was later excised from the park to allow for development of tourist and accommodation facilities on a number of leases issued by Lands Department. The Coral Cay Hotel (which has 12 suites, 6 lodges and several palm units under construction) will provide overnight accommodation for up to 100 guests and refreshments for day-trippers.

Access to Green Island is by ferry, hydroflite, seaplane, private craft and charter boat. About 90% of the island's visitors travel by the two commercial ferry services, Hayles Cairns Cruises and Green Island Seatel Cruises.

The high level of recreational use of Green Island prompted the National Parks and Wildlife Service to conduct a management study (Green Island Management Committee, 1980) and its significant regional economic impact led to an economic study being undertaken by Economic Associates of Australia (1979) on behalf of the Great Barrier Reef Marine Park Authority.

Low Isles

Low Isles are located almost 13 kilometres north-east of Port Douglas. They consist of two wooded areas, a small sand cay of about 1.4 hectares which supports a lighthouse station and a mangrove area, and occupies a single reef platform approximately 1.5 kilometres long (Hudson, 1981).

M.V. "Martin Cash" cruises to the Low Isles from Port Douglas each day for 300 days of the year between April and January. This service has been running since 1979. The launch has a maximum capacity of 160 passengers and takes an estimated 16,000 people annually. Privately-owned and chartered boats also anchor off Low Isle but the number of visitors they bring is not known.

Lizard Island

> "Lizard Island itself covers a little over 500 hectares, but the total system which includes a large lagoon fringed by a connecting coral reef between Lizard, South and Palfrey Islands (some half a kilometre distant) is quite extensive. The island has a high central ridge rising to 370 metres which commands a spectacular view of the mainland and outer Barrier reefs; a number of isolated beaches for swimming and diving; good walking tracks, permanent freshwater, a variety of vegetation types; several excellent anchorages for vessels (some up to 20,000 tons); a flat central plain on which a small airstrip has been constructed; extensive fringing coral reefs and a large deep lagoon surrounded by a true coral reef and having a deep passage into open water" (Goldman, 1979, p.59).

An estimated 11,000 person-days use was made of Lizard Island in 1978/79. This figure is comprised of approximately 7,000 residential tourists at Lizard Island Lodge, 2,000 day visitors, 1,000 campers and 1,000 research station workers.

Apart from three special leases excised for construction of the airstrip, guest house and research station, Lizard Island is a National Park with a low level of recreational development. Camping is permitted on the island and 312 camping permits were issued in 1977-78. From Q.N.P.W.S. camping permit data it is estimated that about 60% of campers are Queenslanders, while about 12% are from overseas and 28% from interstate.

The Lizard Island resort had 31 beds (13 rooms) in 1979 and now has 15 units. It does not operate during the wet season months of February and March. For the remainder of the year the bed occupancy rate is between 70% and 80%. On that basis the total person days per annum would approximate 7,000 (Hundloe et al., 1981).

The tourist lodge was originally conceived as luxury accommodation for game fishermen. According to the Queensland Tourist and Travel Corporation, the principals of Lizard island "estimate that 90% of the people going to Lizard Island were there for game fishing".

There is a "general but loose agreement" between the lodge and the Research Station to the effect that spearfishing is prohibited around the island and line fishing is not permitted on the southern half of the island. Consequently, the south of the island is used for scientific research (Goldman 1979, p.60).

3.2.3.2 Sites Adjacent to the Cairns Section

Four islands adjacent to the Cairns Section have tourist resorts, providing reef-enhanced recreational activities and opportunities for reef-based recreational pursuits within the Cairns Section (Table 3.8).

Reef-related attractions and recreational activities on the adjacent mainland tend to be located in population centres such as Cairns and Port Douglas (see Table 3.8).

TABLE 3.8 REEF-RELATED RECREATION SITES ADJACENT TO THE CAIRNS SECTION

Site	Activities/Facilities
Dunk Island	Resort facilities, snorkelling, diving, fishing, swimming, camping, bush walking, sailing, water skiing, golf, tennis, indoor sports.
Bedarra Island	Resort facilities, snorkelling, swimming, exploring the tropical gardens, island walk.
Double Island	Resort facilities
Fitzroy Island	Resort facilities, snorkelling, diving, glass bottom boat viewing, boom netting, tobogganning, water skiing, windsurfing, island walks, nature studies.
Cairns	"Reef World" Laroc Factory and "Windows on the Reef"
Port Douglas	Maritime Museum
Cooktown	Coral Sea Industries - coral jewellery, museum

Dunk Island for example is a continental island about 5km east of Mission Beach just to the south of the Cairns Section. In 1979 resort guests generated approximately 46,000 person days (Hundloe et al., 1981, p.17).

From another source it is estimated that, annually, approximately 2,000 persons undertake recreational fishing trips from the resort and about estimated 6,000 to 7,000 persons make reef trips per annum.

3.2.4 Visitor Access

Visitor access to the coast adjacent to the Cairns Section is by private or rented vehicle, train, chartered or scheduled bus or coach, boat or aircraft (Table 3.9).

TABLE 3.9 MAIN TYPE OF TRANSPORT USED BY DOMESTIC VISITORS TO THE CAIRNS AND NORTHERN BARRIER REEF ISLANDS REGIONS.

Region Visited	Transport Mode					
	Private Vehicle %	Air %	Train %	Bus/ Coach %	Ship/ Boat %	Other %
Cairns						
1978-79	79.4	20.6	3.7	4.2	13.00	-
1979-80	67.7	17.8	7.8	6.1	18.1	-
1980-81	64.7	26.2	4.2	3.0	1.4	0.4
Northern Barrier Reef Islands						
1978-79	59.5	30.0	8.7	1.8	-	-
1979-80	38.7	31.3	3.2	8.7	.8	-
1980-81	37.1	24.3	9.3	3.7	25.6	-

Source: QTTC, 1980a.

Several of the fringing reefs north of Cairns and South of Innisfail can be reached by a short walk or boat trip from points accessible by road.

Otherwise travel within the outer boundaries of the Cairns Section is limited to scheduled, chartered or privately-owned vessels or aircraft.

3.2.4.1 Light Aircraft

Air Queensland (ex BPA) operate scheduled flights to Lizard Island. There are up to 5 flights per week, with 2 in the off season.

Air Queensland operates a reef sightseeing flight, combined with a day visit to Lizard Island. In 1977-78 2,230 passengers were carried on this tour (Goldman, 1979, p.60).

Scenic flights to reefs in the vicinity of Cairns operate on demand.

Light aircraft can also be chartered, for example, from the North Queensland Aero Club.

Until recently seaplanes operated to Green Island on demand from Cairns with Seaplane Charter Holdings Pty. Ltd. "EAA (1979) estimate that about 3,000 people a year use a seaplane service, ... and other minor charter and commercial services to get to [Green] Island." Seaplanes also used to operate to Michaelmas Cay.

3.2.4.2 Scheduled Boat Services

Several scheduled boat services operate between the mainland and the various islands and reefs within the Cairns Section (see Table 3.10).

TABLE 3.10 SCHEDULED BOAT SERVICES TO DESTINATIONS WITHIN THE OUTER BOUNDARIES OF THE CAIRNS SECTION

Destination	Passengers Capacity	Estimated Passengers Per Year	Frequency
Low Isles	160	16,000	Daily (April-January)
Green Island	878	130,000	Daily (several trips per day)
Beaver Reef	60	5,000	Three times weekly (April-December)

Source: Hudson, 1981; ATIA, 1980; P. Harvey, Pers. Comm., 1981.

3.2.4.3 Charter Boats

Goldman (1979, p.61) reported that according to the Marine Board, "between Dunk Island and Thursday Island there is a total of 47 licensed charter passenger vessels with combined seating for 1,817 passengers... with boats in the Innisfail to Lizard Island region constituting by far the bulk of this number. Some 5 to 10 charter vessels operate out of Cairns, Innisfail and Port Douglas, taking parties of visitors to the reefs for periods of from a day to several weeks." Activities include reef walking, shell collecting, scuba diving, spearfishing, line fishing, water skiing, photography, picnicking, camping and bird watching, snorkelling, swimming.

3.2.4.4 Privately-Owned Boats

These include powered, non-powered boats, and sailing boats for cruising, pleasure, diving or racing. It has been estimated that 5,000 persons travel to Green Island by private powercraft each year (Hundloe et al., 1981, p.14).

> There are 3,371 private pleasure craft (mostly outboard powered runabouts) registered in Cairns (data supplied by Marine Board Office, Brisbane) which probably also work out of Innisfail, Port Douglas and Mossman. Another 84 are registered in Cooktown. No statistics as to the sizes of these craft, the number of passengers they carry, nor the number of trips they would make, on average, to the reef each year are available. The main destinations are Fitzroy and Green Islands, and Michaelmas and Upolu Cays, and reefs within a 50 mile radius of Cairns; inshore reefs off Innisfail and Port Douglas; and to a lesser degree off Mossman and Cooktown. Most visitors to North Queensland travel to the reef in commercial charter vessels and game fishing boats. Again, by far the majority of these are day trippers travelling to Green Island on the regular ferry services operating out of Cairns (Goldman, 1979, p.61).

3.2.4.5 Cruise Vessels

Some tourist cruise ships visit and/or pass through the Cairns Section and may pause in the Reef Region, to permit passengers to fish and explore the reef e.g. Lindblad Explorer, Minghua, Pacific Princess.

3.2.5 Tourist Accommodation

There has been a strong growth over recent years, in the provision of accommodation in the Great Barrier Reef and adjacent regions. Proposed plans for new accommodation indicate that this strong rate of growth will continue (ATIA, 1980).

Surveys of Tourist Accommodation Establishments conducted by the Australian Bureau of Statistics in 1975 and 1979 (Table 3.11) show the increase in the number of tourist accommodation establishments in the Far North Statistical Division, including island resorts off the coast. The growth rate in the Far North between 1975 and 1979 was over 19% and this is considered to be a conservative estimate (ATIA, 1980).

TABLE 3.11 TOURIST ACCOMMODATION, HOTELS AND MOTELS, ESTABLISHMENTS AND ROOMS IN FAR NORTH QUEENSLAND IN 1975 AND 1979.

Statistical Division	Tourist Accommodation			
	Hotel	Motel	Total	Room
Far North 1975	18	54	72	1216
Far North 1979	25	64	89	1717

Source: ABS, Surveys of Tourist Accommodation Establishments and ATIA, 1980.

The Domestic Tourism Monitor and International visitor survey showed the type of accommodation used by domestic and international tourists visiting the Cairns Tourism Region and the Northern Barrier Reef Islands (Table 3.12). It should be noted that the data on islands cannot be considered wholly reliable because of an inadequate sample. For example the table suggests that 33% of 5,416 overseas visitors (Table 3.12) stayed with friends and relatives on Northern Barrier Reef islands.

TABLE 3.12 ACCOMMODATION USED BY DOMESTIC AND INTERNATIONAL TOURISTS VISITING THE CAIRNS REGION AND NORTHERN BARRIER REEF ISLANDS IN 1979/80.

Tourism Region	Type of Accommodation Used (% of nights)				
	Hotel/ Motel	Private Hotel/ Guest House; Rented or Own Flat/House	Friends/ Relatives	Caravan Cabin, Tent in campground	Hired Camper-van, Boat, Farm, Youth Hostel, Other
Domestic tourists to Cairns Region	20.7	14.5	28.0	21.3	15.5
Domestic tourists to Northern Barrier Reef Islands	22.3	38.3	21.7	2.4	15.3
International tourists to Cairns Region	21.8	5.6	50.8	10.4	11.4
International tourists to Northern Barrier Reef Islands	9.7	2.4	33.2	33.0	21.7

Source: QTTC, Domestic Travel in Queensland 1979/80, and
QTTC, International Travel in Queensland 1979/80.

3.2.6 Employment in Accommodation Establishments

Employment in accommodation establishments in the Far North Queensland Statistical Division was examined in the ATIA report and it was found on a state-wide level that "the growth of visitors to the [reef] region which took place over the period (1975-1980) is not necessarily accompanied by a growth in direct employment in the tourist industry, although employment in other sectors could well be affected" (ATIA, 1980, p.37). Table 3.13 shows employment figures on a regional level.

TABLE 3.13 EMPLOYMENT IN HOTELS/MOTELS AND CARAVAN PARKS IN THE FAR NORTH STATISTICAL DIVISION

	March 78	March 79	March 80	% Increase 78/79
Far North	883	945	1058	19.82

Source: ABS, Survey of Tourist Accommodation Establishments; ATIA, 1980, p.37.

This regional information compares with a percentage increase in employment on the coast adjacent to the Great Barrier Reef (over the same period) of 16.66% and over Queensland as a whole of 10.95%.

In a survey of island tourist resorts conducted for the ATIA study the average number of employees was estimated at 89 per resort. On average one person is employed for every room on Great Barrier Reef island resorts while one permanent employee was employed for every two rooms in the mainland areas of the Whitsunday coast and Mission Beach (Hundloe et al., 1981).

3.2.7 Seasonality

According to the Domestic Tourism Monitor and ABS figures the peak visitor periods for the GBR Region are the southern hemisphere winter months of May to September and the month of January, when school and industry holidays coincide throughout Australia.

The ABS Survey of Tourist Accommodation Establishments reported that the peak occupancy months for Cairns were June to September and the low occupancy months were December to April (Hundloe et al., 1981).

According to ABS statistics on Overseas Arrivals and Departures overseas visitors from the Northern Hemisphere tend to visit Australia in the Northern winter - November to March. They constitute only a small proportion of total visitors; their volume is not sufficient to alter the pattern set by the domestic traveller.

Aggressive marketing of package tours to island resorts is being used in an attempt to even out marked fluctuations between peaks and troughs. One particular island resort has enjoyed a 100% occupancy for the past 9 months as a consequence of its marketing program. (ATIA, 1980, p.6).

3.2.8 Length of Stay

According to the Domestic Tourism Monitor about 77% of the trips to the Cairns Region and the Northern Barrier Reef Islands by domestic tourists are of a duration of between one and seven nights (see Table 3.14).

TABLE 3.14: LENGTH OF STAY OF DOMESTIC TOURISTS VISITING THE CAIRNS REGION AND NORTHERN BARRIER REEF ISLANDS

Tourism Regions	Average Length of Stay (% of trips to region)					TOTAL
	1-2 nights	3-7 nights	8-14 nights	15-21 nights	longer	
Cairns Region	52.7	25.1	13.4	3.9	4.9	100%
Northern Barrier Reef Islands	34.3	42.3	11.3	6.5	5.6	100%

Source: ATIA, 1980, p.31 and ASCOT, 1979.

As regards overseas visitors, the Survey of International Visitors 1979/80 revealed that international visitors spent, on average, 30 nights in Australia and, although the figures for the average length of stay are not available, it is calculated that about 5% of the total overseas visitor nights are spent in the Great Barrier Reef Region (ATIA, 1980).

3.2.9 Visitor Use Impact

3.2.9.1 Economic Impact

An initial estimate of the value of tourism in the Cairns region was supplied by the Far North Queensland Development Bureau. The Bureau calculated that during 1977-78 when over 300,000 tourists visited the Cairns region "tourism generated in the order of $50m annually and that 40% of this was due to the Great Barrier Reef and offshore islands" (Goldman, 1979, p.59).

3.2.9.2 Green Island Economic Study

A study that examined the economic importance of Green Island through employment and financial flows generated through tourist and recreation use was conducted by Economic Associates Australia (1979, pp5-8). The total value of sales for all operations on the island, including transport from Cairns, was estimated at $1.9 m in 1979.

Estimates of the average employment and income effects are presented on Table 3.15 for both Far North Queensland (corresponds with Far North Statistical Division) and Queensland.

