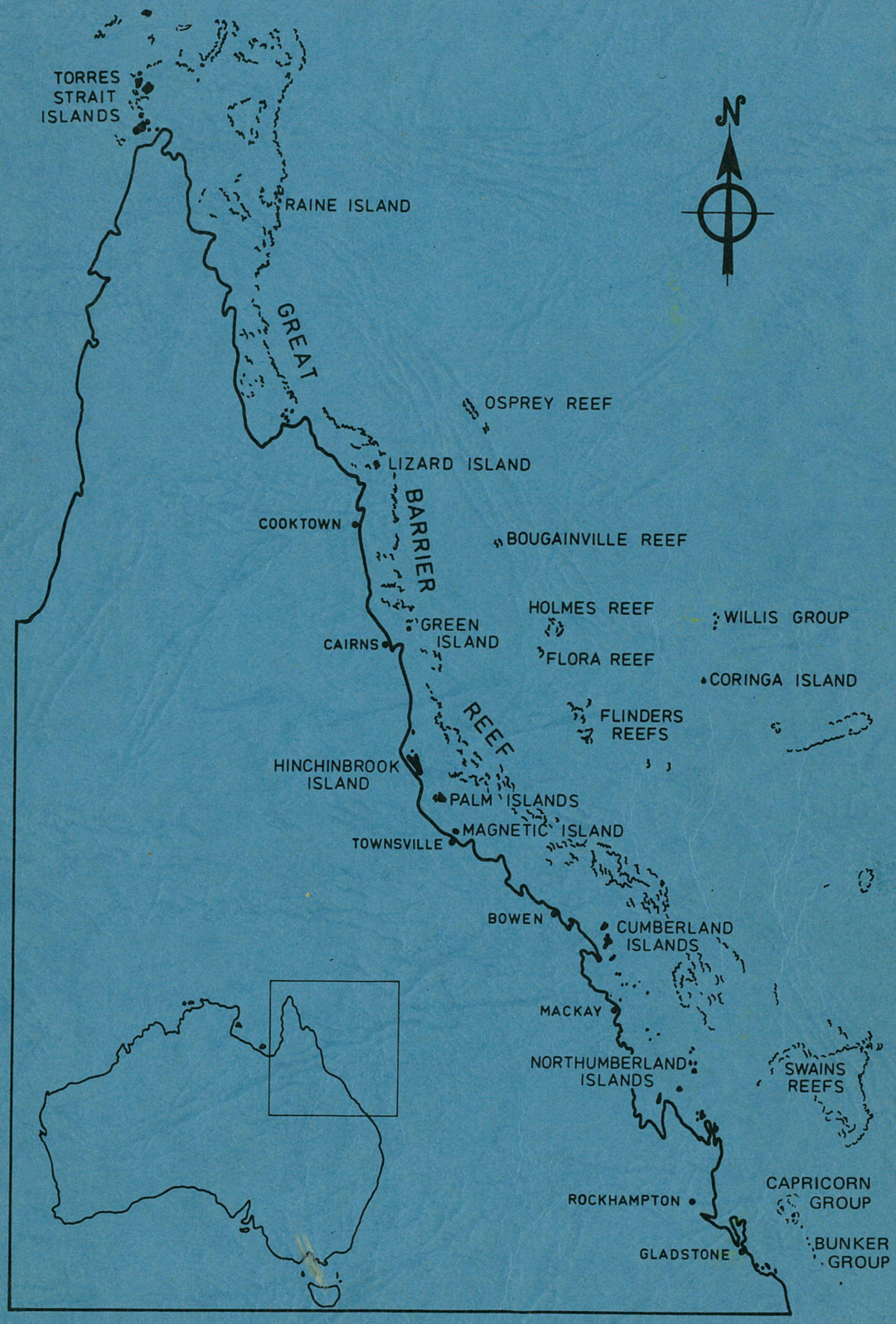

OECD CASE STUDY THE IMPACT OF TOURISM ON THE ENVIRONMENT : HERON ISLAND.

A CASE STUDY PREPARED BY THE GREAT BARRIER REEF MARINE PARK AUTHORITY FOR THE O.E.C.D. ENVIRONMENT COMMITTEE GROUP OF EXPERTS ON THE ENVIRONMENT AND TOURISM.

GBRMPA REPORT STATUS

TITLE: OECD Case Study: The Impact of Tourism on the Environment: Heron Island.

AUTHOR: GBRMPA

AUTHORITY ACCEPTANCE OF REPORT: MPA: 57

DATE: 8 December, 1982.

DECISION relating to acceptance of report:

The Authority accepted the report specified above.

DECISION relating to publication of report:

(OECD will be publishing the report.)

Name of Project Officer: Grant Hawley.

ORGANISATION FOR ECONOMIC
CO-OPERATION AND DEVELOPMENT

Environment Directorate

ENV/TOUR/77.2
Scale D

RESTRICTED

Paris, 16th September 1977

To: Members of the Group of Experts on the Environment and Tourism

(Copy to National Delegations)

Or. English

GUIDELINES FOR THE CASE STUDIES CONCERNING TOURISM AND THE ENVIRONMENT

The attached note contains the directions and guidelines for case studies to be prepared by Member countries. An earlier version of these guidelines have already been sent out for comments and advice, and the replies have been incorporated into this document.

PREFACE

As agreed at the 1st meeting of the Group of Experts on the Environment and Tourism (ENV/TOUR/77/M1) we are enclosing the guidelines for the case studies to be undertaken by participant Member countries. The purpose of the guidelines is to:

a) ensure that case studies focus on problems which emerged as the main issues in the Environment/Tourism context at the meeting of the Group.
b) to ensure a degree of uniformity and comparability between the case studies of the different countries,
c) to assist countries in their undertaking of the study in an area which has hitherto received little attention.

The guidelines, and in particular the data requirements are set out in some detail, and have been prepared with the aim of covering a large variety of tourist areas which occur in Member countries. As a consequence of this, some of the questions will be napplicable for certain case studies. Furthermore it is most likely that long series of precise data will not be available for some of the series suggested. This is likely to be particularly true for environment related questions, where a quantification of environmental changes is rather difficult.

Consequently, the suggested outline of these guidelines should be regarded as an 'ideal' set of guidelines for which the studies should aim for but is not likely to be completely achieved in the majority of cases.

It is also realized that the suggestion to carry out two parallel case studies for each country could be expensive in terms of resource requirements, and the suggestion has been put forward again as an ideal case, rather than as a strict requirement.

As set out under the 'Definition of the problem' on pages 1 & 2 the basic aim is to attempt to answer the three questions defined in that section. It is possible that some countries may find it easier to approach the problem raised in those questions on the basis of already completed case studies.