TABLE 3.15 ESTIMATED EMPLOYMENT AND INCOME GENERATED BY GREEN ISLAND SALES, 1979

	EMPLOYMENT(a)		INCOME($,000)(b)	
	FNQ(c)	Qld	FNQ(c)	Qld
Direct	83	83	640	640
Indirect	44	49	282	375
Direct & Indirect	127	132	922	1015
Induced	37	69	231	466
Total	164	201	1153	1482

(a) Full time equivalents
(b) Wages, salaries and supplements only, for 12 months
(c) Far North Queensland

Direct effects as shown in the table refer only to the labour employed (income earned) on the island and the transport services from Cairns. Tourist expenditures on Green Island also lead to indirect effects through goods and services being supplied to Green Island operations. In addition to these direct and indirect effects, what are termed induced effects arise through a series of output, income and employment effects generated as a result of the spending of income earned in the production of the Green Island services.

The direct plus indirect employment in the Far North Region arising from Green Island tourism represents about 1 percent and 0.3 percent of the Cairns and Far North Queensland total work forces respectively.

It should be recognised that these economic impacts are not equivalent to the immediate losses in employment and income which would arise if Green Island was "closed". To derive such a measure, account must be taken of the behaviour of tourists under this hypothetical circumstance... Making allowance for [this and] the implicit consequences in terms of changes in accommodation and other expenditures in Far North Queensland, a revised estimate has been made of the economic impacts generated by tourism on Green Island. The current value of expenditures with this approach is estimated to lie between $2.6 to $4.0 m. Estimates of the corresponding employment and income generated in Far North Queensland are shown in Table 3.16.

TABLE 3.16 FAR NORTH QUEENSLAND: ESTIMATED EMPLOYMENT AND INCOME GENERATED BY TOURIST EXPENDITURE DEPENDENT(c) ON GREEN ISLAND, 1979

	EMPLOYMENT(a)	INCOME(b) ($,000)
Direct	143 - 220	954 - 1359
Direct & Indirect	177 - 269	1195 - 1836
Induced	51 - 78	303 - 466
Total	288 - 347	1498 - 2302

(a), (b) See footnotes in Table 3.15.

(c) i.e. in the sense that expenditure (or similar amounts of expenditure because of substitute tourist activities) in the region would not occur if the trip to Green Island were unavailable.

Considering Queensland as a whole and Australia, the consequences in terms of employment and income in the tourist industry would be less than those which are estimated to apply to the Far North Region. As well, the economic impacts on the total economy would fall far short of those in the tourist industry because of substitution outside this sector.

The economic impacts discussed in relation to Green Island need to be interpreted with care. For example, employment of labour can only be regarded as an economic benefit - that is a net gain to society - if other opportunities do not exist for employment of that labour.

3.2.9.3 Proposed Cairns Section Economic Impact Study

The IASR study (Hundloe et al., 1981), commissioned by the GBRMPA, and subtitled "Some Economic Characteristics and Multipliers" described the major economic uses of the Cairns Section.

The five reef-related activities that formed the focus of the study were:

- commercial fishing
- resort recreation
- day trips
- charter boat fishing
- amateur fishing.

A summary of findings is presented in Table 3.17. The total value of output of five reef-related activities was estimated at $29.040 million (Hundloe et al., 1981, p. vii)

The report also derives multipliers for the major uses. These allow decision-makers to estimate readily the end result (in terms of income, output and employment generated or lost) of any actions which would effect the output of the major uses of the proposed Cairns Section of the Great Barrier Reef Marine Park, and to compare the impacts across the industries concerned (Hundloe et al., 1981, p. 55).

3.2.9.5 Physical Impact

Much of the damage caused to reefs as a consequence of human activity is unintentional. Reef walking, diving, snorkelling, anchoring of boats and stranding of boats on reef flats at low tide all damage coral. Overseas studies have shown that the impact of human activity on heavily-used areas can cause major local alteration to the morphology and biology of coral reefs.

3.3 Other Human Usage

3.3.1 Research Activities

Lizard Island Research Station, established in 1973, is a focal point for marine research on the northern Great Barrier Reef by Australian and overseas scientists.

In January 1978 the Lizard Island Research Station in conjunction with Macquarie University constructed a small tubular steel research platform on Carter Reef (14 kilometres north-east of Lizard Island). The impact of this structure on the new pending reef environment is unknown but shading and bird droppings may have an effect.

Low Isles is of significance to research as it was the site of the base for the Royal Society Expedition of 1928, which carried out one of the first comprehensive studies on the Great Barrier Reef. It has also been used as a base for subsequent major expeditions in 1958 and 1973.

TABLE 3.17 ECONOMIC IMPACT OF FIVE KEY ACTIVITIES IN THE CAIRNS SECTION

Economic Characteristics and Multipliers	Key Activities				
	Commercial Fishing	Resort Recreation	Day Trips	Charter Boat Fishing	Amateur Fishing
Value of output sales $million (1979 prices)	11.474	4.895	2.330	4.020	6.321
Regional total output multiplier	1.543	1.571	1.600	1.371	1.412
Regional total income multiplier	.335	.456	.475	.264	.107
Regional total employment multiplier	.089	.057	.062	.033	.023

Source: Hundloe et al., 1981, pp. vii-viii.

Whilst interpretation of the multipliers may be contentious the values do provide a basis for assessing the relative importance of the various aspects of reef use.

3.2.9.4 Average Daily Expenditure

A useful economic indicator is average daily expenditure, but no reliable figures for domestic and international tourists and day visitors are available.

The Queensland Department of Primary Industries, Division of Dairying and Fisheries (formerly the Queensland Fisheries Service) has a large laboratory in Cairns and recently established a field station on Green Island.

A private research foundation based at Daintree conducts research in the Cairns Section focussed on Escape Reef.

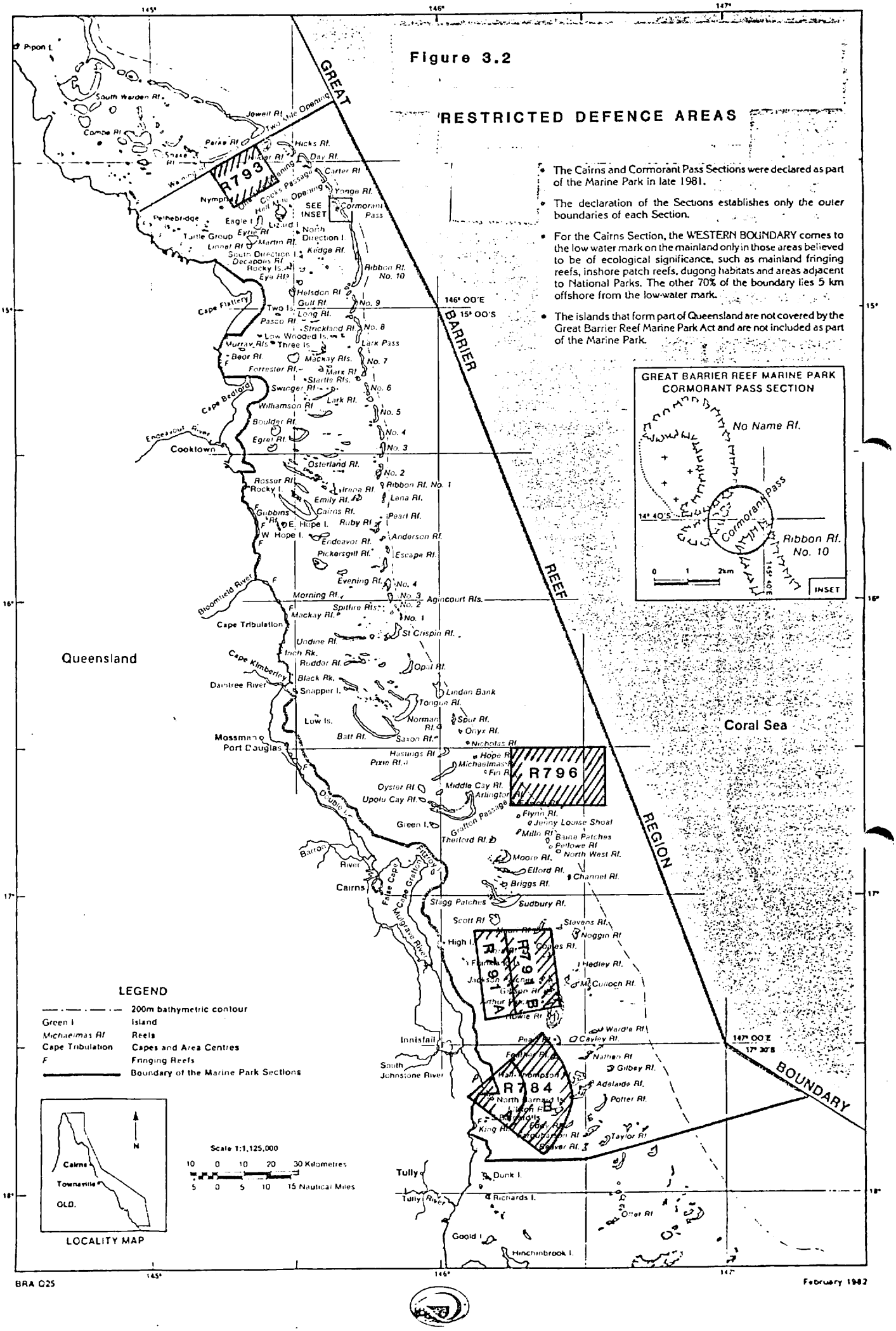
Other research in the Section is undertaken by the Northern Fisheries Unit of the Commonwealth Department of Primary Industry (based in Cairns) and various universities visiting the area. A number of Queensland Government Departments, including the Geological Survey of Queensland and the Beach Protection Authority also undertake research in the Section.

3.3.2 Defence Usage

The Department of Defence conducts live firing activities in four areas within the Cairns Section (see Figure 3.2). The targets for the live firing are not on or close to reefs, thus the firing does not impact directly upon the Reef. Research by the Defence Department involves studies into the effect of a tropical marine environment on materials.

3.3.3 Shipping Routes

The area between the outer reefs of the Great Barrier Reef and the mainland coast is traversed by one of the few Australian coastal shipping routes which carries, in addition to overseas and interstate traffic, heavy intrastate traffic. This includes not only bulk



This map is not to be used for navigational purposes.

shipments between Weipa and Gladstone but also vessels serving Peninsula, Torres Strait and Gulf ports. There is also a number of Passes through the Reef which link the coastal shipping route with the Coral Sea, e.g. the Grafton Passage.

The Commonwealth Department of Transport is responsible for developing and implementing national policies relating to marine transport and assumes administrative, technical and operational responsibility for the Commonwealth Government's involvement in marine transport and related activities.

The Department maintains a series of lights and channel markers along the major "inner route" shipping lane which passes through the whole of the area between the coast and the inner barrier reef. In 1977, 1,410 vessels were piloted along the inner route. Approximately 5% of total users were non-piloted and 200 to 300 voyages were made by small local coastal vessels. Total throughput in 1977 was estimated to be about 35,000,000 tonnes. Vessels may be up to 250,000 tonnes displacement with a draught of no more than 11.9 metres. Although well charted and marked the inner route is potentially dangerous as large vessels must adhere to tidal schedules.

3.3.3.1 Harbour Developments and Port Areas

The principal ports adjoining the Cairns Section are Cairns, Cape Flattery and Mourilyan.

The Port of Cairns is controlled by the Cairns Port Authority. The Port Authority is concerned with a considerable number of related activities including land reclamation, a base for commercial fishermen, facilities for the Royal Australian Navy, and facilities for recreational activities, in addition to the normal operations of a major port. The area controlled by the Cairns Port Authority was extended subsequent to the proclamation of the Cairns Section. The Harbour of Cairns now covers waters to the west and south of Green Island which are within the Marine Park (see Figure 3.3).

3.3.4 Mainland Activities Adjacent to the Cairns Section

Although mainland activities adjacent to the Cairns Section may not constitute direct use of the Marine Park, they represent sources of reef usage. Expansion of these activities, particularly urban and industrial development, will provide an expanded base for reef usage. Therefore the relevant features of industrial, agricultural and urban activities on the mainland adjacent to the Cairns Section are discussed.

3.3.4.1 Industrial Development

In Queensland the Department of Industrial Development is responsible for administration of the Industrial Development Act. There is a Northern Regional Office of the Department and Industrial Estates at Cairns (Portsmith) Atherton and Innisfail. Other Crown Industrial Estates are located at Cardwell and Gordonvale. A further 111.25 ha at Cairns is in the process of being reclaimed for a future industrial estate.

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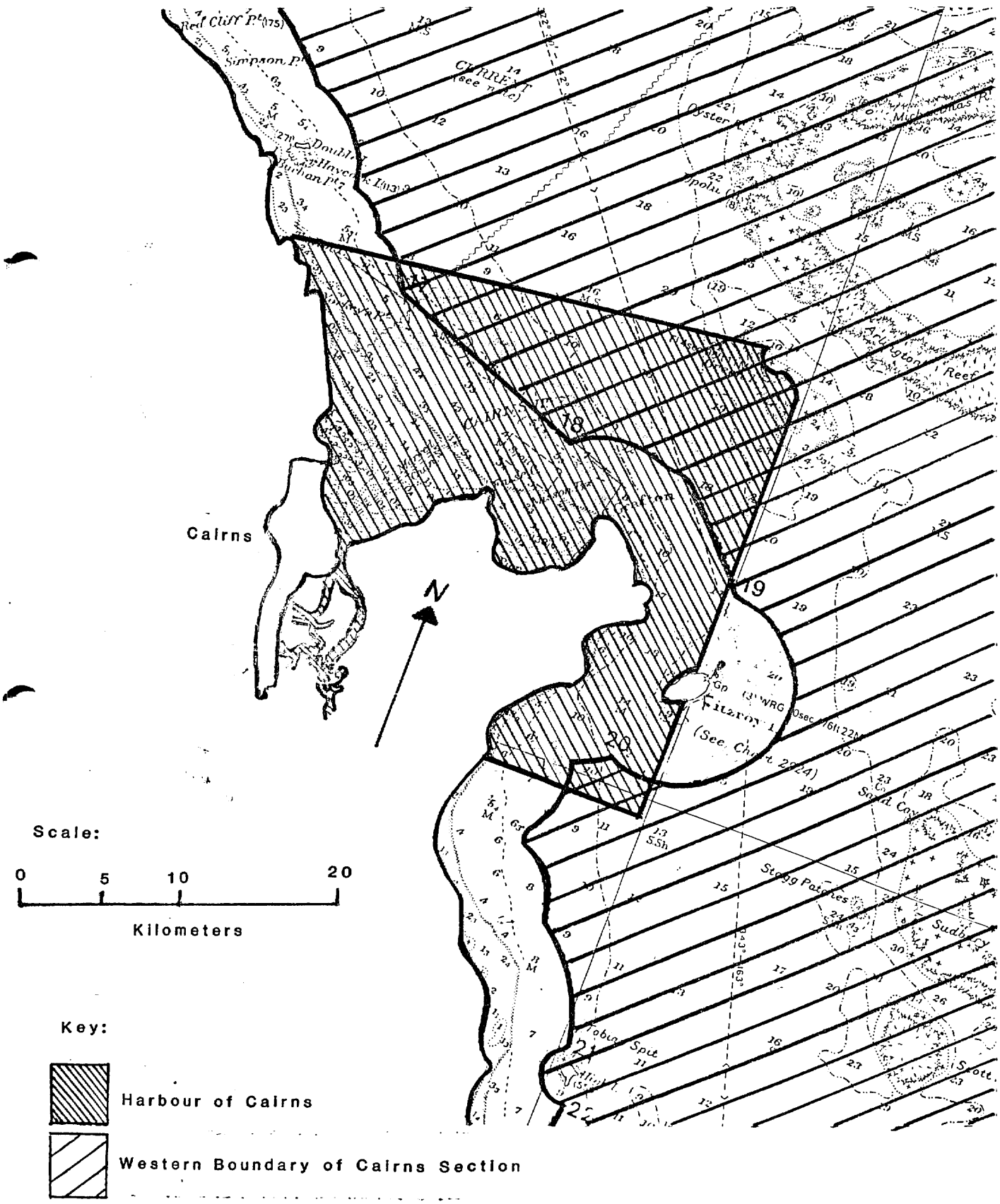
Figure 3.3

HARBOUR OF CAIRNS AND THE CAIRNS SECTION OF THE MARINE PARK



Source: Queensland Government Gazette, 26 December 1981

According to the Statistical Summary produced by the Australian Bureau of Statistics, the Local Authorities whose areas adjoin parts of the Cairns Section contained 174 manufacturing establishments in 1974-75, and there have been significant further developments.

Most industrial developments in the area adjoining the Cairns Section tend to be concerned with the provision of services but there is potential for further major investment, particularly in relation to by-products of the sugar industry.

3.3.4.2 Sugar Industry

Among the numerous rural industries, the sugar industry warrants particular mention. In 1978 mills in local authority areas adjacent to the Cairns Section crushed over 5 million tonnes of cane and produced nearly 690,000 tonnes of sugar. The value of the sugar produced in 1978 was estimated to have been of the order of $150,000,000 and represented a major contribution towards the Australian economy.

3.3.4.3 Extractive Industries

Operations for the recovery of minerals are specifically prohibited in a Section of the Marine Park by the legislation, except for research purposes, with the permission of the Authority.

There is one licence current for the recovery of shell grit in the Cairns Section; on North-west Sudbury Reef. This is regulated under the Fisheries Act 1976.

3.3.4.4 Urban Development

An indication of the extent and pace of urban development can be obtained from the number of dwellings in the Local Government Areas at the 1976 census and the percentage increase since the 1971 census (see Table 3.18). The City of Cairns and the adjacent part of Mulgrave Shire contained 13,533 dwellings at the 1976 census. This represented an increase since the 1971 census, but the extent is difficult to determine because of changes in the census boundaries.

TABLE 3.18 NUMBER OF DWELLINGS IN THE LOCAL GOVERNMENT AREAS ADJOINING PARTS OF THE CAIRNS SECTION

Local Government Areas	Total Dwellings (1976)	Intercensal Variation (%)
Shire of Cook	948	+10.75
Shire of Douglas	1470	+17.51
Shire of Mulgrave	2613	+31.70
Shire of Johnstone	5260	+06.28
Shire of Cardwell	1974	+10.53

Source: ABS, 1971 and 1976 Census Data

The 1976 census conducted by the Australian Bureau of Statistics also showed the population figures for Local Authority Areas adjoining parts of the Cairns Section (Table 3.19).

TABLE 3.19 POPULATION FIGURES FOR THE LOCAL GOVERNMENT AREAS ADJOINING PARTS OF THE CAIRNS SECTION

Shire of Cook (including Weipa)	5 547
Shire of Douglas	4 746
Shire of Mulgrave	23 025
City of Cairns (including Green Island)	34 857
Shire of Johnstone	16 776
Shire of Cardwell	6 478

Source: ABS, 1980.

The total population of the Local Authorities adjacent to the Cairns Section was approximately 92,000, of which a very large proportion resides on the coast.

In Queensland, Local Authorities are consitituted under the Local Government Act and with the exception of two small areas unrelated to the Great Barrier Reef Region, the entire land surface of the State is incorporated under the Act. Local Authorities may also apply to have foreshores placed under their control.

Local Authorities exercise a wide range of powers through By-laws and Town Plans. In general, the more populous Local Authorities provide a broader range of amenties and services than do those which serve more sparsely populated areas.

Three of the local Authorities have existing statutory Town Plans and the other three are in the process of preparing them.

The proposed town plan for Cook Shire will provide for the larger islands to be zoned. The proposed town plan for Douglas Shire provides for all islands to be zoned. The existing town planning scheme for the city of Cairns does not provide for the zoning of the islands but it is probable that a new scheme will do so. The Mulgrave Shire has a current and separate offshore islands town planning scheme which provides for zoning the larger islands. Johnstone Shire has an existing scheme which does not provide for zoning of islands.

3.3.4.5 Aboriginal Reserves

There are seven Aboriginal Rserves on the Queensland coast between The Jeannie River to the north and Tully in the south: Hope Vale (104,00 ha), Cooktown (10 ha), Wujal Wujal (116 ha), Daintree (48 ha), Mossman (27 ha), Cairns (16 ha), and Yarrabah (15,450 ha), and one offshore reserve Rocky Island (12 ha). Some 10,000 Aboriginals live along this coastal strip, and about 2000 of them live in the three main reserves of Hope Vale, Wujal Wujal, and Yarrabah.

The Hope Vale community has a clear affinity with the islands adjacent to their Reserve. The islands are used as bases for fishing and turtle and dugong hunting. The community has strong traditional ties with the islands between Cape Melville and Cooktown. These islands include Three Islands, Two Islands, South and North Direction Islands, the Turtle group, Kew, Nymph, Lizard and Coquet Islands, the Howick group, Bewick and Stapleton Islands, and the Pipon Islands.

The Wujal Wujal community (formerly Bloomfield River) has ties with Hope Island, south-east of Cooktown, and members of the community regularly visit the island.

The islands off Yarrabah Reserve are considered by the Yarrabah community to be part of their traditional lands. These islands include Rocky Island, which is a reserve, and Fitzroy Island which is not a reserve.

Certain Aboriginal communities claim some offshore islands as their traditional land but these claims are not currently recognised under any State or Commonwealth laws.

Some islands in this area are also known to have Aboriginal artifacts on them, and it is possible that certain reefs and islands would have mythological significance to some of the communities.

3.3.4.6 National Parks

Mainland National Parks adjacent to the Cairns Section are the Mount Cook, Endeavour River, Cedar Bay, Cape Tribulation, Etty Bay, Mt Maria, Kurrimine, Clump Point and Maria Creek National Parks.

Island National Parks in the Cairns Section are Lizard Island, Nymph Island, Turtle Group, Rocky Islets, Two Islands, Three Islands, Hope Island, Snapper Island, Green Island, Michaelmas Cay, Upolu Cay, High Island, Frankland Islands, North Barnard Islands and South Barnard Islands. The majority of these lie close to the coast.

Queensland legislation for the establishment of Marine National Parks was introduced as an amendment to the Forestry Act in 1971 and, in 1974, Green Island Reef was one of the first two Marine National Parks declared in Queensland. Subsequently, this became a Marine Park under the Fisheries Act 1976. Green Island Marine Park covers an area of 3,000 ha extending 1.6 km beyond the edge of the reef fringing the island. Within the Park, marine life is protected. Recreational fishing by hand line is permitted in some areas and the use of spear guns and nets is prohibited.

4. INITIAL ANALYSIS OF THE REPRESENTATIONS RECEIVED IN CONNEXION WITH THE NOTICE OF INTENT TO PREPARE ZONING PLANS FOR CAIRNS AND CORMORANT PASS SECTIONS

4.1 Overview:

4.1.1 Number of Representations

199 written Representations have been received.

4.1.2 Who Sent Representations

Representations were received from individuals, informal groups of families, friends and colleagues, and organisations.

90 representations were sent by individuals

28 representations were sent by informal groups (who, for this purpose are defined as representations with more than one signature)

81 representations were sent by organisations or clubs (who usually had a printed letterhead on their correspondence)

Of these, 29 were leisure time organisations and clubs

e.g. Cairns Marine Radio Club Babinda Amateur Fishing Club
Cairns Shell Club

39 were business or professional organisations or clubs (operating during business hours)

e.g. Queensland Commercial Fishermen's Organisation
Cairns Reef World Laroc Pty. Ltd.
Low Isles Cruises

4 were government or semi-government instrumentalities

e.g. Department of Defence
Department of Transport Australia
Cairns Port Authority

9 were other organisations or clubs not mentioned above

e.g. Marine Research Foundation
Get Us Out of the U.N. Campaign
Trinity Jaycees
Queensland Conservation Council Inc.

4.1.3 Where Those Who Sent Representations Came From

62% of those who sent representations gave an address within the Cairns Section or on the coastal strip (including Atherton T/lands) adjacent to the Cairns Section

23 % of representations came from the rest of Qld
14 % were from other states
and only 1 % were from outside Australia

4.1.4. Number of Signatures

19 of the 199 (9.5%) representations were signed by more than one person.

This meant that 233 signatures were received.

One representation was unsigned.

4.1.5 Number of People On Whose Behalf Representations Were Made

15% of the representations specified the number of people on whose behalf the representation was being made. Specific references was made to over 1,201,347 people.

4.1.6 Sections Mentioned in the Representations

In only 26% of the representations (i.e. 52) was the Cormorant Pass Section of the Marine Park specifically mentioned (see Table 4.1).

However it is difficult to tell whether those who sent representations in which only the Cairns Section was mentioned meant their recommendations to refer to the Cormorant Pass Section as well, and used the "Cairns Section" as a shorthand version of the Cairns and Cormorant Pass Sections of the Marine Park.

Table 4.1

Cormorant Pass mentioned on heading	Cormorant Pass mentioned specifically in the text	Potato Cod mentioned specifically
31	32	8

4.1.7 Reef Experience Mentioned

49 people (26%) who sent representations said that they had had first-hand experience of a reef somewhere in the world.

Of the number of people who mentioned how many years they had been visiting the Great Barrier Reef

12 stated under 5 yrs

11 stated between 5 and 10 yrs

8 stated between 10 and 20 yrs

and 18 stated over 20 years

4.2 Preliminary Content Analysis

4.2.1 General Matters Raised in the Representations

In the 199 representations analysed so far

164 (82%) representations contained information and/or recommendations on fishing matters.

109 (55%) on tourism and recreation matters.

82 (41%) on conservation matters.

145 (73%) on specific zoning matters.

4.2.2 Specific Activities Mentioned in Representations

The following fishing activities were mentioned in the representations received. The number of representations in which information was provided and a recommendation made regarding each activity is shown in Table 4.2.

Table 4.2

Fishing Activity	Number of Representations		
	In which activity mentioned	Information Provided	Recommendation made
Fisheries - General reference (includes suggested Zoning Plans, suggestion for zones e.g. MNP, SRZ refer to all or some fishing - not counted elsewhere yet)	66	8	61
Trawling - commercial	67	33	52
Trolling - commercial	12	5	10
Trolling - recreational	26	16	19
Gill net fishing - commercial	9	2	9
Bait net fishing - commercial	8	2	7
Bait net fishing - recreational	5	2	4
Hand line fishing - commercial	18	6	15
Hand line fishing - recreational	100	66	78
Big game fishing - recreational	16	5	13
Light tackle fishing - recreational	8	4	6
Spearfishing - commercial	28	4	26
Spearfishing - recreational	65	21	53
Aquarium fish collecting - commercial	36	10	31
Aquarium fish collecting - recreational	23	1	22
Coral collecting - commercial	38	8	35
Coral collecting - recreational	27	1	26
Shell collecting - commercial	40	5	38
Shell collecting - recreational	44	8	40
Other fishing activities	14	3	12
Aboriginal fishing	13	5	12

The following recreational and tourist activities were mentioned in the representations received. The number of representations in which information was provided and a recommendation made regarding each activity is shown in Table 4.3.

Table 4.3

Recreational and Tourist Activity	Number of Representations		
	In which activity mentioned	Information Provided	Recommendation made
Recreational Use - General reference only	79	29	74
Reef walking	15	5	10
Snorkelling	28	27	20
Diving	44	35	38
Underwater photography	15	12	12
Glass bottom boat viewing	14	11	10
Underwater observatory	5	2	5
Scenic reef flights	6	3	6
Reef cruising	2	1	2
Power boating	11	9	8
Sailing	4	2	3
Water skiing, jet skiing	3	2	3
Resort activities/facilities/ development	17	3	16
Camping	19	8	14
Bird/turtle/other animal watch and non-scientific study	9	6	6
Man-made displays/exhibits	11	3	11
Other recreational activities e.g. Picnicking, handfeeding fish, wind surfing, island walking	19	14	11

Conservation and other issues are summarised in Table 4.4

Table 4.4

Conservation and Other matters	Number of Representations		
	In which activity mentioned	Information Provided	Recommendation made
Conservation - general reference	82	30	74
Bird breeding	40	24	36
Turtle	20	10	19
Dugong	23	15	22
Whales	5	3	4
Other animals mentioned	10	4	9
Exotic plants	3	1	2
National Parks	22	7	17
Scientific Research	75	30	72
Education/interpretation	35	5	34
Shipping	27	6	26
Defence	8	5	5
Mining/Oil Drilling	36	6	33
Public nuisance e.g. island buzzing/vandalism	10	6	9
Waste disposal/pollution	59	17	55
Other activities/issues not associated with fisheries or recreational use	135	72	118
Navigational Aids	14	1	13
Specific Zoning	145	104	145
Traditional Aboriginal Hunting	18	8	18

4.2.3 Additional Information Supplied in the Representation.

Overview

Representations from organisations such as the Australian Littoral Society, Conservation groups and the Far North Queensland Promotion Bureau contained a large amount of useful information relating to their particular area of interest.

4.2.3.1 Fisheries

Otter Trawling

Many recreational fishermen and others reported large numbers of dead juvenile fish (5-10 cm) including trout, trevally, whiting, nannygai, red emperor, and snapper being washed ashore dead, drifting past them or being consumed by sharks (33, 42, 75, 65, 66, 82, 86, 95, 109, 140, 162, 184, 122, 127). A number of people also reported declines in fish catches coincident with the increase in the number of trawlers (61, 91, 119, 154).

Of annual expenditure of about $7.8 million by the trawler fleet, fuel ($1.6 million) and repairs and maintenance ($1.9 million) make up major components (189, 142, Driml et al, 1981).

Areas trawled within the Cairns Section can be divided into established trawl grounds (heavily exploited, medium intensity exploitation) lightly exploited, unexploited, unsuitable for trawling and nursery areas (142, 189, 195).

Banana and leader prawns are caught by day in isolated pockets close to shore. Banana prawns are known to aggregate into dense schools or "boils" and single day catches have exceeded 2,000 kg when such schools have been trawled. For unknown reasons schools of this size have not been located recently and are now considered rare by fishermen. A few small trawlers operating out of each port in the Cairns Section fish exclusively for banana prawns. Effort is concentrated near estuaries from which banana prawns emigrate to deeper water.

1980 and 1981 have been poor years for individual fishermen due to the increase in vessel numbers. The catch passing through major processors now approaches 800 tonnes p.a. 51% of which is handled by one Cairns based processor.

Trawlers claim they do not trawl close to reefs if there is any possibility of sustaining gear damage. A set of warp wire, otter boards, trawl net and footrope chain costs up to $3000 and damage can cost days of downtime. The shape of the submarine topography determines how near to the reef edge a trawl shot can be made. Many south and south-eastern edges of reefs can be trawled very closely while other aspects are not suitable for trawling as far as 2 km away from the dropoff. Trawler operators keep well clear of reefs as the risk of fouling gear far outweighs any marginal increase in catch.

A recent development in northern prawn fisheries is the commercial utilization of incidental sea snake catches. One or two snakes per trawl commonly appear and up to 15 have been observed in a single shot. Skins are currently fetching an average of $4.00 each to fishermen and this price will probably follow market influences. However the future of this development is in doubt due to impending changes in wildlife export laws. Sea snakes are abundant on east coast and Gulf of Carpentaria trawling grounds.

An average of 6 kg of fish and other marine life is discarded for every 1 kg of prawn landed in tiger prawning operations. This fish may at times be deposited on reefs under unusual weather conditions. A percentage of by-catch will be utilised as bait in future by the developing tuna fishery. Discharge of trash is at present essential for the viability of prawning operations, as there is no more economical method of disposal or utilization.

4.2.3.2 Commercial Fishing Other Than Otter Trawling

4.2.3.3 Pelagic Fishery

Commercial mackerel fishing is generally a part time activity, (181) frequently undertaken in conjunction with reef fishing, and can be the major source of income between May and December. Peak seasons for specific areas are May-August, November and December for Low Isles, October-November for Green Island and Upolu, November-December for Lizard, October to January for the reefs between Arthurs, Patches and Lizard. (23, 166).