A suggested time-table is also set out in the guidelines and although it is realized that this time-table is very tight, it is hoped that countries will be able to adhere to it.

The Secretariat will be available, within reasonable limits, to provide professional advice both in setting up the study, and in particular writing the conclusions once the necessary data have been collected and analysed.

INTRODUCTION

The rapid economic growth experienced by most industrialized countries since the early fifties has resulted in not only large increases in disposable income, but also in substantial reductions in working hours. This growing affluence in combination with increased leisure time (and vastly improved means of transportation) has, in turn, led to a rapid growth in the demand for tourist services.

In response to this growing demand, large investments have been made in tourist related facilities by both private interprises and public authorities.

Countries deciding to promote the development of a tourist industry to provide services do so in the hope of achieving a number of economic objectives also, the most important of which are:

a) an inflow of foreign exchange,
b) the creation of new jobs,
c) an increase in government revenue,
c) the development of certain regions.

The basic prerequisites for a successful development of a tourist industry are:

- climatic conditions favorable for tourist activities.
- a natural potential for various recreational activities (like, for example, swimming, boating, fishing, hiking, ski-ing, etc.),
- areas of scenic beauty,
- places of historical interest,
- an interesting cultural and social environment.

However, in order to draw full economic benefits from these "natural resources", substantial amounts of both capital and labour are needed. Thus, large investments are generally required for:

- infrastructure (providing public services like electricity, water etc.),
- accomodation (eg. hotels, camping and caravanning sites etc.),
- recreational facilities (eg. ski-lifts, swimming pools, tennis-courts, golf- courses, hiking trails, picnic areas etc.),
- other service facitlities (eg. restaurants, night-clubs, boutiques etc.).

Thus, the development of a tourist industry is associated with certain costs. These costs are not only those arising out of investments of labour and other operating expenses in the provision of tourist services, but also include substantial "intangible" costs. Among those, the most important are:

a) the possible deterioration of environmental quality, and
b) the possible negative effects of tourist behaviour on traditional social and cultural values.

DEFINITION OF THE PROBLEM

As the consequence of this, there has been lately a growing concern in some OECD cointries about the environmental costs associated with the growth of the tourist industry. Attention has been drawn to a number of specific cases where the development of tourism has resulted in substantial deterioration of environmental quality.

Critics of the development of tourism have argued that the environmental quality deterioration has reduced the net benefit of the tourist project in two ways, namely:
a) directly, by increasing the social costs of tourism and
b) indirectly, by causing a decrease in the number of tourists visiting the affected areas (leading in turn to a decrease in the income derived from tourism).

The additional costs of a tourist development policy without negative environmental impact would, according to these critics, be fully offset by the benefits of avoiding the above-mentioned negative effects of present tourism policy.

These arguments raise three important questions, namely

1) Under which circumstances does the development of a tourist industry result in a deterioration of environmental quality?

2) To what extent does a deterioration of environmental quality in a particular area result in a decrease in the number of tourists visiting that area?

3) Is it possible to design a tourist development policy that has no negative environmental impact and, if so, what would be the costs of such a policy?

THE SCOPE OF THE STUDY

In order to answer the questions raised above, it would be ideal to select and analyse at least two cases of tourist development - one with and one without significant deterioration of environmental quality.

Other significant parameters in the selection of sites could be:
a) the precise definition of area, preferably very small (eg. one village, one beach resort),
b) the existence of only one or two major tourist attractions,
c) the existence of one (or only a few) environmental problems which could be regarded as serious,
d) those where data is likely to be avoidable in relatively long periods

The first step of the analysis would be to compare the various components of the tourist development policy in the two cases. If such a comparison would disclose significant differences in the policies pursued in the two cases, the second step of the analysis would be to determine whether these policy differences could explain the difference in environmental impact. Such analyses would obviously require rather detailed information about the different components of the tourism development policies in the two cases.

The third step of the analysis would be to check if there has been any differences in the tourist flow which could possibly be attributed to the difference in environmental impact associated with the tourist development policies in the two cases. This part of the analysis would require reliable time-series for some indicators of environmental quality as well as relaible data on tourist flows.

The final step of the analysis would be to calculate the difference in cost between the two tourist development policies. This difference will consistitute a measure of the cost of avoiding the type of environmental quality deterioration experienced in one of the cases. This cost should finally be compared with the corresponding benefits (ie. the avoidance of the direct and indirect costs associated with an environmental quality deterioration).

Time series for the data

For the successful carrying out of the project it is highly desirable to obtain and investigate a relatively long series of data for the region in question. It is possible that for some of the series only very recent data is available, or it might be necessary to collect new information for the current year.

Procedure for carrying out the analysis

a) Case studies to be prepared specifically for the project:
   - selection of sites by governments on the basis of the guidelines,
   - collection of data undertaken by Member governments with occasional assistance from the Secretariat,
   - analytical work to be carried out jointly by Member countries and the Secretariat,
   - final output of the case study to be drafted jointly.

b) Case studies already available in Member countries:
   - either can be used in their existing form for the conclusions of the project,
   - or can be modified by the country to be more in line with the outlines of the new case studies.

Expected timing and results

a) The case studies to be commenced immediately.

b) First review of the selected cases and data during October for the November meeting of the Group.

c) Finalisation of the case studies by the end of February.

d) Draft synthesis report by June 1978.

SUGGESTED DATA REQUIREMENTS

In order to facilitate data collection and the carrying out of the investigation by those Member countries who have volunteered to prepare case studies, the following set of guidelines have been prepared.
(1)

A THE GENERAL BACKGROUND

1. Name and Location of area

2. Size and topography of area. Map showing built-up areas, agricultural land, woodland etc.

3. Natural potential and principal attractions for tourists:

   3.1 Climate
   3.2 Potential for recreational activities
   3.3 Areas of scenic beauty
   3.4 Places of historical and cultural interest

Definition of Tourism

4. Breakdown of tourist purpose

   4.1 Recreational
   4.2 Cultural
   4.3 Business and Conferences
   4.4 Other

5. Tourist Composition

   5.1 National
   5.2 International (specify nationality distribution)
   5.3 Specify proportion of 'mass-tourism' (eg. large tour operations, charter organisations etc.)
   5.4 Specify proportion of de-luxe, exclusive tourism.
   5.5 Specify proportion of low expenditure camping, touring type of tourism.
   5.6 Other

6. Seasonal aspects of tourism

   6.1 Summer
   6.2 Winter

7. Length of stay

   7.1 Short duration (eg. less than one month)
   7.1.1 Weekends
   7.2 Long duration (eg. more than one month)

(1) For all entries, except those marked with an asterisk * data should preferably be given for each year from the starting year of tourist development ie. ten years, or as far back as possible.