Most mackerel are caught above shoals in 18 to 20 fathoms (166).

About 36 vessels valued at $1.08 million participate in the fishery. Catches average about 5000 kg per vessel, with estimates of the total catch value between $2.42 and $0.54 million (189, 195). Recurrent expenditure for the mackeral fleet in the Section was estimated to be $104,000 ($36,000 on stores, $32,400 on fuel and $36,000 on repairs and maintenance) in 1979/80 (189).

In 1982 10-20% of the catch of 180 tonnes was estimated to have been caught by amateurs (195).

For recreational fishermen with small boats, e.g. less than 5-6m, inshore reefs are important mackerel fishing areas e.g. coastal fringing reefs Snapper, Low Isles, High Island, Franklin Islands, King Reef (25, 48, 58, 71, 86, 95, 121, 134).

Trolling for bait (mackerels and tuna) for marlin fishing occurs between September and December generally seaward of the inshore shipping channel. The best concentrations of bait occur on the corners of reefs and bommies e.g. Linden Bank and Jenny Louise shoal (20).

Travelling vessels always use troll lines.

Mackerel fishermen use seine nets and cast nets in island lagoons, off beaches and estuaries when fishing for baitfish. Garfish are the main target species. An entire seasons bait may be taken in 1 or 2 successful trips, after which it is salted and frozen for later use. The reefs fished for bait fish are High Island, Fitzroy, Double (outside the park), Low, Snapper, Hope, Franklands, Green Islands, Cape Bedford, Cape Flattery and Lizard Island (23, 95). The main season is May to September (23). Baitnets used are a maximum of 100 m long by 100 m deep (195).

Recreational fishermen (trollers) use bait nets from mainland and island beaches for bait (garfish, "sea sardine").

4.2.3.4 Demersal Fishery

There are very few commercial fishermen fishing for reef fish in the Cairns Section (142) and it is reported that there are no full time reef fishermen in the Section (195). Many mackerel fishermen rely on reef fishing for about 10% of their income and in some cases up to 20% (195). It is believed that the commercial reef fish catch in the Section is in the vicinity of 265 tonnes which is reported to represent about 25% of total reef fish landings (189). [However GBRMPA estimates that the recreational catch is somewhat higher than this.]

Small boat users of the Section are numerous and generally use the areas indicated by previous surveys for a range of reef fishing, pelagic fishing and other recreational activities. Launching areas identified as being more heavily used than previously understood include Russell Heads and Bellenden Ker. Many small boat users identified nearshore Island reefs - Snapper, High, Frankland, Barnards and King Reefs as important because of their proximity to shore.

When the subject was referred to, all but one representration reported that catches have declined particularly on nearshore reefs.

While small boat users fish close to reefs, deep sea clubs working from charter boats tend to "drift fish" in deeper water (30 fathoms) at night generally on the eastern sides of reefs, weather permitting, for red fish (nannygai, red emperor, spangled emperor, cod etc.). This activity frequently takes place in the area of Euston, Finn, Flynn, Norman, Saxon, Arlington, Tetford etc.

A "spawning aggregation" of passionfruit trout off Howie was identified by two charterboat operators (33,55).

Marlin boats anchored behind the ribbons reef fish at night and often drop back to the 20 fathom area behind reefs to fish for red emperor and scarlet perch (28). Some charter boat operators make passengers return undersized fish and deliberately drift off good patches of fish after a period.

4.2.3.5 Game Fishing

From tag returns up to 1500 miles away in most directions it appears that black marlin are not part of a single stock (10).

The "concentrating" effect of the ribbon reef "barrier" to congregating black marlin diminishes south of Linden Bank (10).

Although the main season is August to December, when up to 40 game boats congregate in the area (144) marlin are fished 12 months of the year seaward of the outer breakers (34).

Passages and areas in the southern part of the Section are reported as popular light tackle areas. (29, 33, 65) The area known as the "paddock" the area bordered by Ellison to Eddie, Farquharson, Beaver and west for about 5 miles is reputed to be the best light tackle area in Australia with plenty of baitfish and marlin and sailfish around 30 kgs (65).

4.2.3.6 Crab Fishery

4.2.3.7 Coral Collection

About 75% of coral collected is Pocillopora damicornis (brown stem) and the remainder largely Acropora spp. A major coral collector in Cairns reports 50% of coral he collects is made into souvenirs, 25% goes to other manufacturers and about 25% to aquarium retailers (114). Total coral production from the Cairns Section is estimated to be 20 tonnes (195), one collector reports his annual collection for the past 10 years from Sudbury to be 2 tonnes (128). He suggests that given the costs and prices of coral collected in the area that it is doubtful whether the industry provides much income at present (128).

Most of the coral collected from leases in the Section at present appears to go into the local souvenir or aquarium trade. A number of leaseholders are concerned about shipment of bulk coral south and overseas.

Coral collectors report that brown stem regrows very rapidly (12-18 months) after collection (114, 128).

One collector provided a list of criteria for coral leases - size of area, number of areas, more than one lease for brown stem, the possible benefits of a blanket roving lease for brown stem. (114)

4.2.3.8 Aquarium Fish Collection

Four collectors are licenced to collect aquarium fish but all other persons licenced as Master Fishermen can also collect fish (195). Six commercial collectors report that they operate in the Section (18, 35, 47, 54, 68, 148) and an additional collector is known to operate. One of these operators uses 6 to 8 divers and it has been estimated that collectively 3000 - 6000 specimens per week could be sent out of the Cairns area (148).

One operator with a fairly substantial operation collects 200 - 300 damsels per dive and 100 - 150 chaetodons per diver. Damsels, wrasses, chaetodons, tangs, and trigger fish are caught using snorkels and nets; clown fish angels, tangs and pseudochromis are caught using hookah and their ascent is staged to reduce buoyancy problems. He estimates mortality at about 1% (18) and may collect in the vicinity of 25,000 fish per year (pers comm.)

Most operators collect from reefs near their base, as large runabouts appear to be the preferred access mode. Collectors are based in Port Douglas (1), Cairns (5), and Mission Beach (1). The Port Douglas collector mainly fishes Rudder, Undine, Batt, Tongue and St Crispin (68); the Cairns collectors fish Arlington (most important), Euston, Oyster, Sandy, north of Michaelmas, Hastings, Nicholas, Hope, Tetford, Moore, Elford, Sudbury, Spur (47, 18, 54, 68), Frankland Islands, St Crispin, Agincourt (68); the Mission Beach collector Eddy. One collector has rated reefs from which he collects in importance (18).

The number of collectors has increased in recent years (148) and the market is reported as improving (18) because of increased freight rates from the Philippines (pers comm.).

One collector, no longer operative, claims records of fish collected used to be supplied to Harbours and Marine (105).

4.2.3.9 Spearfishing

While there are reports of low fish populations at reefs near most population centres, the reefs off the Franklands, High Islands and Barnards were specifically referred to as areas much speared, often with scuba (36, 60, 90, 122, 182).

Several charter boat operators prohibit spearing with scuba or spearing from their boats (37, 50).

4.2.3.10 Shell Collection

There are believed to be no local commercial shell collectors working in the Section (97) although interstate collectors may operate. St Crispin Reef used to be the only area at which commercial shell collecting was undertaken (for volutes) (97).

The Cairns Shell Club has provided a list of criteria for good "shelling reefs" including accessibility by dinghy, large drying reef flat, clear water run to port, sand cays, differing varieties provided by island and mainland fringing reefs. They have divided reefs of the area into 3 categories:

1. used on an annual basis (e.g. Michaelmas, Taylor, Feather, Peart, S. Barnard, King Reef.
2. used infrequently (e.g. Beaver, Ellison, Cayley, Nathan, Moore, Norman, Snapper)
3. have been used but present difficulties for regular use (e.g. Flora, N. Barnard, High Island, Lizard) 197.

4.2.3.11 Gill Net Fishery

Gill net fishing for salmon, queenfish and barramundi is a reasonably important commercial fishery wherever the park comes into the coast. The areas include the King Reef - Kurrimine Beach area, the area between Cape Kimberly and Cape Tribulation and the area from Lookout Point North (59 and pers. comm.).

Dugong are known to be caught in barramundi nets. Three fishermen working the Innisfail to Port Douglas area (outside the park) are reported to have killed some 5 dugong per year in nets between fringing reefs and the beach (174).

4.2.3.12 Other Fisheries

There appears to be potential for development of a fishery for yellowfin and bigeye tuna and also possibly skipjack east of the outer barrier in the northern two thirds of the Section (142, 195).

The Japanese Far Seas Fleet took an average of around 750 tonnes of tuna per year on longlines in the Coral Sea outside the Barrier Reef from the early 1960's to 1980, after which longlining was banned in the area between 12°S and 19°S. Japanese longline vessels have handlined for yellowfin and bigeye tuna in an area off Cairns since 1965. Prior to their exclusion from the Great Barrier Reef Region in November 1980, this fishery was partly conducted within the area of what is now the Cairns Section (195).

The fishery for yellowfin and bigeye tuna in the Coral Sea was first exploited by Australian vessels in October 1981. The extent of these grounds is presently not known but all fishing by Australians to date has been done outside the Barrier Reef region. The distribution of these fish is dependent on local water temperatures and temperature fronts which may change location from one season to the next. At times tuna may appear in exploitable quantities within the Barrier Reef region (195).

Skipjack tuna are also known to be seasonally abundant in the Coral Sea. Skipjack can be caught by purse seining and pole and line fishing with live bait. Although not fished in this area at present, it is possible that a skipjack fishery could develop in future in the Coral Sea including the Cairns Section. A pole and line fishery would require areas for live baiting (195).

Fish Aggregation Devices (payaws) have been used successfully near reefs in the Philippines and other tropical countries to attract tuna. These devices involve anchoring a floating raft or similar structure in waters frequented by migrating fish. It is envisaged that payaws may be deployed in the Great Barrier Reef Region. (195)

With the development of the tuna fishery in the Coral Sea the collection of live bait in the Cairns Section may become an important accessory fishery. Live bait for tuna fishing is collected at night by small (to 200m) purse seine or lampara nets and attractant lights (195).

Other fisheries which used to be operative include beche de mer, green snail and pearl shell (195). A trochus fishery has recommenced and trochus culture could be possible (195). Protected to semi - protected reef flats may provide possibilities for shellfish culture (19).

4.2.3.13 Aboriginal Fishing

Dugong, turtle and fish are hunted and fished by aboriginal people living adjacent and near to the Section.

The residents at Hopevale fish Beor Reef, McIvor River, Low Wooded Isles, Three Isles, Mackay, Egret Reefs and coastal fringing reefs for fish. Bowden, Swinger, Lark and Egret are often fished for turtle and the coastline west of Linnet Reef for dugong (83). About 20-30 dugong are taken each year by the 12 dugong hunters at Hopevale (174, 175). These are usually taken north of Lookout Point to the Starcke River.

Bloomfield residents fish at Hope Island for turtles and the fringing reefs at the north of the Bloomfield River for fish (84).

No estimate of dugong or turtle taken by Bloomfield or Yarrabah residents is available.

4.2.3.14 Tourism and Recreation

Light Aircraft

Air Queensland supplied the following information about its involvement in Great Barrier Reef tourism:

Throughout the tourist season, Air Queensland conducts separate tours which overfly sections of the Great Barrier Reef. These are:

* Gooney Bird Tours: a 14 day DC3 tour of Queensland and the Northern Territory. Includes a Whitsunday-Cairns and a Cairns-Cooktown sector, where views of the reef are one of the attractions.

* Top of Australia Tour: a 3 day DC3 tour of the Cape York Peninsula. Includes a day visit to Lizard Island, glass-bottom boat cruise and aerial viewing of the Reef. This tour is also packaged as part of a fly/coach tour from Brisbane.

* Blue Lagoon Day Tour (Cooktown and Lizard Island): an extremely popular tour which includes a sector along the outer reef from Lizard Island to Cairns. Sold separately, or as a component of various other package tours.

* Cooktown Heritage day tours: This tour also includes the highly popular low level flight down the Ribbon Reefs, following the Outer Barrier to Cairns.

* Wonders of the Reef: Includes a flight from Endeavour Reef along the Outer Barrier to Green Island.

* Great Barrier Reef Spectacular: A 1 1/2 hour scenic flight from Townsville. The increase in international tourist arrivals and the establishment of the casino at Townsville will ensure a rapid growth of this market.

* Capricorn Group Flights: a 1 1/4 hour flight from Rockhampton which fills a very evident need for scenic access to one of the most attractive sections of the Great Barrier Reef.

In the course of these activities, Air Queensland expects to conduct approximately 960 flights during the 1982 tourist season, carrying about 12,600 passengers over the Great Barrier Reef. Projected growth of this market is in the order of 20% per year (77).

4.2.3.15 Charter Boats

Several charter boat operators referred to their present activities and future plans. For example a Port Douglas charter boat operator runs a daily cruise from Port Douglas to Low Isles between April and January that carries 160 passengers. In August 1982 the company will begin a daily cruise for up to 118 passengers to the outer reef (Representation 37). Another Port Douglas based entrepreneur plans to conduct a tourist cruise business and operate a large vessel that can accommodate up to 25 people (143). In several years time a company from Innisfail will operate five day voyages for 70-80 passengers (29). Another tourist operator reported that approximately five new charter vessels are coming into operation out of Cairns this year, with potential to carry 400 passengers a day (50).

4.2.4 Recommendations provided by representations

4.2.4.1 General recommendations regarding fishing activities

47 representations made general suggestions that restrictions of some sort on "fishing" were necessary. These ranged from zoning plans or guidelines for the entire Section or small areas to recommendations that overfishing should not be permitted. Recommendations of this nature frequently referred either to the entire spectrum of fishing activities and have not been included under specific fishing activities recommendations. Recommendations were included under specific activities when specific activities were mentioned.

12 representations specifically referred to commercial fishing and the necessity for some regulation. No representation suggested that no restriction at all was necessary. 3 representations initially not in favour of much restriction, were in favour of particular restrictions (e.g. closing spawning grounds) or restrictions on groups other than themselves.

4.2.4.2 Recommendations regarding specific fishing activities

Trawling, spearfishing and line fishing were the three "fishing" topics about which most recommendations were made.

Trawling: 30 representations expressed concern or recommended that something should be done about the large 'by-catch' of juvenile and bait fish and the coincident decline in reef fish catches with an increase in trawling activity. The dumping of by-catch was also objected to; sharks take the fish or they wash ashore dead.

21 representations suggested that trawlers should be kept away from the immediate vicinity of reefs and from the mainland, the distance varying fromn 1km to 7 miles. General concern at the activities of trawlers, the need for some restrictions (e.g. on numbers of boats and areas trawled) was expressed in 21 representations.

Recreational line fishing: 55 representations supported some sort of restriction on line fishing (not including bag limits). These suggestions ranged from (temporarily or permanently) closed areas, closed seasons, to minimum size limits. 18 representations expressed support for some sort of bag limit and 4 were specifically against a bag limit.

Recreational spearfishing: 27 representations recommended some regulation of spearfishing. An additional 10 recommended bag limits of some sort, 7 thought it should be entirely prohibited and 12 recommended that spearing with scuba should be banned. Two specifically suggested that line and spearfishing should be treated equally. 17 representations recommended banning commercial spearfishing.

Trolling was generally regarded as a reasonable activity requiring little restriction, except for some specific areas (e.g. scientific research areas) or time periods (8 and 11 representations put these views for commercial and recreational trolling respectively). No representations suggested banning it. 11 representations requested specific areas be kept open e.g. Snapper.

Seven representations felt gill netting should be banned or restricted; one was in favour. Big game fishing recommendations were evenly divided between no restrictions (4) banning or phasing the activity out (4) and continuing with some restriction (3).

No representation were opposed to a continuation of aboriginal fishing rights. All were in favour of a continuation of aboriginal fishing though most included some sort of qualifier e.g. using traditional methods, to levels consistent with conservation of the presence, providing catch data etc.

Collection of aquarium fish: 11 representations favoured some sort of restriction on commercial aquarium fish and 12 thought it should be banned or phased out, frequently describing it as an unreasonable use. On the other hand banning or phasing recreational aquarium fish collecting was suggested in only 5 representations, while 16 suggested some sort of restriction was necessary; many of these suggested that the activity should be "discouraged".

Commercial coral collection: 5 represenations suggested some sort of restriction, 20 recommended banning or phasing out. 19 representations were in favour of discouraging and restricting amateur coral collection, 5 were in favour of banning or phasing it out.

Commercial shell collection: all representations specifically mentioning this activity were in favour of some restriction (18 recommended restriction and 29 recommended banning or phasing it out).

Recreational shell collecting should be banned or phased out according to 6 representations and restricted ("discouraged") according to 32.

4.2.4.3 Recommendations regarding

In none of the representations received was the recommendation made that the Marine Park should not be used for recreational and tourist activities.

The topics that were raised in relation to tourism and recreation included general policy matters, suggestions regarding various recreational activities and/or where they should be permitted or prohibited, proposed zones (mostly taken from the Capricornia Zoning Plan) and regulations.

In 74 representations in which general recommendations concerning recreational and tourist usage were made, a wide spectrum of opinion was expressed, ranging from little to no restrictions on visitor access through to prohibiting further tourist development. Approximately two-thirds of the recommendations suggested some restrictions or limitations be placed on the recreational activities themselves, the areas in which they could be permitted or the length of time they should be allowed.

In most of the recommendations which referred to specific recreational activities it was suggested that the particular activity in which the sender of the representation was engaged should be allowed to continue.

More representations (38) contained recommendations on scuba and/or skin diving than any other specific recreational activity. Nearly all (95%) of the recommendations made regarding diving wanted this activity to continue and to be permitted in particular locations or throughout the Marine Park.

All of the twenty recommendations made regarding snorkelling favoured continuation of this particular activity. Likewise the twelve recommendations relating to underwater photography all suggested that their usage of the Cairns be allowed to continue.

Another category that attracted comment was resort activities, facilities and tourist developments. In most (75%) of these representations, it was recommended that further tourist development be prohibited; and six of these representations specifically mentioned "on sand cays".

Other activities that generated over ten recommendations were camping and man-made displays and exhibits. In 4 of the 14 representations referring to camping, low cost or low impact camping was recommended in the Marine Park. In another 3, it was recommended that no camping be allowed on sand cays. As far as man-made islands and structures are concerned, most represenations (55%) suggested careful assessment and consideration before approval was given, 2 were totally opposed and 3 approved of man-made structures.

As far as the other activities for which 10 or less recommendations were received, all those who mentioned glass-bottom boat and coral viewing, underwater observatories, bird and marine life watching, picnicking, reef cruising and sailing, and water skiing recommended such activities be permitted. The majority of those who mentioned reef walking, and power boating recommended these activities should be permitted.

5. FUTURE PROSPECTS FOR ACTIVITIES IN THE CAIRNS SECTION

5.1 Fisheries

While there appear to be moderate prospects for development of some existing and new fisheries within the Cairns Section, new fisheries should not be established until the viability of the fishery is adequately assessed. This includes both environmental impacts on both the target and non-target organisms and the economic viability of the proposed fishery.

5.1.1 Otter trawling

On the east coast of Queensland, prawn stocks appear to be fully exploited. While catches of deep water prawns (royal reds) sometimes reach significant quantities in parts of the central coast there is no indication of a major new resource. Bugs may not withstand heavy fishing pressure and scallops are not regarded as an economic proposition (Matilda and Hill, 1981).

There are proposals to survey deep water to 200 fathoms (365m) for commercial prawn stocks (DPI, 1982) and some good catches have been made in limited areas (Matilda and Hill, 1981).

Prospects for expansion:

inshore: nil

offshore (east of GBR): poor to moderate

5.1.2 Commercial fishing other than otter trawling

5.1.3 Pelagic fishery

There would appear to be little potential for expansion of the mackerel fishery in the Cairns Section.

There appears to be potential for development of an offshore tuna fishery, previously exploited by Japanese longliners. The Japanese Far Seas Fleet took an average of about 750 tonnes of tuna per year in the Coral Sea east of the Great Barrier Reef and Japanese vessels have handlined for yellowfin and bigeye tuna off Cairns since 1965. Nine vessels engaged in exploratory handline fishing for this tuna resource last year and it appears that at times, tuna may appear in exploitable quantities in the Great Barrier Reef Region. (Aust. Fish. 1982, DPI, 1982).

Skipjack tuna are also known to occur in the Coral Sea and therefore it is possible that a fishery could develop in the Cairns Section for skipjack (DPI, 1982).

Fish Aggregation Services (FADS) (payaws) have been used in other tropical countries to attract tuna with considerable success. It is possible that these could be introduced offshore in the Cairns Section (DPI, 1982).

The development of an offshore tuna fishery will necessitate the development of a supporting bait fishery. It has been suggested that a percentage of the trawl by-catch could be used as bait for this fishery (DPI, 1982). Live bait may also be required using night purse seining and attractant lights (DPI, 1982). No information is available on the extent of resources.

Prospects for expansion:

mackerel:	nil
yellowfish, bigeye tuna:	good
skipjack tuna:	moderate
bait fishery:	moderate

5.1.4 Demersal fishery

This fishery is over exploited in some areas throughout the Section (e.g. close to major population centres) and probably fully exploited throughout the Section as a whole. However as the fishery is largely recreational, additional boats are free to enter the fishery and will continue to do so. In the absence of regulations, catch unit effort will probably decline.

Prospects for expansion: nil

5.1.5 Game fishery

The big game recreational fishery, with its growing emphasis on tag and release, can probably undergo some expansion if survival of the released fish is good. If this is the case the size of this fishery will be limited by economic factors largely unrelated to the fish (e.g. the rates charged by boats and the number of vessels which can be supported by recreational anglers).

Prospects for expansion: moderate.

5.1.6 Coral collection

Until recently, coral collection has been a relatively minor activity because of the large volume of coral exported from the Philippines. However the recent ban on coral exports from the Philippines has enhanced prospects for local coral collectors. In future export of Australian coral will require a permit under the Exports (Fish) Regulations Act (DPI, 1982).

The potential impact of increased coral collection will vary depending upon the volume, type, frequency and location of collected coral.

Prospects for expansion: moderate.

5.1.7 Aquarium fish collection

The volume of aquarium fish collecting in the Cairns Section has increased over the last few years as increased freight rates have raised the price of Philippine imports. This situation can be expected to continue with locally caught fish becoming more economically attractive. The potential impact of increased collecting activity is largely unknown.

Prospects for future expansion

aquarium fish: moderate

5.1.8 Gill net fishery

"Inshore stocks of fin fish are fully or nearly fully exploited. Restrictions on entry and effort are being introduced in order to relieve pressure on the most valuable fishery namely that for barramundi (Matilda and Hill, 1981)."

Prospects for future expansion

inshore net fishery: nil

Prospects for future expansion

bait fishery: moderate

5.1.9 Beche de mer, trochus, green snail etc.

Beche de mer offer little prospect of supporting an economically viable fishery in the Cairns Section. A limited trochus fishery and trochus culture appear to be sustainable. Little is known about the prospects for a fishery on green snail but it is believed to be similar to beche de mer. Clams, extensively harvested by the Taiwanese, currently do not offer great prospects for a fishery.

Prospects for future expansion

beche de mer:	nil
trochus:	moderate
green snail:	nil
clams:	nil

5.2 Tourism and Recreation

There is clearly potential for a vast increase in tourist and recreational use and appreciation of the resources of the Cairns Section of the Great Barrier Reef Marine Park. It seems probable that with a few years tourism will be the most significant economic activity in the Section.

The nature and extent of growth will depend heavily on external economic and social factors, these include:

- increase in leisure time
- decrease in working hours
- increase in population
- ageing of population
- level of unemployment
- level of disposable income
- changes in costs relative to alternative destinations
- marketing and promotion
- changes in transport technology

For these reasons the extent and time scale of realisation of specific proposals is difficult to predict. Projects which have been indicated in representations include:

- artifical reef platforms
- accommodation facilities on the reef
- hovercraft and high-speed catamarans

It is clear that reefs accessible to major points of embarkation must be regarded as having high tourist potential.

5.3 Other Aspects

5.3.1 Shipping

(a) A new deep-water port has been proposed for the Cape Grafton Area

(b) The dredging of shipping channels requires spoil dumps. There will probably be a need for these in the Marine Park near Cairns.

5.3.2 Navigational Aids and Moorings

The representations identified the need for

(a) more comprehensive navigational aids for boat users in reefal areas

(b) mooring sites and mooring points in areas of heavy boat usage, if anchor damage is to be avoided.

(c) lights to mark shipping channels out into Coral Sea.

5.3.3 Aircraft and Hovercraft operations

Some comments were made complaining about aircraft 'buzzing' islands, and also about the disturbance of bird colonies by sea-plane landings and scenic flights.

There may be a need to designate some sea-plane landing areas around popular destinations, e.g. Michaelmas Cay and Green Island.

One representation proposed a hovercraft service. This will need special investigation to determine its impact on reefs, cays and islands and on fish and bird life.

5.3.4 Structures on Reefs

It is likely that permanent man-made structures to serve the tourist industry will be established on reefs in the near future. Special consideration of their needs, and potential impact will be needed.

5.3.5 Oil Pipeline Corridors

An Australian oil company has indicated a possible need for oil pipelines across the Marine Park seabed.

6. MANAGEMENT CONSIDERATIONS

6.1 Experience Gained from Establishing Capricornia

6.1.1 Introduction

The following review is an evaluation of the short experience in management of the Capricornia Section of the Marine Park. It is not comprehensive, primarily because there has not been sufficient time for many elements of management to be tested and evaluated. Never-the-less, problems have arisen with some management activities, and these generally derive from application of the Zoning Plan and Regulations. Hence, this review concentrates on these two documents.

The following is not a criticism of the planning for Capricornia, but rather is intended as constructive comment for discussion included in preparations for the Cairns Zoning Plan, and in due course, the review of the Capricornia Zoning Plan.

This review aims at pinpointing specific problems, commenting on the apparent reasons for their existence and what implications they have to management, and makes recommendations as to how they might be remedied.

6.1.2 Zoning Plan

Problem	Comments	Recommendations
1. The Zoning Plan is difficult to follow, for both the general public and day-to-day management staff.	. primarily due to (a) the use of multiple exceptions e.g. General Use 'B' - use and entry (b) the complexity of relating activities to zones.	(a) the number of exceptions be kept to a minimum (b) the Z.P. only contain provisions for activities known to be or which might reasonably be undertaken in the Section. Other unforeseen activities to be covered by permit. (c) where possible amalgamate similar activities into a single category e.g. research. (d) the number of zones to be reduced or if not possible, not increased (see point 7).
2. The Z.P. is definitive on some activities in some zones but silent on the same activities in other zones.	. creates problems when assessing permit applications. . it is necessary to extrapolate to fill gaps.	The Z.P. contain a consolidated table detailing the status of all activities defined in the plan for all zones

Problem	Comments	Recommendations
3. Some terminology the plan is unclear e.g. scientific research vs manipulative research vs research.	. makes it difficult to evaluate use and entry provisions. . necessary to extrapolate.	Clearly define all terms used in the Z.P.
4. The list of interpretations does not adequately cover all terms used in the plan e.g. what is a wreck, an education program, etc.	. creates difficulties when assessing permit applications. . difficult to apply in practical situations	as above.
5. The Z.P. does not define limits of jurisdiction (low-water mark).	. creates problems with enforcement and prosecution. . creates unnecessary confusion between GBRMPA/QNPWS and for the public.	. seek legal advice. . state the limits of jurusdiction for management purposes.
6. Some zone names do not immediately or adequately convey the main purposes of the zones or how they differ e.g. General Use 'A' and 'B'.	. creates interpretive problems. . creates public confusion	. use names which evoke a meaning . do not sub-categorise e.g. 'A' or 'B'.

Problem	Comments	Recommendations
7. The plan contains too many zones and closure areas, some with greatly overlapping functions e.g. MNP 'B' Zone and Reef Appreciation Areas.	. adds to the difficulty of interpreting and understanding the plan.	keep the number of zones/ areas to a minimum
8. Seasonal closure of reefs is too indefinite.	. confuses the public. e.g. assumptions about permanent closure. . difficult to administer and interpret.	define in the ZP important breeding areas for annual closure over a set period of years.
9. Seasonal Closure Areas are too extensive.	. they reduce opportunities to users such as divers and fishermen. . the 100m distance from the reef edge is difficult to delineate by surveillance aircraft . there would appear to be few added problems to breeding fauna if the SCAs were reduced to the reef edge. . reduction to reef edge would provide safer anchorages.	reduce SCAs to cover the area from LWM on the island to the reef edge.

Problem	Comments	Recommendations
10. Replenishment Areas are indefinite with regards to any systematic declaration.	. creates interpretive problems. . creates management problems.	. The Z.P. nominate specific reefs for closure in defined years. . Management resources be committed when ZP drawn up.
11. Elements of the Capricornia map in the Z.P. are cluttered and difficult to read.	. creates interpretive problems.	. simplify the map. (is cross hatching plus colour coding necessary?)
12. Elements of the Capricornia map are inconsistent e.g. some reefs in the Section are called islands (One Tree Island) whilst others are termed reefs (Boult Reef).	. creates interpretive problems.	standardize nomenclature.
13. The Regulations contain specific activities and terms not mentioned in the Zoning Plan e.g. reef walking areas, discharge of waste, spearfishing with SCUBA, littering provisions, use of powerhead, removal of wrecks.	. the Z.P. should be capable of standing on its own with regards to usage of the Section. . inconsistencies may create interpretive problems. . regulations should derive from and expand on the ZP.	ensure all terms and activities likely to be covered by Regulations appear in the ZP.

Problem	Comments	Recommendations
14. The reason for permits for some activities is unclear and difficult to administer e.g. Fishing by means of an amateur bait net.. in MNP'A', removal of wrecks, education programs.	• experience indicates low frequency for some activities undertaken in the Section. It is questionable whether the likely "impact" requires a permit for control.	• activities infrequently undertaken should only require permits if they have significant potential impact on the reef or other users.

6.1.3 Regulations

Problem	Comments	Recommendations
1. Some controls on activities appear only in the Regulations.		refer to comments/ recommendations for the Z.P.
2. Some requirements of sub-regulation 5(2) appear to be repetitive or superfluous.	. the following 3 requirements of the sub-regulation appear to require amalgamation and simplification - the name of the zone to be used or entered - the name or position of each shoal or reef (if any) on or near which such use or entry is proposed - the proposed movements in the zone of the person preparing to use or enter the zone.	The 3 requirements be amalgamated into the following single requirement:- - proposed movements in the Section including the names of shoals or reefs of shoals or reefs (where applicable) on or near which entry is proposed.
3. Sub-regulation 5(3) lacks definition on the number of times additional information may be sought.	. would be better to define the number of requests for additional information to have a standard approach between assessors.	the sub-regulations provide for 2 requests for additional information.

Problem	Comments	Recommendations
4. Sub-regulation 5(5) is difficult to interpret with regards to orderly and proper management.	. the requirement to have regard to orderly and proper management in the zone is difficult for the nominated delegate to assess and is therefore open to challenge in the event of a refused permission.	replace this requirement with something relating to the method of conducting the activity in the zone.
5. Sub-regulation 5(5) is inadequate in respects.	. experience has shown that a requirement to consider the needs for an environmental impact statement would be appropriate in some instances e.g. LEI.	make provision in the sub-regulation for having regard for the need of an EIS.
6. Sub-regulation 7(4) and 7(5) are difficult to manage from both a definitional and practical viewpoint.	. when is a wreck not a wreck?	refer to comments and recommendations in the Z.P. section.