8. Economic activities (description)

   8.1 Industrial
   8.2 Agricultural (including fisheries)
   8.3 Other (including tourist industry)

9. Size of permanent population

   9.1 Urban
   9.2 Non-urban

10. Employment

   10.1 Industrial
   10.2 Agricultural (incl. fisheries)
   10.3 Public services
   10.4 Private services
   10.5 Tourism
   10.6 Unemployed

B ECONOMIC DIMENSIONS OF THE TOURIST ENVIRONMENT

CAPACITY:

1. Tourist accomodation capacity

   1.1 Hotels and pensions
   1.2 Camp and caravan sites
   1.3 Other

2. Average cost of accomodation (c9st/night)

   2.1 Hotels (specify with or without meals)
   2.2 Camp sites etc.
   2.3 Other

3. Average monthly occupation rate

   3.1 Hotels
   3.2 Camp sites
   3.3 Other

4. Ratio of second homes to tourist hotels and pensions

5. Ratio of camping sites etc. to tourist hotels and penisions

6. Number and capacity of recreational facilities

   6.1 Ski-lifts
   6.2 Beaches
   6.3 Swimming pools
   6.4 Tennis courts
   6.5 Golf curses
   6.6 Hiking trails
   6.7 Picnic areas
   6.8 Others (specify)

7. Capacity of environment related public services. (Percent of peak population served.)

    7.1 Sewers i.e. ration of buildings connected to sewage
        7.1.1 Type and efficiency of treatment plant
        7.1.2 Mode and location of water discharge
    7.2 Solid waste collection i.e ratio of buildings to waste collection
        7.2.1 Frequency of collection
        7.2.2 Method of disposal

8. Capacity of other public services

    8.1 Utilities
    8.2 Communications
    8.3 Transportation
    8.4 Health
        8.4.1 Number of Hospital beds
        8.4.2 Number of first aid stations
    8.5 Other (e.g. Law and order provisions)

9. Size of private service sector

    9.1 Shops, boutiques, etc.
    9.2 Restaurants, bars etc.
    9.3 Night clubs, theatres, etc.
    9.4 Casinos, etc.
    9.5 Other (specify)

EXPENDITURE AND INCOME.

10. Average daily tourist expenditure

    10.1 Total (excluding accommodation)
        10.1.1 Food
        10.1.2 Entertainment
        10.1.3 Souvenirs
        10.1.4 Other

11. Cost of living indices for tourism (including accommodation)

    11.1 Composite
    11.2 Individual

12. Public revenues from tourism (specify item and whether local or federal income

    12.1 Tourist taxes
    12.2 Property taxes and rates
    12.3 Sales tax
    12.4 Gambling tax

13. Investments for public services (specify proportion from local or federal funds)

    13.1 Sewers and treatment plants
    13.2 Solid waste, collection and disposal
    13.3 Utilities
    13.4 Communications
    13.5 Transportation
    13.6 Health
    13.7 Recreational facilities and areas accessible to the public
    13.8 Central government grants for tourist services and environment
    13.9 Other

14. Operating costs for public services (specify whether inclusive or exclusive of capital costs)

    14.1 Sewers and treatment
    14.2 Solid waste collection and disposal
    14.3 Utilities
    14.4 Communications
    14.5 Transportation
    14.6 Health
    14.7 Recreational facilities and areas accessible to the public
    14.8 Other

15. Investments for private services (specify whether domestic or foreig funds)

    15.1 Accomodation
    15.2 Shops, etc.
    15.3 Restaurants, etc.
    15.4 Night clubs, etc.
    15.5 Other (specify)

C INSTITUTIONAL AND LEGAL INFORMATION

1. Public regulations affecting the tourist industry (specify dates)

2. Public authorities responsible for implementing tourist policy (local, regional and national):

    2.1 Raising revenue
    2.2 Passing regulations concerning
        - buildings
        - roads
        - hygiene
        - tourist development
        - environmental matters.

D THE IMPACT OF TOURISM ON THE ENVIRONMENT

1. Trace the effects of major tourist developments on the environment. (As a guide to this section see Annexe which includes a systematic framework for data collection and analysis of the relationship between tourism and the environment.)

    1.2 Generation of waste residuals
        - service industries
        - urbanisation
        - transportation.

    1.2.1 Impact of waste on the environment
        - change in quality of air
        - change in quality of water
        - change in quality of land (soil)
        - health of biological species
        - health and welfare of man.

1.3 Permanent restructuring of the environment

1.3.1 Major construction activity
- Transport networks (roads, airports)
- Energy networks
- Urban expansion (hotels, services)
- Reservoirs, irrigation networks.

1.3.2 Change in land use
- Expansion of recreational lands
- Expansion of agricultural uses.

1.3.3 Impact of permanent restructuring of the environment on

- Habitats and populations of biological species
- Habitats and welfare of man

2. Individual and Collective response to environmental change.

(See Annexe 1)

2.1 Individual
- reaction of local residents (adaptation, protest, change in attitudes to the environment)
- reaction of tourists (change in attitudes to the environment, decline in tourist revenue)

2.2 Collective
- government expenditure on clean-up and pollution abatement
- government policy on conservation, national parks etc.
- expenditure on management and maintenence of services
- creation of environmental "ethics " and propaganda
- regulation and planning of tourist industry.

QUALITATIVE INFORMATION

1. Ad hoc surveys of
   - perception and attitudinal changes regarding environment
   - recreational use of natural resources
   - travel habits, commuting and holiday

2. Impact of tourism on local life styles, crafts and culture.

3. Impact of tourism on surrounding area hinterland

   3.1 Environmental
   3.2 Economic
   3.3 Socio-cultural

4. Impact of tourism on historical sites

5. Photographic information, maps etc.

6. A summary of the broader economic aspects.

7. If using a concept of 'carrying capacity' please give an operational definition.

ANNEX A SUPPLEMENTARY EFFORT TO SYSTEMATIZE THE RELATIONSHIP BETWEEN TOURISM AND THE ENVIRONMENT

In order to assess the relationship between tourism and the environment, a framework has been prepared, (see attached tables) This framework has been developed within the Environment Directorate at the OECD, in connection with the work programme on "Environmental Statistics and Indicators on the state of the Environment".

The aim would be the collection of series of data which link the impact of tourist development in terms of:
a) Measurable stress on the environment (eg. activities such as the generation of waste, or the permanent restructuring of the environment-buildings, roads etc.).
b) Measurable environmental response (eg. quality of air, water, land).

This framework allows for the consequent generation of defensive response to environmental stress. These exist at two levels:
a) Individual reaction
   (i) local residents - protest
   - change in attitudes towards the environment.
   - adaptation (eg. recycling, use of technological aids such as air-conditioning)
   (ii) Tourists - Reduction in tourist numbers, effect on revenue
   - alteration in tourist market (eg. change from deluxe to mass tourism)

b) Collective reaction

Measures taken by governments, local authorities, tourist agencies to regulate man-made stress on the environment including policies, expenditures and propoganda.

The table on page 11 & 12 is designed to show the kinds of relationships assumed by the framework. The main classes of stress activity to which tourism can contribute include:
1 generation of waste residuals
2 permanent restructuring of the environment
3 population dynamics.
Tourism itself constitutes a response to changes in the environment and as such can be used as an indicator of altering attitudes and expectations. The measures listed above can provide an indication of tourist response to man-made environmental stress. The final indicator of stress activity (listed below) is included to assess the synergetic relationship between man-made and natural events (climate etc.) which contribute to a change in environments, the secondary consequences can perhaps be measured in tourist behaviour.
4 The effect of natural activity on environments.

SUGGESTED DATA SOURCES
Stressor measures - derived from macro and micro statistics
eg. tourist activity and development, population density, transport networks (see page 4-8 in guidelines)

Stress measures
- derived from micro-statistics, monitoring data location specific.
eg. emissions of pollutants, noise etc.

Environmental response
- micro-statistics, location specific
eg. concentration of pollutants in environmenta media, disappearance of biological species and/or habitat, incidence of morbidity.

Human response
- macro-statistics related to expenditure incurred as a result of the implementation of policy
- policy and programmes
- environmental law or "ethic"
eg. pollution abatement expenditure, designated land uses for National parks, wildlife refuge, and landscape preservation.

(1) See U.N. Statistics Commission, Conference for European Statistician
"Statistics for Environmental studies and policies" CES/AC/40/2 Geneva Feb. '73
"Steps towards a system of Environmental statistics" CES/Sem 6/2 Geneva, Sept. '7
"Urban Environmental Indicators: a tool to assess man's urban environment" ENV/(76) 52, Environment Directorate, OEC Paris Dec. '76
See also documents submitted at the "Special meeting on Urban, Environmental indicators", Environment Directorate OECD Paris Sept. '76

It is thought that the attached table will provide a useful abbreviation of the problems under question in this project, as it helps to focus the attention of the Group on the environmental aspect. It has been developed with the aim of assisting the compilation of the case studies in conjunction with the guidelines.

TOURISM AND ENVIRONMENTAL STRESS

ENV/TOUR/77.2

STRESSOR ACTIVITIES	STRESS	PRIMARY RESPONSE ENVIRONMENTAL	SECONDARY RESPONSE HUMAN	STOCK
1. Generation of waste residuals - service industries - urbanisation - transportation	1. Pollution loadings - emissions - effluent discharges - solid waste disposal - noise (traffic aircraft etc)	1. Change in quality of environmental media - air - water - land (soil) 2. Health of biological organisms. 3. Health of humans.	1. Individual defensive measures locals - air conditioning - recycling of waste materials - protests and attitude change tourists - change of attitude towards the environment - decline in tourist revenue etc. 2. Collective defensive measures - expenditure on pollution abatement by tourist related industries - expenditure by government on waste treatment plants - clean-up of rivers, beaches, etc.	(see page 6 and 7 in Guidelines)
2. Permanent Environmental Restructuring a) Major construction activity - Trasnport networks - Energy networks - Urban expansion - Reservoirs, irrigation networks. b) Change in land use - Expansion of recreational lands - Expansion of agricultural uses.	2. Restructuring of local environments - land taken out of primary production - land flooded by reservoirs - access of man to wilderness	1. Change in habitat 2. Change in population of biological species 3. Change in health and welfare of man	1. Individual - impact on aesthetic values 2. Collective measures - expenditure on environmental improvements, - expenditure on management of conservation - designation of wild life conservation and National parks - controls on access to recreational lands	1. Stock of man-made infrastructure 2. Land use designation for national parks, wildlife conservation and landscape preservation.

STRESSOR ACTIVITY	STRESS	PRIMARY RESPONSE	SECONDARY RESPONSE	STOCK
Effect of tourism on population dynamics 1. Population growth 2. Population movement	1. Population density (seasonal) 2. Population movement to better climate (seasonal and permanent)	1. Demand for natural resources - land and water energy - man-made infra-structure	1. Expenditure on urban and regional planning, including tourist policies 2. New housing stock 3. Growth in support services 4. Perceptions and attitudes towards overcrowding and the environment	1. Demographic census 2. Housing stock

IMPACT OF NATURAL ACTIVITY

Natural Activity				
1. Changes in climate (long term) 2. Temporary variation in climbate 3. Area of 'high probability' of violent geo-physical events	1. Extremes in seasonal climat i.e. above and below normal range 2. Geo-physical events	1. Harvest variation 2. Floods and droughts 3. Loss of life and livelihood	1. Alteration in tourist use patterns 2. Expenditure to combat the effect of extreme weather conditions or serious geo-physical events	1. Mapping of the natural region - physical features, - climate, soil, - ecological zones.

CASE STUDY: THE IMPACT OF TOURISM ON THE ENVIRONMENT: HERON ISLAND

Contents:

Figures

APPENDIX

Acknowledgements

- Cover map and figure 1... Australian Underwater Federation "The Great Barrier Reef a divers guide" P. Saenger (Ed) Brisbane 1977

- Figure 2... Survey Office. Department of Lands, Brisbane

- Figure 4... Director, Queensland National Parks and Wildlife Service, Brisbane.

- Appendix II "Heron Island Fishing Guide", "Divers' Guide to Heron Island" Heron Island Pty Ltd.

A. The General Background.

This case study on the interrelationships of tourism and the environment has been prepared by the Great Barrier Reef Marine Park Authority. The Authority is a Commonwealth Government organisation within the Department of Environment, Housing and Community Development.

The study area, known as Heron Island is situated on the Australian Great Barrier Reef. The island was chosen as it represented an area where the effects of human habitation since the 1920's on a coral cay/reef compex could be studied. Scientific and tourist interests presently utilise the island and surrounding reef.

Various attempts at retrieving information relevant to all facets of the O.E.C.D. guidelines were made; however little data was available for Section B. Information of this type is not available either from the organisations on the island or the Government.

Appendix 1 contains two questionnaires designed by the Great Barrier Reef Marine Park Authority. The questionnaires were deemed necessary to retrieve the available information. The questionnaires were mailed to the respondents one month prior a follow up personal interview. Although additional information relevant to many facets of the study undoubtedly exists, it was not possible to collect and analyse the data for this study.