Problem	Comments	Recommendations
7. Sub-regulations 11(1)-(3) will be virtually impossible to police in the marine environment.	. not a proven problem due to the present scarcity of boating patrols. However, the number of patrols even with established field bases will be inadequate to police the sub-regulations.	(a) delete sub-regs 11(1)-(3) as separate regulations and incorporate into general waste discharge regulations (b) preferably handle the problem of littering by education
8. The identity card in Schedule 2 of the Regulations is inadequate.	. a revised identity card has been prepared and issued to inspectors.	the form of the revised card should be included into the Cairns Regulations.
9. Schedule 1 is not immediately clear to the general public.	. the public is not made aware in the schedule of species requiring a permit that might have previously been popular to collect e.g. crayfish.	The Schedule highlight protected species popular to collect.

6.1.4 Other Comments/Recommendations

1. A general body of Regulations relating to all Sections be produced.

2. The Regulations should make some reference to the provisions for confiscation of property as detailed in the Act.

3. The Queensland Groper should be a protected species in the Regulations.

4. The Zoning Plan should be supported by statements of policy or judgements which indicate why zoning decisions were made e.g. reasons for restrictions, location of zones, periods of closure, activities requiring permits etc.

6.2 Possible Management Requirements for Cairns/Cormorant Pass Sections

6.2.1 Assumptions

In order to assess the anticipated management requirements for the Cairns/Cormorant Pass Sections, it is necessary to make a number of assumptions:-

(a) that management guidelines for the Capricornia Section are broadly applicable to the Cairns/Cormorant Pass Sections.

(b) permanent bases will only be located in or adjacent to areas which are intensively used or are ecologically sensitive i.e.

• Seasonal Closure Areas*	-	the Turtle Group of islands
	-	Onyx Reef
	-	Saxon Reef
	-	Hope Reef
• Coastal fringing reef near population centres or terrestrial national parks	-	adjacent to Kurrimine N.P.
	-	adjacent to Cedar Bay N.P.
• Preservation Areas*	-	fringing reef S-W of the Turtle Island Group
	-	south of Lizard Island
	-	reef west of Lark Pass
	-	fringing reef near the Bloomfield River
	-	Linden Bank
	-	part of the area between Middle Cay Reef and Arlington

* based on SIRO plan - not final.

. Intensively used areas	-	Lizard Island
	-	Low Isles
	-	Michaelmas Reef
	-	Upolu Cay Reef
	-	Arlington Reef
	-	Green Island
	-	King Reef
	-	Beaver Reef
. Other popular areas	-	Boulder Reef
	-	Egret Reef
	-	Osterland Reef
	-	Tongue Reef
	-	Batt Reef
	-	Gibson Reef
	-	Arthur Patches
	-	Howie Reef
. Special areas of concern other than the above	-	Cormorant Pass

(c) aerial surveillance will be an essential component of day-to-day management of the Cairns/Cormorant Pass Sections.

(d) boating surveillance will concentrate on high usage areas.

(e) the capacity should assist for seagoing surveillance craft to reach any point in the Sections in a single day if necessary (weather permitting).

(f) crews should be available to undertake boating patrols 7 days per week (weather and mechanical condition of the boats permitting).

(g) bases should be manned 7 days per week.

6.2.2 Possible Management Arrangements

6.2.2.1 Bases

To satisfactorily manage the areas listed in 6.2.1(b), permanent bases should be established and manned at the following locations:-

- Cairns (Section Headquarters)
- Lizard Island]
- Innisfail] outstations
- Green Island]

6.2.2.2 Staffing

The number of personnel required to satisfy assumptions 6.2.1(f) and (g) will be 24. They will be required as follows:-

- 1 clerical position based in Brisbane
- 2 clerical positions based in Cairns
- 11 graduate positions based in Cairns and operating on rotation at the Section headquarters, outstations and on the boat based in Cairns
- 10 technical positions based in Cairns and operating on the same basis as the graduate positions.

The graduate and technical officers will be divided into 8 teams - 3 consisting of 2 officers, and the remaining 5 with 3 officers each. The teams will operate on the following rotational basis:-

	Ten Day Periods								
Team No.	1	2	3	4	5	6	7	8	9
1	G	I	O	G	I	O	G	I	O
2	O	G	I	O	G	I	O	G	I
3	I	O	G	I	O	G	I	O	G
4	O	L	C	CB	O	L*	C*	CB*	O
5	O	O	L	C	CB	O	L	C	CB
6	CB	O	O	L	C	CB	O	L	C
7	C	CB	O	O	L	C	CB	O	L
8	L	C	CB	O	O	L*	C*	CB*	O

. Teams 1,2 and 3 will have 2 officers each

. Teams 4-8 will have 3 officers each

I = Innisfail
G = Green Island
C = Cairns Headquarters
CB = Cairns boat
L = Lizard Island outstation and boat
O = Days off

* The apparent overlap with these groups will be offset by staff leave, sickness etc.

6.2.2.3 Accommodation

To facilitate operations and house the 8 teams of graduate and technical officers, the following office and housing requirements are estimated:-

- Cairns-workshop and storage area for boat and equipment
  - Office space - for 10 persons
  - housing - officers to provide their own
- Innisfail - Office space - for 2 persons
  - housing - flat/motel room permanently booked for 2 persons
- Lizard Island
  - Office space and workshop for 3 persons
  - housing - staff quarters for 6 persons
- Green Island
  - Office and Interpretive Centre
  - Housing - staff quarters for 2 persons.

6.2.3 Capital and Operational Requirements

To facilitate terrestrial operations associated with the marine park, 3 vehicles will be required - all 3 to be based in Cairns.

To facilitate interpretive operations in the Section, sets of audio-visual equipment will be required for Cairns, Innisfail, Green Island and Lizard Island.

To provide adequate aerial surveillance of the Section, there should be :-

- 4 ACSO reef flights per week
- ad hoc flights from Cairns on contract.

To satisfy the assumptions relating to boating patrols as specified in 6.2.1(d) and (e), 2 nine metre vessels will be located in the Section - one in Cairns, the other at Lizard Island. The 9 metre vessels will operate on the following basis:-

- both boats will concentrate their activities within a 60km radius of their respective bases
- the Lizard Island boat will have the capacity to patrol any point between the northern boundary of the Section and Cape Tribulation in a single day (which may necessitate an overnight stop away from base)
- the Cairns boat will have the capacity to patrol any point between Cape Tribulation and the southern boundary of the Section (which may necessitate an overnight stop away from base).

6.2.4 Estimated Costs

The table below is based on the following assumptions:-

(i) Salaries and allowances for the 24 anticipated officers listed in Section 1(6)(ii) will be paid at the 1982/83 rates shown in the 3YRP for Capricornia

(ii) the figure for operating costs will be approximately equivalent to the 1982/83 figure shown in the 3YRP for Capricornia multiplied by the ratio of anticipated Cairns staff to Capricornia staff (1.26:1)

(iii) the capital works and services figure for Cairns will be approximately equivalent to that for the entire 3 years of the Capricornia 3YRP multiplied by the ratio of anticipated Cairns staff to Capricornia staff (1.26:1).

Salaries and Allowances (including on cost charges)	$ 416,000*
Operating Costs	382,000*
Capital Works and Services (initial establishment program)	502,000
	1,300,000

* for one year only.

7. GUIDELINES

The Division of Land Use Research of the Commonwealth Scientific and Industrial Research organisation is currently conducting a study to evaluate the extent to which computer software generated for terrestrial planning applications can be used in Great Barrier Reef Marine Park planning.

The evaluation is not complete however in the course of the research project it has been necessary to derive policy guidelines for use in the study. These guidelines are based on the strategy of the Capricornia Zoning Plan and regulations and on local knowledge of the Cairns Section and its use as conveyed in discussion between Authority staff and CSIRO researchers.

The guidelines are presented here as a basis for review, evaluation, extension and modification for the purpose of developing the draft zoning plans.

"Zoning plans are assembled by allocating one of a number of pre-specified zone types to each of the individual mapping units into which the section is divided.

It is the planner's hope that he will be able to formally recognize most of the principles to be taken into account in making zoning decisions in a manageably sized set of guidelines - judged for the exercise recently undertaken by CSIRO for GBRMPA to be about 50.

The zoning plan will largely be judged on how well it satisfies expressed and inferred demands from various interest groups including users, conservationists and perhaps park managers themselves. Thus guidelines will largely be statements in either concrete or abstract terms about the zone types which should be allocated to various classes of mapping units in the eyes of various interest groups.

Classification of guidelines

As a matter of expression, guidelines which the planner intends to fully implement in the zoning plan usually contain the phrase 'will be zoned' whereas guidelines which the planner accepts he may not be able to fully implement contain phrases like 'should, as far as possible, be zoned .....'.

This distinction between 'black-and-white' or imperative, and 'grey' or indicative guidelines is an important one. A planning exercise guided by a large number of imperative guidelines might be infeasible, since the guidelines are likely to be contradictory and no plan can satisfy them all.

Consider the following example:

1. All islands with seabird nesting colonies will be zoned 'Preservation'
2. All existing resorts will be zoned 'General Use'.

Clearly islands with both seabirds and resorts cannot be rationally zoned under these guidelines which commit certain classes of islands (resorts or seabirds) to certain zone types.

An alternative to the imperative policy which commits a class of mapping unit to a zone type is the imperative policy which excludes the possibility of a class of mapping units being allocated to one or more zone types. For example:

1. Islands with seabirds nesting colonies will not be zoned 'General Use'
2. Islands with resorts will not be zoned 'Preservation'.

Provided there is a third zone type available there is clearly a simple solution to the planning problem which satisfies these two exclusion policies.

This is frequently the case; a large number of exclusion policies can simplify a complex planning problem (without creating contradictions) merely through reducing the number of possible solutions.

Just as imperative policies can be usefully divided into exclusion and commitment policies, grey or indicative policies can be divided into preference and avoidance policies (Figure 7.1).

Guidelines

Imperative ('will')		Indicative ('should')	
Exclusion ('will not be')	Commitment ('will be')	Preference ('should be')	Avoidance ('should not be')

Figure 7.1

Continuing the previous example, Guideline 1 could be expressed as a preference thus:

As far as possible, all islands with seabird nesting colonies should be zoned 'Preservation' ..... or as an avoidance thus:

As far as possible islands with seabird nesting colonies should not be zoned 'General use'.

Preference and avoidance guidelines thus indicate what is or is not desired without insisting that it be totally achieved in the zoning plan.

In the next section the guidelines chosen to guide the present planning exercise will be presented. It will then be seen that it was thought appropriate to define three commitment guidelines governing the zoning of existing shipping lanes, some research sites and a dugong habitat area. It was not felt appropriate to include any exclusion guidelines although the possibility of excluding 'preservation' as an option on mapping units surrounding existing resorts was considered.

Most of the guidelines presented are of the preference-avoidance type and the main task in the planning exercise, apart from deciding how to interpret each in practice and acquiring the data to do so, is balancing the relative extent to which these preference-avoidance guidelines will be satisfied in the final zoning plan.

Guidelines for the present exercise

Flexible and efficient methods for developing appropriate policy sets in a variety of situations have not been developed. Various suggestions include starting with goals, objectives, values, issues or problems.

For the present exercise no formal method was used. Starting with the list of activities recognized in the Capricornia zoning plan and drawing on information on use of the Cairns Section, GBRMPA staff were asked to suggest criteria which different interest groups would probably wish to see met by the eventual zoning plan. The research team digested, edited and grouped suggestions to produce the list to be detailed presently.

Whilst the set adopted reflects the time and resources available for its development, it is wide-ranging insofar as it attempts to recognize at least one demand from each of 21 interest groups (Table 7.1). This is in fact the classificatory basis on which preference/avoidance guidelines are grouped in the following list.

In the right environment policy sets are evolutionary, improving over time in response to new issues and new knowledge. There appears to be no reason why the guidelines set for the present exercise should not be regarded as the first of several generations. The use of such sets to guide the organized acquisition of upgraded knowledge through research will be discussed in a later chapter.

The guidelines refer to a set of 8 zone types which are summarised in Table 7.2.

TABLE 7.1

Activities to be directly considered in Cairns Section planning exercise

1. Commercial shipping (non-tourist ships)
2. Scientific research on reefs and shoals
3. Establishment of scientific research stations
4. Diving and snorkelling
5. Swimming
6. Reef walking
7. Recreational line fishing
8. Other (non-recreational) line fishing
9. Netting
10. Collecting coral
11. Collecting shells
12. Collecting aquarium fish
13. Trolling
14. Trawl fishing
15. Spear fishing
16. Erecting observatories
17. Erecting artificial islands
18. Cruising by tourist ships
19. Commercial day cruising
20. Private power boating
21. Testing of Defence materials

A. Commitment

1. All mapping units classified as SC (coastal shipping lane) or ST (transverse shipping lane) will be zoned General Use (A) (GU(A))

Purpose: This reflects the judgment that declaration and zoning of the Cairns section must not in any way interfere with existing commercial shipping operations along and through the Reef. As GU(A) is the only zone type under which commercial shipping is freely permitted this recognises that major shipping channels should automatically be zoned in this way.

2. The mapping unit containing Carter Reef will be zoned Scientific Research (SR)

Purpose: This reef has already been extensively used for scientific research and this reflects the judgment that this investment and the results obtained to date are too valuable to jeopardize by zoning the reef for anything other than exclusively scientific research purposes.

3. The mapping unit situated north of Cape Flattery and classified as CH (Coastal Habitat) will be zoned Preservation (PR) or SR

Purpose: This policy reflects the importance of conserving the dugong and that this area is a tiger prawn nursery area.

This matter is being referred to QWG to determine the extent to which such a zoning would be consistent with usage of adjacent areas of Queensland.

4. Reefs where there has been an investment in tourism should not be zoned GU(A) or GU(B)

Purpose: This will ensure a zoning which will enhance the attractiveness of such reefs for tourism. Special consideration will be needed in the zoning of Green and Lizard Islands.

5. The MNP and REC zones will extend 100 metres seawards of the reef edge, when zoning individual reefs.

Purpose: To ensure that trolling for pelagic species will not be prevented in areas that are important for that activity e.g. Green Is.

B. Preference and avoidance

B.1 Conservation

6. As far as possible (AFAP) zone areas containing colonies which could be used for interpretation (passive viewing etc.) so as to both protect the colony and make it available for interpretation, i.e. Recreation (REC), Marine National Park (MNP) or Reef Appreciation Area (RAA)

Purpose: This is currently directed towards the control of access to and exploitation in situations such as the potato cod colony in Cormorant Pass. A recreation, marine national park or reef appreciation zoning implies that the site can be visited but not spear-fished.

7. AFAP ensure that areas containing threatened species are zoned PR

Purpose: At present this is basically intended to protect dugong habitat but obviously can be extended to other species if this found to be necessary.

8. AFAP zone all known seabird breeding areas in the Marine Park as PR, SR, or S (S = seasonal closure)

Purpose: This aims to ensure that cays and islands with breeding colonies of birds can be protected during the breeding season by zoning the surrounding areas in ways which totally (P, SR) or conditionally (S) prohibit public access.

9. Where appropriate ensure that areas associated with existing off-shore national parks and nature reserves or existing coastal national parks are zoned as REC or MNP

Purpose: This seeks an appropriate zoning for areas abutting coastal national parks or adjoining island national parks.

10. Where appropriate ensure that areas zoned PR, SR, MNP or REC are not adjacent to recognized shipping channels or near major river outlets

Purpose: This is an attempt to keep protection areas away from pollution hazards but it is recognized that this position is neither strong nor grounded on an analysis of pollution hazard.

11. AFAP ensure that inter-reef areas are zoned the same as the adjacent reefs

Purpose: This recognizes the probable importance of inter-reefal areas to the ecology of the adjacent reefs.