Despite the limited resources which the Authority could direct to the study, it has nevertheless proven extremely fruitful to the Authority as a baseline study on the relationships between tourism and the environment, and will provide the basis for the measurement of future yearly trends.

1. Name and location of the area:

The Great Barrier Reef comprises some 2,500 reefs, shoals and coral island cays*, lying on a 2,000 kilometer section of the north-eastern continental shelf of Australia. The Great Barrier Reef has evolved to its present shape largely through the accretion of minute skeletons of a single celled animal known as a coral polyp and cementation processes associated with coralline algae. These form an underlying skeleton of lime. The majority of coral polyps and algae are colonial in form. Geologically there have been coral reefs off the north-eastern coast of Australia since the Devonian period. Their relative positions have been determined through contemporary sea levels. Running north-easterly from approximately 24°30' south, the Great Barrier Reef parallels the coast of Queensland (one of seven States in the island continent of Australia) and extends to the shores of Nuigini.

The Lady Elliott Island and the Bunker and Capricorn Groups of reefs and island cays form the southern most portion of the Great Barrier Reef (See figures 1 and 2). They are physiographicall distinct from other reefs in the Great Barrier Reef province in that they are an aggregation of individual reefs and vegetated cays lying along a deep sea landform known as the Bunker and Capricorn Ridge. This ridge is isolated from the coastal landscape by the Curtis Channel and from the more northerly province of the Great Barrier Reef by the Capricorn channel, both areas of deep sea.

The main portion of the Great Barrier Reef consists of a broken chain of submerged reefs some 1,600 kilometers in length and up to 60 kilometers in width, with relatively few land forms above water. Great Barrier Reef waters support a myriad of specially adapted and interdependent animals and plants. Coral cays feature a distinctive vegetation and provide important nesting areas for migratory sea-birds and turtles.

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* A cay is similar in formation to a large sandbank. Cays are composed of coral rock and sand deposited by wind and wave action o the leeward side of drying reefs. Cays can reach 200 hectares in area, however the majority are small. Cays are dependent on the weather for their permanency and some develop a distinct vegetation covering. Once vegetation is established a soil is developed from decomposing vegetable and bird guano material. Cays are found more to the northern and southern, than the middle portions of the Great Barrier Reef.

LOCATION OF STUDY AREA

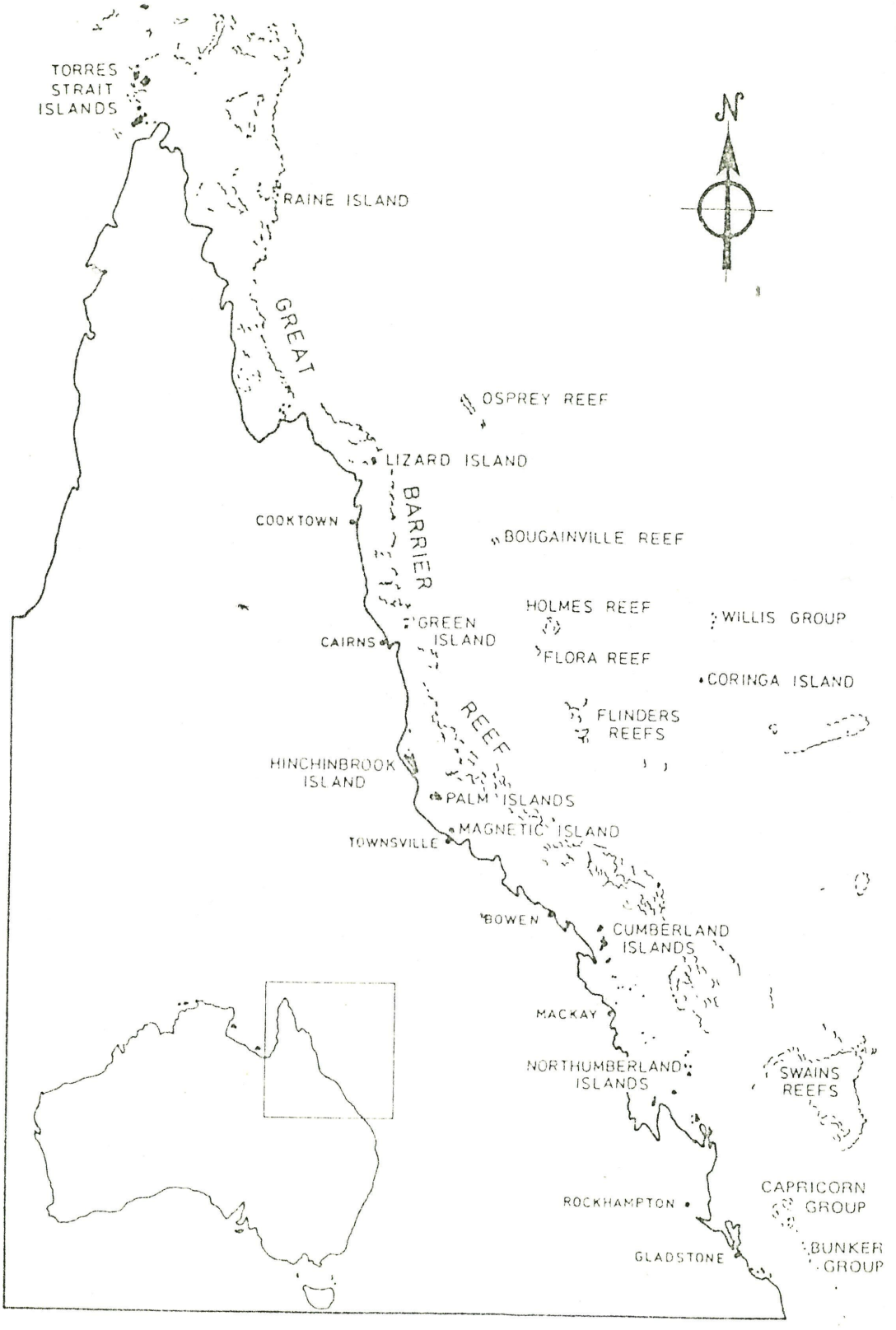


figure 1....

THE LADY ELLIOTT ISLAND , BUNKER AND CAPRICORN GROUPS

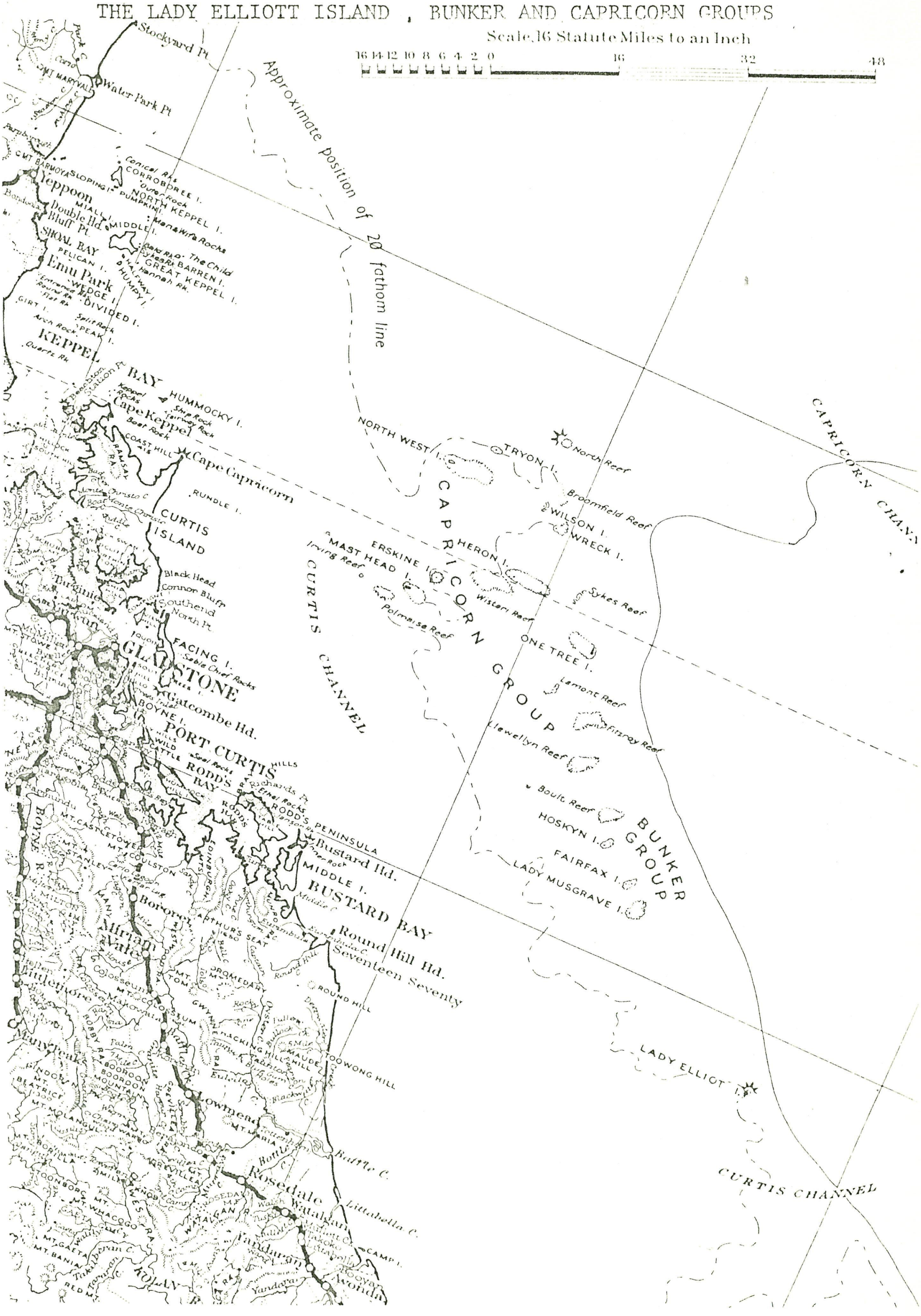


figure 2

The coral reefs have great aesthetic appeal, being diverse in species and rich in shape and form. The fish and sedentary fauna is bizarre and colourful. Underwater scenery such as cliffs, caves and coral covered boulders provide a great number of interesting sites for diving, fishing and exploring.

The social and economic history of the Great Barrier Reef includes expoloitation of fish and sedentary organisms by Macasson fishermen for perhaps centuries prior to European discovery and settlement in Australia. Commercial fishing continues today by Australian and overseas fleets which exploit the deep sea fish resources and some sedentary organisms. Although the Great Barrier Reef has not played a significant role in the Australian economy to date, its potential for further commercial fishing, tourism and other recreational activities is becoming recognised.

The Lady Elliott Island, Bunker and Capricorn groups of reefs and coral cays constitute the most accessible section of the Great Barrier Reef to the more populated southern parts of Australia (see figures 1,2,3). Several of the coral cays are popular for camping and day visits. Only Heron Island cay and Lady Elliott Island cay have permanent structures for residential tourism. Heron Island cay situated on the Capricorn Ridge is the only cay to have had continuous human occupation since its use as a turtle canning site during the 1920's. The cay is approximately 65 kilometers east of the coastal city of Gladstone and has transport connections from that city via passenger ferry and helicopter.

Gladstone had an estimated population in 1977 of 19,000. Major industries include the world's largest alumina refinery, and Queensland's biggest electricity generating power station. The city is accessible by road, rail, air and sea. Gladstone is acknowledged as the main port for access to the southern section of the Great Barrier Reef. Tourist facilities in Gladstone are in a development stage. The Airport terminal is small and uninviting. At all disembarkation points there are no garage or lockup facilities for motor vehicle owners. Tourist agents seem unaware of the potential of the local area and have few "off-beat" ideas for day or weeklong trips.

figure 3...

Geographics

FEATURE (1)	LOCATION (2) Latitude South ° '	LOCATION (2) Longitude East ° '	PRESENT TENURE (3) (Island Only)	REEF TYPE	AREA (HECTARES) Reef Bank or Shoal	AREA (HECTARES) Island	AREA (HECTARES) Total	APPROXIMATE DISTANCES TO (i) Gladstone	(ii) Yeppoon (in nautical miles)
Innamincka Shoal	23 01	151 50			60	-	60	60	58
Haberfield Shoal	23 02	151 44			60	-	60	55	55
Guthrie Shoal	23 03	151 51			60	-	60	58	63
Douglas Shoal	23 06	151 39			120	-	120	48	50
North Reef Island	23 11	151 54	Ownership transferred to Commonwealth	Platform	295	15	310	53	62
Tryon Island	23 15	151 47	Vacant Crown Land State of Queensland	Platform	190	30	220	46	57
Brew Shoal	23 16	151 45			60	-	60	44	54
North West Island	23 18	151 42	Vacant Crown Land State of Queensland	Platform	3000	125	3125	41	53
Broomfield Reef	23 16	151 56		Lagoonal Platform	720	-	720	50	65
Wilson Island	23 18	151 55	Vacant Crown Land State of Queensland	Platform	145	10	155	46	64
Wreck Island	23 20	151 57	Special Lease No. 33716 J.Booth expiry 31/12/79	Platform	470	30	500	48	68
Rock Cod Shoal	23 41	151 37			625	-	625	22	53
Irving Reef	23 33	151 38		Platform	190	-	190	27	54
Polmaise Reef	23 34	151 41		Platform	820	-	820	29	56
Masthead Island	23 32	151 44	Recreation and Scientific Reserve State of Queensland	Platform	640	40	680	32	58
Erskine Island	23 30	151 46	Vacant Crown Land State of Queensland	Platform	95	5	100	39	59