12. AFAP ensure that fringing reefs are zoned REC or MNP

Purpose: This recognizes that these areas are particularly likely to be subject to heavy use pressures and hence need to be zoned in a way where that use can be strongly controlled. Under REC, sensitive areas could be controlled through the use of 'reef appreciation' areas.

13. AFAP ensure that a number of reefs/shoals zoned PR are situated in the eastern part of the section

14. AFAP ensure that a number of reefs/shoals zoned PR are situated in the northern part of the section

15. AFAP ensure that a number of reefs/shoals zoned PR are situated in the southern part of the section

Purpose: 13, 14 and 15 are intended to ensure that when preservation reefs are identified they will be distributed throughout the Section.

B.2 Aircraft operations

16. AFAP ensure areas suitable for all-weather amphibious aircraft and seaplane landing are not zoned PR, SR or S

17. AFAP avoid locating aircraft landing areas adjacent to islands where major sea-bird breeding colonies exist

Purpose: 16 and 17 provide for safe aircraft operation (16), while minimising the danger of bird strikes by aircraft especially in a critical period such as landing and taking off (17).

B.3 Diving, snorkelling, swimming, reef walking

18. AFAP avoid zoning areas particularly attractive for reef walking as PR or SR

Purpose: This has the purpose of trying to ensure that areas considered particularly attractive for reef walking are not placed in a zone in which that activity would be prohibited.

19. AFAP ensure that areas attractive for swimming, snorkelling, diving or reef walking are zoned as REC or MNP or are designated as Reef Appreciation Areas in REC, GU(A) or GU(B)

Purpose: Purpose is to ensure that some of the more attractive areas for recreation activities are zoned in ways which minimize the chance of conflict and amenity loss through the presence of commercial and recreational fishing, spearfishing, netting and collecting activities.

B.4 Line fishing

20. AFAP avoid zoning areas attractive for recreational/other line fishing as PR, SR or MNP

Purpose: This is concerned with the level of availability of areas for line fishing activities, and aims to keep attractive line fishing areas from being placed in zones where this activity is not permitted.

21. AFAP ensure fish spawning areas zoned for GU(B) and S

Purpose: This aims to protect spawning populations of fish.

B.5 Netting

22. AFAP, avoid zoning areas regarded as attractive for netting as PR, SR, MNP, REC or S

Purpose: This aims to retain the rights of net fishermen to use the areas they wish to use as far as possible.

B.6 Collecting

Note: It was agreed that research is needed to develop a policy on management of coral collecting. Until the result of this research is available expansion of coral collecting should not be allowed.

23. AFAP ensure that a number of attractive collecting sites for coral, shells or aquarium fish are included in areas zoned GU(A) or GU(B)

Purpose: This is to ensure that a sufficient number of sites suitable for collecting shells, aquarium fish and coral will be available in zones where these activities can be granted a permit.

24. AFAP ensure that areas containing existing collecting leases are zoned GU(A) or GU(B)

Purpose: This recognizes that the rights of existing coral lease holders should be protected by avoiding the conflict which could arise if existing leases were zoned in a way which prohibited collecting. These rights are not absolute however and the guidelines may or may not be satisfied in any plans generated. Note: Leases would be relocated where this guideline is not met.

B.7 Trolling

25. As far as possible, avoid zoning attractive trolling areas as PR, SR, S, MNP or REC

Purpose: This is designed to ensure that attractive trolling areas are as available as possible by reducing the area zoned so as to totally or seasonally prohibit trolling.

B.8 Trawling

26. AFAP ensure that areas attractive for trawling are zoned GU(A)

Purpose: GU(A) is the only zone in which trawling is permitted and this seeks to maximize the area available for this activity.

B.9 Spear fishing

27. AFAP avoid zoning areas attractive for spear fishing as P, SR, REC or MNP

Purpose: This attempts to ensure that areas attractive for spear fishing will be zoned in ways such that the activity is not prohibited.

B.10 Boating and tourist ships

28. AFAP avoid zoning areas attractive to visitors in tourist ships as PR or SR

Purpose: This is intended to ensure that tourist ships will not be prevented from using those parts of the Section they favour. Permits for tourist ships would still be required but the guideline aims to minimize the areas from which they would be automatically prohibited.

29. AFAP areas within commercial day cruising distance of major coastal settlement should be zoned in ways which permit the more popular day cruise activities i.e. REC, MNP, GU(A) or GU(B)

Purpose: This attempts to ensure that people on commercial day cruises will be adequately catered for in terms of sites for swimming, diving, snorkelling, reef walking and recreational line fishing.

30. AFAP areas within operating distances from major and minor coastal settlements for private boats should be zoned in ways which permit the more popular day tripping activities i.e. MNP, REC, GU(A) or GU(B)

Purpose: This attempts to ensure that people using their private boats to go fishing, swimming, diving, snorkelling and reef walking will be adequately catered for.

31. AFAP ensure that anchorages are not zoned PR, SR or S

32. AFAP ensure that there is an anchorange within 60km of a harbour or another anchorage

Purpose: 31 and 32 provide for safe anchorage of boats travelling through the Section.

B.11 Defence areas

33. AFAP ensure that essential testing areas for Defence materials are zoned GU(A) or GU(B)

Purpose: The status of these areas is not clear but they are areas subject to notice of temporary closure. Parts of these areas inside established shipping lanes will automatically be zoned GU(A) (see Commitment 1) and this guideline seeks to have the remaining Defence areas zoned the same, GU(A), or similarly, i.e. GU(B).

B.12 Multiple use, complementary activities and conflicting activities

34. AFAP avoid zoning areas currently heavily used for collecting and fishing as PR, SR or MNP

Purpose: This is a general guideline to reflect the planning authority's concern to ensure that, as far as possible, existing use will not be curtailed under the zoning plan.

35. AFAP avoid zoning areas attractive for both spear fishing and line fishing as REC, MNP, SR or PR

36. AFAP ensure that areas attractive for both recreational line fishing and netting are zoned as GU(B) or GU(A)

Purpose: Much netting activity is to collect bait for line fishing and trolling and the policy seeks zonings such that these complementary activities can co-exist.

B.14 Management facilitation

37. AFAP ensure that zone types requiring a high level of field supervision, namely MNP or REC are confined to areas readily accessible from settlements and resorts (possible management centres)

38. AFAP ensure that areas zoned P, SR, MNP, REC or S are readily identifiable

Purpose: It is important for management and interpretation.

39. AFAP ensure that reefs and shoals in shipping channels are zoned GU(A)

Purpose: Given that the shipping channels themselves will be zoned GU(A) this recognizes that it would be administratively and managerially easier if mapping units within these channels were similarly zoned.

40. AFAP avoid zoning areas adjacent to coastal settlements or off-shore resorts as PR or SR

Purpose: Resorts could not operate under these zonings and to the extent that the guideline is satisfied, it is implied that, on resort islands, seabird breeding colonies will be protected by Queensland government regulations and management programs.

41. AFAP ensure that reefs and waters around islands on which camping is allowed are zoned GU(B), REC or MNP

Purpose: This will provide for the zoning to complement the island management.

B.14 Park design

42. Zone as much of the Cairns section as possible GU(A)

43. Zone as much of the section as possible as GU(B)

44. Zone as much of the section as possible as P, SR, MNP(A), MNP(A1) or MNP(B)

Purpose: This allows the proportion of the Section in the main zone type to be easily adjusted.

45. AFAP areas classified as inner waters should be zoned as GU(A) or GU(B)

Purpose: This is a broad guideline for ensuring that if no other zoning is demanded for these waters they will be zoned so as to be available for commercial and other shipping. Inner waters are those lying between coastal waters and the 200 metre bathymetric contour.

46. AFAP ensure that areas bordering the Cairns section to the north, south or east are zoned GU(A)

Purpose: This reflects the design principle that the Section should be zoned so that restrictions on activities increase as one moves towards the 'centre' of the Section. It is held that such zoning is readily understood by users and hence more likely to be adhered to.

47. AFAP areas abutting port areas should be zoned GU(A)

Purpose: Intended to buffer entry into the Park in the sense that when entering the Park from a port area, the first zone encountered will be associated with minimal control of activities."

b/fc

APPENDIX 1

NOTE:- LATITUDE AND LONGTITUDE IS INCLUDED FOR EASE OF LOCATION ON MAP OR CHART, AND IS GIVEN TO THE NEAR WHOLE MINUTE.

Listing of Coral Reefs in Cairns Section

Coastal fringing reefs and fringing reefs around Continental islands are not included in this list. JCU refers to James Cook University chart of area 14°S to 17°S. MPA refers to unnamed identified reefs shown on reconnaissance map - 17°S to 18°S.

Sources: (1) JCU Reef and Island Classification Map Cape Grafton to Barrow Island.
(2) Admiralty Charts - BA and Aus Series 829, 830, 831, 832.

No.	Reef	Latitude	Longtitude
1	Hilder Reef	14°27'S	145°25'E
2	Hicks Reef	14°27'S	145°30'E
3	Day Reef	14°30'S	145°33'E
4	J.C.U. 14°No. 28	14°42'S	145°E
5	Covered Reef	14°40'S	145°10'E
6	Turtle Reef	14°43'S	145°09'E
7	Carter Reef	14°33'S	145°35'E
8	Yonge Reef	14°36'S	145°37'E
9	No Name Reef	14°39'S	145°39'E
10	MacGillvray Reef	14°39'S	145°29'E
11	Nymph Island Reef (Cay)	14°39'S	145°15'E
12	Maxwell Reef	14°47'S	145°19'E
13	Martin Reef	14°45'S	145°21'E
14	Linnet Reef	14°47'S	145°21'E
15	J.C.U. 14°No. 24	14°42'S	145°32'E
16	J.C.U. 14°No. 23	14°40'S	145°39'E
17	J.C.U. 14°No. 25	14°42'S	145°35'E
18	East Pethebridge Islet Reef (Cay)	14°44'S	145°06'E
19	West Pethebridge Islet Reef (Cay)	14°44'S	145°05'E
20	Turtle Group Island Reef (Cay)	14°44'S	145°10'E
21	Eyrie Reef (Cay)	14°42'S	145°23'E
22	J.C.U. 14°No. 29	14°48'S	145°08'E
23	J.C.U. 14°No. 30	14°49'S	145°11'S
24	Kedge Reef	14°46'S	145°32'E
25	J.C.U. 14°No. 26	14°46'S	145°32'E
26	Ribbon Reef No. 10	14°40'S to 14°56'S	145°40'E to 145°44'E
27	Sim Reef	14°49'S	145°17'E
28	Decapolis Reef	14°51'S	145°16'E
29	J.C.U. 14°No. 27	14°50'S	145°36'E
30	Eye Reef	14°53'S	145°28'E
31	Helsdon Reef	14°57'S	145°29'E
32	J.C.U. 14°No. 31	14°52'S	145°32'E
33	J.C.U. 14°No. 36	14°55'S	145°31'E

No.	Reef	Latitude	Longtitude
34	J.C.U. 14°No. 32	14°52'S	145°33'E
35	Gull Reef (Cay)	15°00'S	145°34'E
36	J.C.U. 14°No. 33	14°53'S	145°40'E
37	J.C.U. 14°No. 34	14°55'S	145°41'E
38	J.C.U. 14°No. 35	14°56'S	145°41'E
39	J.C.U. 14°No. 37	14°57'S	145°41'E
40	Ribbon Reef No. 9	14°59'S	145°43'E
41	Two Isles Reef (cay)	15°01'S	145°26'E
42	Pasco Reef (cay)	15°02'S	145°32'E
43	Long Reef	15°02'S	145°34'E
44	J.C.U. 15°No. 1	15°02'S	145°41'E
45	Ribbon Reef No. 8	14°04'S	145°43'E
46	J.C.U. 15°No. 3	15°05'S	145°40'E
47	J.C.U. 15°No. 2	15°06'S	145°38'E
48	Strickland Reef	15°04'S	145°31'E
49	Murray Reefs	15°05'S	145°16'E
50	Low Wooded Isle Reef	15°06'S	145°23'E
51	Conical Rock Reef	15°08'S	145°19'E
52	Three Isles Reef (cay)	15°07'S	145°25'E
53	Beor Reef	15°09'S	145°16'E
54	Forrester Reef	15°09'S	145°30'E
55	Mackay Reefs	15°08'S	145°32'E
56	Harrier Reef	15°08'S	145°41'E
57	Startle Reefs	15°12'S	145°31'E
58	Marx Reef	15°12'S	145°37'E
59	Ribbon Reef No. 7	15°08'S to 15°11'S	145°44'E
60	Swinger Reef (cay)	15°14'S	145°32'E
61	Pullen Reefs	15°15'S	145°35'E
62	J.C.U. 15°No. 4	15°14'S	145°43'E
63	Lark Reef	15°16'S to 15°19'S	145°31'E to 145°39'E
64	Ribbon Reef No. 6	15°16'S	145°45'E
65	J.C.U. 15°No. 5	15°18'S	145°45'E
66	Williamson Reefs	15°22'S	145°32'E to 145°37'E
67	J.C.U. 15°No. 6	15°20'S	145°45'E
68	J.C.U. 15°No. 7	15°20'S	145°38'E
69	Ribbon Reef No. 5	15°21'S	145°46'E
70	Boulder Reef	15°25'S	145°26'E
71	J.C.U. 15°No. 8	15°23'S	145°46'E
72	J.C.U. 15°No. 9	15°24'S	145°46'E
73	J.C.U. 15°No. 10	15°26'S	145°31'E
74	J.C.U. 15°No. 11	15°26'S	145°37'E
75	J.C.U. 15°No. 12	15°26'S	145°39'E
76	Ribbon Reef No. 4	15°26'S	145°47'E
77	Egret Reef	15°26'S	145°25'E
78	J.C.U. 15°No. 13	15°28'S	145°40'E
79	J.C.U. 15°No. 14	15°29'S	145°39'E
80	J.C.U. 15°No. 16	15°29'S	145°30'E
81	Ribbon Reef No. 3	15°29'S	145°48'E
82	J.C.U. 15°No. 15	15°30'S	145°37'E
83	J.C.U. 15°No. 17	15°30'S	145°33'E

No.	Reef	Latitude	Longtitude
84	J.C.U. 15°No. 18	15°30'S	145°46'E
85	J.C.U. 15°No. 19	15°31'S	145°46'E
86	Dawson Reef	15°30'S	145°19'E
87	Cowlishaw Reef	15°32'S	145°21'E
88	Osterland Reef	15°31'S to 15°35'S	145°27'E to 145°33'E
89	J.C.U. 15°No. 20	15°33'S	145°39'E
90	Ribbon Reef No. 2	15°34'S	145°47'E
91	Ribbon Reef No. 1	15°36'S	145°47'E
92	Rosser Reef	15°36'S	145°31'E
93	Emily Reef	15°37'S	145°37'E
94	Bee Reef	15°38'S	145°25'E
95	Cairns Reef	15°38'S to 15°44'S	145°27'E to 145°35'E
96	Irene Reef	15°39'S	145°43'E
97	Lena Reef	15°39'S	145°48'E
98	Gubbins Reef	15°43'S	145°24'E
99	Pearl Reef	15°43'S	145°47'E
100	East Hope Island Reef (cay)	15°45'S	145°28'E
101	West Hope Island Reef (cay)	15°45'S	145°26'E
102	Ruby Reef	15°45'S	145°47'E
103	Endeavour Reef	15°46'S	145°35'E
104	Andersen Reef	15°47'S	145°48'E
105	Pickersgill Reef (cay)	15°52'S	145°35'E
106	Evening Reef	15°54'S	145°40'E
107	Escape Reef	15°49'S to 15°54'S	145°48'E
108	Morning Reef	15°57'S	145°40'E
109	Agincourt Reef No. 4	15°56'S	145°49'E
110	Lake Reef	15°55'S	145°23'E
111	Agincourt Reef No. 3	15°59'S	145°49'E
112	Spitfire Reefs	16°01'S	145°37'E to 145°38'E
113	Agincourt Reef No. 2	16°01'S	145°50'E
114	Agincourt Reef No. 1	16°03'S	145°52'E
115	J.C.U. 16°No. 1	16°01'S	145°47'E
116	J.C.U. 16°No. 2	16°01'S	145°48'E
117	J.C.U. 16°No. 3	16°02'S	145°50'E
118	J.C.U. 16°No. 4	16°03'S	145°44'E
119	J.C.U. 16°No. 5	16°05'S	145°43'E
120	Mackay Reef (cay)	16°02'S	145°39'E
121	J.C.U. 16°No. 6	16°07'S	145°46'E
122	Undine Reef (cay)	16°07'S	145°38'E to 145°44'E
123	St Crispin Reef	16°05'S to 16°08'S	145°47'E to 145°52'E
124	Rudder Reef	16°11'S	145°39'E to 145°45'E
125	J.C.U. 16°No. 7	16°14'S	145°48'E
126	Opal Reef	16°14'S	145°53'E
127	J.C.U. 16°No. 8	16°17'S	145°47'E
128	J.C.U. 16°No. 9	16°16'S	145°50'E