....(continued)

figure 3 (cont)

Geographics

FEATURE[1]	LOCATION[2] Latitude South ° '	LOCATION[2] Longitude East ° '	PRESENT TENURE[3] (Island Only)	REEF TYPE	AREA (HECTARES) Reef Bank or Shoal	AREA (HECTARES) Island	AREA (HECTARES) Total	APPROXIMATE DISTANCES TO (i) Gladstone (ii) Yeppoon (in nautical miles)	
Wistari Reef	23 28	151 52		Lagoonal Platform	2250	-	2250	41	65
Heron Island	23 27	151 55	Heron Island Research Station Board 2.023 hectares expires 31/3/92 Heron Island P/L non competitive lease 4.65 hectares and helipad. National Park State of Queensland	Lagoonal Platform	2700	20	2720	43	66
				Wall	630	-	630	49	73
Sykes Reef	23 26	152 03							
One Tree Island	23 30	152 05	Special Lease Trustee of the Australian Museum lease expires 31/7/84	Lagoonal Platform	1290	20	1310	49	76
				Wall	310	-	310	46	77
Lamont Reef	23 26	152 03		Closed Ring	1380	-	1380	50	84
Fitzroy Reef	23 37	152 08		Closed Ring	1440	-	1440	52	85
Llewellyn Reef	23 42	152 20		Closed Ring	600	-	600	56	92
Boult Reef	23 45	152 16							
Hoskyn Islands	23 49	152 18	National Park State of Queensland	Platform	285	25	310	55	93
Fairfax Islands	23 52	152 22	National Park State of Queensland	Platform	315	60	375	61	97
Lady Musgrave Island	23 55	152 24	National Park State of Queensland. Portion subject of special lease for permanent occupancy Commonwealth of Australia for Automatic Light Station	Closed Ring	1050	60	1110	62	99

(continued)

figure 3 (cont) Geographics

FEATURE(1)	LOCATION(2) Latitude South ° '	LOCATION(2) Longitude East ° '	PRESENT TENURE(3) (Island Only)	REEF TYPE	AREA (HECTARES) Reef Bank or Shoal	Island	Total	APPROXIMATE DISTANCES TO (i) Gladstone (ii) Yeppoon (in nautical miles)	
Lady Elliott Island	24 07	152 43	Commonwealth of Australia (transferred Property). Adams 55 acres, 5 year lease	Platform	70	60	130	80	124
Herald Patches	24 13	152 42			1910	-	1910	80	124
Johnson Patch	23 05	151 37						47	46
Goodwin Shoal	22 55	151 44						62	64
Edgell Bank	22 53	151 46						64	58
Moresby Bank	22 52	151 43						65	57
Karamea Bank	22 39	151 32						73	52

Footnotes

(1) The following terminology has been derived from The Australia Pilot Volume 111 (1973) and The Mariner's Handbook (1973)

island - a permanent or vegetated coral cay
shoal - a feature which does not emerge at low water of Spring Tides
bank - a small shoal.

A patch is similar to a shoal
For reef types refer to (4) below.

(2) Location (latitude and longitude) have been determined using The Australia Pilot Volume 111 (1973) and the charts BA345, BA346, (British Admiralty) and maps Rockhampton, Heron Island, Bundaberg (1:250,000 topographical series Division of National Mapping).

(3) Present Tenure given by The Commonwealth Survey Office, Brisbane (personal communication)

figure 3.(cont)

2. Size and topography:

Heron Island cay has a total area of twenty hectares. The cay is located on the western extremity of the Heron Island reef which has an area of 2,700 hectares. The Heron Island tourist resort is located at the western end of the cay on a lease from the Queensland Government of 4.65 hectares. The remainder of the cay is a gazetted Queensland National Park, with the exception of a special lease of 2 hectares upon which the Heron Island Research Station is located (see figure 4).

The cay is flat domed in shape. Maximum height above sea level is six metres. The largest part of the island is heavily forested by the soft wooded broadleaf tree *Pisonia grandis* which excludes most understoreys. Encircling the *Pisonia* forest is a ring of grasses and spinifex species. Secondary shrubs include *Casuarina* and *Pandanus* species. The vegetation is climatically adapted as there is no permanent water available.