No.	Reef	Latitude	Longtitude
129	Tongue Reef	16°16'S to 16°25'S	145°38.5'E to 145°55'E
130	J.C.U. 16°No. 10	16°21'S	145°46'E
131	Batt Reef	16°21'S to 16°28'S	145°41'E to 145°51'E
132	Low Islets Reef (cay)	16°23'S	145°41'S
133	Satellite Reef	16°27'S	145°41'E
134	Norman Reef	16°26'S	146°E
135	Saxon Reef	16°28'S	145°59'E
136	Spur Reef	16°24'S	146°03'E
137	Onyx Reef	16°25'S	146°04'E
138	Nicholas Reef	16°29'S	146°06'E
139	Egmont Reef	16°31'S	145°32'E
140	Korea Reef	16°32'S	145°33'E
141	Wentworth Reef	16°31'S	145°31'E
142	Pixie Reef	16°35'S	145°52'E
143	Hastings Reef	16°31'S	146°E
144	Hope Reef	16°31'S	146°08'E
145	Michaelmas Reef (cay)	16°33'S to 16°37'S	145°57'E to 146°03'E
146	Oyster Reef	16°38'S	145°56'E
147	Middle Cay Reef (cay)	16°39'S	145°59'E
148	Fin Reef	16°37'S	146°09'E
149	Upolu Cay Reef (cay)	16°40'S	145°56'E
150	Arlington Reef	16°39'S to 16°45'S	145°57'E to 146°07'E
151	Green Island Reef (cay)	16°45'S	145°54'E
152	Euston Reef	16°41'S	146°15'E
153	Flynn Reef	16°44'S	146°16'E
154	Thetford Reef	16°49'S	146°11'E
155	Milln Reef	16°47'S	146°16'E
156	Moore Reef	16°52'S	146°13'E
157	Pellowe Reef	16°51'S	146°21'E
158	North West Reef	16°52'S	146°23'E
159	Elford Road	16°55'S	146°11'E to 146°18'E
160	Briggs Reef	16°56'S	146°12'E
161	Channel Reef	16°56'S	146°26'E
162	Sudbury Reef (cay)	16°57'S to 17°03'S	146°09'E to 146°17'E
163	Scott Reef	17°04'S	146°11'E
164	Maori Reef	17°06'S	146°20'E
165	Stevens Reef	17°06'S	146°24'E
166	Noggin Reef	17°08'S	146°28'E
167	Flora Reef	17°11'S	146°17'E
168	Coates Reef	17°12'S	146°22'E
169	Hedley Reef	17°15'S	146°28'E
170	Gibson Reef	17°18'S	146°22'E
171	McCulloch Reef	17°17'S	146°27'E
172	Howie Reef	17°21'S to 17°27'S	146°22'E to 146°25'E
173	Wardle Reef	17°27'S	146°32'E
174	Peart Reef	17°29'S	146°24'E

No.	Reef	Latitude	Longtitude
175	Cayley Reef	17°29'S	146°27'E
176	Feather Reef	17°32'S	146°23'E
177	Nathan Reef	17°32'S	146°30'E
178	Gilbey Reef	17°35'S	146°35'E
179	Hall-Thompson Reef	17°36'S	146°28'E
180	Adelaide Reef	17°40'S	146°39'E
181	Ellison Reef	17°43'S	146°24'E
182	Eddy Reef	17°46'S	146°26'E
183	Beaver Reef (cay)	17°51'S	146°29'E
184	King Reef	17°46'S	146°09'E
185	Potter Reef	17°42'S	146°33'E
186	MPA 17°No. 1	17°45'S	146°31'E
187	MPA 17°No. 2	17°47'S	146°39'E
188	Farquarson Reef	17°48'S	146°31'E
189	Taylor Reef (cay)	17°50'S	146°33'E

Listing of Coastal Fringing Reefs

A total of 22 unnamed coastal fringing reefs are shown in Queensland Department of Mapping and Surveying 1:100,000 cadastral maps, covering the Cairns Sections (14°18'S to 17°53'S), and the Aus. Series Admiralty Charts numbers Aus. 829, 830, 831, 832.

The term coastal fringing reef refers to reefs at the shoreline and extending continuously offshore. Isolated reefs within five kilometres of the shoreline are listed as independent reefs.

No.	Fringing Reef	Latitude	Longtitude
1		14°44'S	144°57'E
2		14°45'S	145°01'E
3		14°47'S	145°05'E
4		14°49'S	145°11'E
5		15°10'S	145°14'E
6		15°11'S	145°14'E
7		15°33'S	145°18'E
8		15°34'S	145°19'E
9		15°36'S	145°18'E
10		15°38'S	145°18'E
11		15°40'S to 15°46'S	145°21'E
12		15°47'S	145°21'E
13		15°53'S	145°21'E
14		15°56'S	145°23'E
15		15°58'S	145°25'E
16		16°S	145°26'E
17		16°03'S	145°28'E
18		16°04'S	145°28'E
19		16°06'S	145°28'E
20		16°13'S	145°28'E
21		16°16'S	145°28'E
22		17°43'S	146°06'E
23		17°47'S	146°06'E

List of Fringing Reefs around Islands and Rocks

A total of 11 fringing reefs around Continental islands and rocks are shown in the Queensland Department of Mapping and Surveying 1-100,000 cadastral maps and Admiralty Charts as lying within the Cairns Section.

No.	Location	Latitude	Longtitude
1	Lizard Island Reef (around Lizard Palfrey, Bird and South Islands)	14°38'S to 14°42'S	145°26'E to 145°28'E
2	North Direction Island Reef	14°44'S	145°30'E
3	South Direction Island Reef	14°48'S to 14°50'S	145°30'E to 145°31'E
4	Rocky Islets Reef	14°50'S to 14°52'S	145°28'E 145°29'E
5	High Rock Reef	14°49'S	145°33'E
6	Snapper Island Reef	16°18'S	145°30'E
7	High Island Island Reef	17°10'S	146°E
8	Normanby Island Reef (around Grange Rock and Normanby and Mabel Islands)	17°12'S to 17°13'S	146°04'E to 146°05'E
9	Russell Island Reef (around Russell and Round Islands)	17°13'S to 17°14'S	146°05'E
10	Kent Island Reef (around Kent, Bresnahan, Hutchison and Jessie Islands)	17°40'S	146°09'E to 146°11'E
11	South Barnard Group Reef (around Stephens and Sisters Islands)	17°44'S	146°09'E

Listing of Low Wooded Islands occurring within the outer boundaries of the Cairns Section

J.C.U.N.Q. "1" Classification:

1 = "low wooded island" (i.e. reefs capped by islands of reefal origin, generally including cemented deposits, extensive shingle ridges, spits or islets and often extensive mangrove development.

No.	Reef	Latitude	Longtitude
1	Nymph Island	14°39'S	145°15'E
2	Turtle Group - (6)	14°44'S	145°11'E
3	Two Isles - (2)	15°01'S	145°26'E
4	Low Wooded Isle	15°05'S	145°23'E
5	Three Isles - (3)	15°06'S	145°25'E
6	W. Hope Island	15°45'S	145°33'E
7	Low Isles - (2)	16°23'S	145°33'E

Listing of Sand Cays occurring within the outer boundaries of the Cairns Section

J.C.U. "v" Classification

v = vegetated sand or shingle cay - not applicable to category "1".

No.	Cay	Latitude	Longtitude
1	Michaelmas Cay	16°36'S	145°59'E
2	Pethebridge Islets - (2)	14°44'S	145°04'E
3	E Hope Island	15°44'S	145°28'E
4	Green Island	16°45'S	145°59'E

J.C.U. "c" Classification

c = sand or shingle cay, unvegetated not applicable to category "1" or "v".

No.	Cay	Latitude	Longtitude
1	Gull Reef	15°S	145°34'E
2	Pasco Reef	15°02'S	145°32'E
3	Swinger Reef Cay	15°15'S	145°32'E
4	Pickersgill Reef Cay	15°51'S	145°34'E
5	Mackay Reef Cay	16°03'S	145°39'E
6	Undine Reef Cay	16°06'S	145°39'E
7	Middle Reef Cay (Little Upolu)	16°39'S	146°E
8	Upolu Cay	16°40'S	145°56'E
9	Sudbury Reef Cay	16°57'S	146°08'E
10	Taylor Reef Cay	17°51'S	146°42'E
11	Beaver Reef Cay	17°52'S	146°29'E
12	Eye Reef Cay	14°53'S	145°28'E
13	Sth. Direction Is. Cay	14°49'S	145°30'E
14	Rocky Is. Cays - (2)	14°51'S	145°29'E
15	JCU 14°No. 31	14°52'S	145°32'E

Listings of Shoals, Patches, Banks and Rocks in Cairns Section

No.	Shoal	Latitude	Longtitude
1	Underwood Shoal	14°35'S	145°28'E
2	Stewart Shoal	14°36'S	145°28'E
3	Petricola Shoal	14°37'S	145°28'E
4	Crompton Shoal	14°42'S	145°16'E
5	Gunga Shoal	14°41'S	145°12'E
6	Jenny Louise Shoal	16°45'S	146°20'E
7	Hervey Shoal	17°03'S	146°28'E
8	Raaf Shoals	17°11'S	146°33'E
9	Surprise Shoal	17°36'S	146°25'E
10	Publican Shoal	17°16'S	146°37'E
11	Horshoe (Horseshoe) Shoal	17°42'S	146°34'E

No.	Patch	Latitude	Longtitude
1	Gill Patches	15°38'S	145°30'E
2	Baines Patches	16°49'S	146°21'E
3	Stagg Patches	17°01'S	146°08'E
4	Jackson Patches	17°16'S	146°18'E
5	Arthur Patches	17°23'S	146°21'E
6	Jones Patch	17°13'S	146°04'E
7	Malcolm Patch	15°37'S	145°26'E
8	Blackbird Patches	15°29'S	145°19'E
9	Draper Patch	15°32'S	145°18'E
10	Ottaway Patch	15°42'S	145°25'E
11	Stonor Patch	15°42'S	145°26'E
12	Delius Patch	15°42'S	145°24'E
13	Jorgies Patches	16°35'S	145°59'E (approx.)
14	Mustard Patches	17°18'S	146°37'E
15	Cayleys Patches	17°26'S	146°29'E

No.	Bank	Latitude	Longtitude
1	Ada Bank	15°S	145°28'E
2	Tilbrook Bank	15°S	145°31'E
3	Linden Bank	16°18'S	146°E
4	Goudge Bank	17°39'S	146°23'E

No.	Rock	Latitude	Longtitude
1	High Rock	14°49'S	145°33'E
2	Conical Rock	15°08'S	145°19'E
3	Bonner Rock	15°58'S	145°37'E
4	Meaburn Rock	17°34'S	146°10'E
5	Pratt Rock	16°09'S	145°37'E
6	Struck (Inch) Rock	16°10'S	145°26'E
7	Black Rock	16°14'S	145°29'E
8	Four Foot Rock	14°51'S	145°15'E
9	Grange Rock	17°12'S	146°05'E

Listing of Continental Islands occurring within the boundaries of the Cairns Section

No.	Island	Latitude	Longtitude
1	Lizard Island	14°40'S	145°28'E
2	Palfrey Island	14°41'S	145°26'E
3	South Island	14°42'S	145°27'E
4	Bird (Sea) Island	14°41'S	145°28'E
5	Rocky Islets (4)	14°51'S	145°28'E
6	North Direction Island	14°44'S	145°30'E
7	South Direction Island	14°49'S	145°30'E
8	Rocky Island	15°36'S	145°20'E
9	Snapper Island	16°18'S	145°30'E

APPENDIX TWO

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4. INITIAL ANALYSIS OF THE REPRESENTATIONS RECEIVED IN CONNEXION WITH THE NOTICE OF INTENT TO PREPARE ZONING PLANS FOR CAIRNS AND CORMORANT PASS SECTIONS

4.1 Overview:

4.1.1 Number of Representations

202 written Representations have been received.

4.1.2 Who Sent Representations

Representations were received from individuals, informal groups of families, friends and colleagues, and organisations.

91 representations were sent by individuals

28 representations were sent by informal groups (who, for this purpose are defined as representations with more than one signature)

83 representations were sent by organisations or clubs (who usually had a printed letterhead on their correspondence)

Of these, 30 were leisure time organisations and clubs

e.g. Cairns Marine Radio Club
Babinda Amateur Fishing Club
Cairns Shell Club

39 were business or professional organisations or clubs (operating during business hours)

e.g. Queensland Commercial Fishermen's Organisation
Cairns Reef World
Laroc Pty. Ltd.
Low Isles Cruises

5 were government or semi-government instrumentalities

e.g. Department of Defence
Department of Transport Australia
Cairns Port Authority
Queensland Government

9 were other organisations or clubs not mentioned above

e.g. Marine Research Foundation
Get Us Out of the U.N. Campaign
Trinity Jaycees
Queensland Conservation Council Inc.

4.1.3 Addresses on Representations

66% of those who sent representations gave an address within the Cairns Section or on the coastal strip (including Atherton Tablelands) adjacent to the Cairns Section

21 % of representations came from the rest of Qld
12.5 % were from other states
and only 0.5 % were from outside Australia

4.1.4. Number of Signatures

19 of the 202 (9.4%) representations were signed by more than one person.

This meant that 236 signatures were received.

One representation was unsigned.

4.1.5 Number of People On Whose Behalf Representations Were Made

15% of the representations specified the number of people on whose behalf the representation was being made. Specific reference was made to over 1,201,349 people.

4.1.6 Sections Mentioned in the Representations

In only 26% of the representations (i.e. 53) was the Cormorant Pass Section of the Marine Park specifically mentioned (see Table 4.1).

However it is difficult to tell whether those who sent representations in which only the Cairns Section was mentioned meant their recommendations to refer to the Cormorant Pass Section as well, and used the "Cairns Section" as a shorthand version of the Cairns and Cormorant Pass Sections of the Marine Park.

TABLE 4.1 MENTION OF CORMORANT PASS

Cormorant Pass mentioned on heading	Cormorant Pass mentioned specifically in the text	Potato Cod mentioned specifically
31	32	8

4.1.7 Reef Experience Mentioned

50 people (25%) who sent representations said that they had had first-hand experience of a reef somewhere in the world.

Of the number of people who mentioned how many years they had been visiting the Great Barrier Reef

12 stated under 5 yrs

11 stated between 5 and 10 yrs

8 stated between 10 and 20 yrs

and 19 stated over 20 years

4.2 Preliminary Content Analysis

4.2.1 General Matters Raised in the Representations

In the ~~199~~ 202 representations analysed so far

167 ~~164~~ 82.7 (82%) representations contained information and/or recommendations on fishing matters.

111 ~~109~~ 55 (55%) on tourism and recreation matters.

84 ~~82~~ 41.6 (41%) on conservation matters.

148 145 (73%) on specific zoning matters.