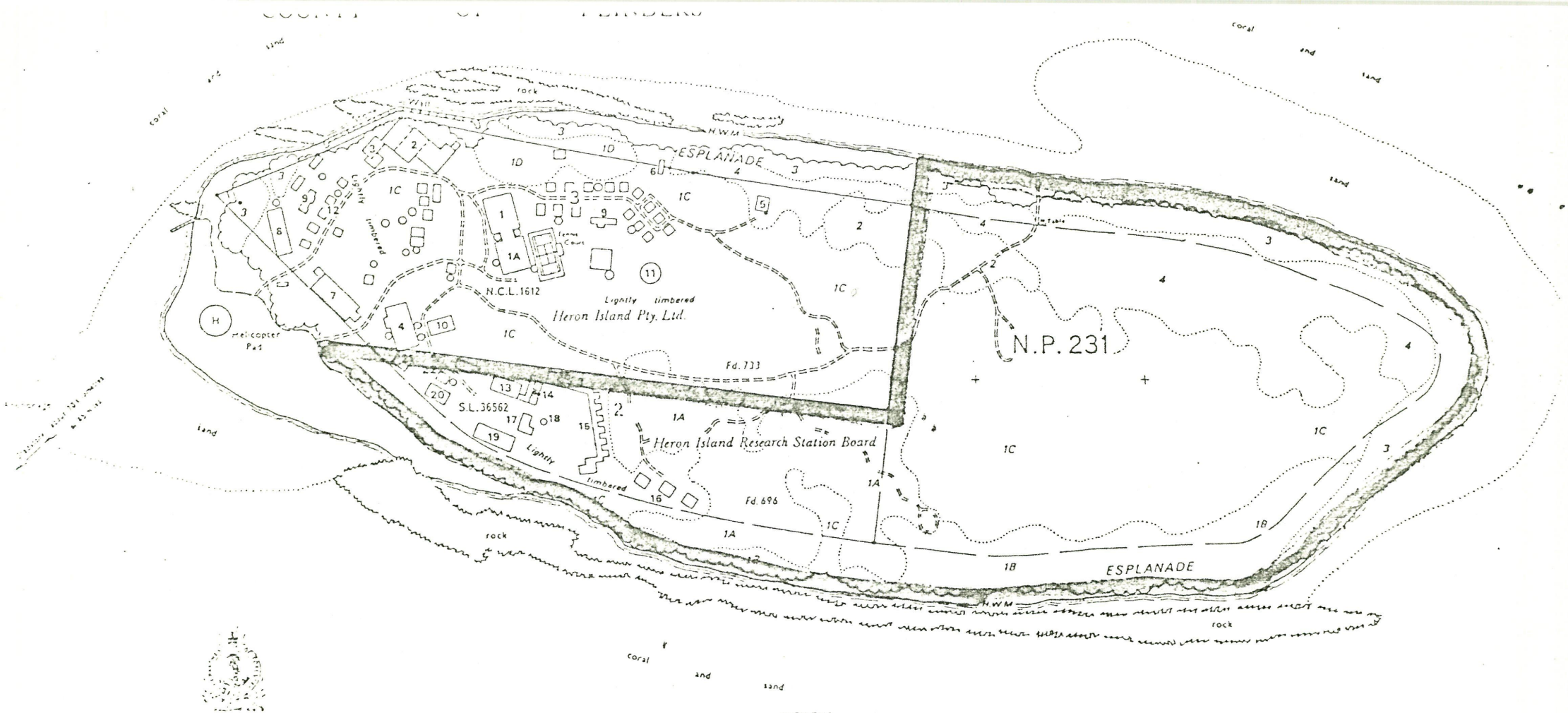
3. Natural potential and principal attractions for tourists.

3.- 1. Climate.

An equable maritime sub-tropical climate influenced by the Tropic of Capricorn is a very significant element of the commercial potential of the Heron Island resort. Annual temperatures show a January maximum and minimum of 28°C and 20°C respectively, whilst July experiences a maximum of 18°C and a minimum of 11°C. Average rainfall is 1,016 to 1,143 mm per annum, the wettest and driest periods being January and February (summer) and September and October (spring) respectively. A dry weather period October to late December coincides with Australia's major summer vacation period. Winds are sometimes fresh throughout the year and cyclonic depressions can pass over the area although these are infrequent.

3.2 Potential for recreational activities:

The tourist potential of the Great Barrier Reef is difficult to gauge except at locations such as Heron Island where a permanent landform allows a site for tourist development. Vegetated coral cays are conducive to relaxed and idyllic living. Other attractions include secluded beaches, sparkling reef waters and a marine environment both visually and physically satisfying.



HERON ISLAND
NATIONAL PARK
MONTO FORESTRY DISTRICT

Scale 1:2 000

N.P.231 – G.G.1960 1 163 – 30 2 0

Compiled by Survey and Mapping Branch
Department of Forestry, Brisbane, Dec., 1972
Cartographer J. Walker
S.G.Reid, Government Printer

Price $2.50

AMENITIES

RESORT

Dining Room – Kitchen (A)	1
Bar–Theatre–Office–Shops–P.O.–Games Room	2
Booking Office	3
Desalination Plant–Generator–Air Compressor for Scuba Gear	4
Residence	5
Boatshed	6
Reef View Luxury Accommodation	7
Accommodation Units	8
Ablutions Blocks	9
Vehicle Garage	10
Water Tank	11
Staff Accommodation	12

RESEARCH STATION

Kitchen and Dining Room	13
Toilets	14
Accommodation	15
Units	16
Marine Aquaria and Pool	17
Fresh Water Tank	18
Laboratory and Library	19
Director's House	20
Manager's House	21
Workshop	22

VEGETATION

Pisonia grandis forest with occasional Cattle palm plants, Ficus opposita and Pisonia umbellifera	1
Tall (55 ft.) dense forest with closed canopy	1A
Lower forest with closed canopy	1B
Varying height and suffering some disturbance – canopy not continuous	1C
Pisonia grandis with Cordia subcordata	1D
Cordia subcordata dominating	2
Casuarina equisetifolia sometimes with Pandanus sp., Tournefortia argentea and Scaevola taccada	3
Tournefortia argentea, Scaevola taccada, Ficus opposita, Pemphis sp. with open mat Cyperaceae	4

figure 4

The cay has a variety of fauna, both indigenous and exotic. Introduced species have included peacocks, parrots, rats and cockroaches. Present island management policies aim at controlling these species, thus permitting the indigenous birds and turtles relative freedom. Summer vacationers to the island live closely with nesting white-capped noddy terns *(Anous minutus)* and wedge tailed shearwaters *(Puffinus pacificus)* which together with nesting turtles are a major wildlife attraction at certain periods of the year.

3. 3 Areas of Scenic Beauty:

Most of the reefs and cays of the Great Barrier Reef are outstandingly beautiful and Heron Island and reef are no exception. At locally known spots on the Heron Island Reef, tourists can see a dazzling array of coral fish and other marine flora and fauna.

3.4 Places of historical and cultural interest

Little documented evidence or material remains of Heron Island's historical and cultural past. In 1839 H.M.S. Beagle visited the area. Between 1842 and 1845 two survey vessels, H.M.S. Fly and H.M.S. Bramble discovered One Tree, Heron and Wreck Islands. A turtle fishing lease was held on Heron Island from the mid 1920's. In 1932 the operation was sub-leased and converted to a fishing resort. As popularity increased so the resort developed and in 1974 the P & O shipping line acquired a major share-holding in the resort. Research into marine biology took an upsurge during the 1950's with the establishment of the Heron Island Research Station. The station is today operated by a joint Board consisting of the University of Queensland and the Great Barrier Reef Committee. For years the island has been known to a handful of Australian and overseas travellers as a reef fishing resort "par excellence" and promoted by annual fishing conventions and through a wide readership of fishing publications. Indeed one of Australia's paramount general reference books, "Guide to Fishes" lists many of its reef fish of good table quality as having been taken in the Heron Island region.

4. Breakdown of tourist purpose

4.1 Recreational

Fishing

Prior to the advent of packaged holidays, good road and air communication and trailerable lightweight motor boats, recreational reef fishing was a holiday pursuit of the rich. This tradition is still exemplified in Australia's far northern coastal city of Cairns, whose annual flotilla of expensive charter and game fishing boats continue to attract the world's game and sports fishermen.

CHECK SCIENTIFIC TERMINOLOGY

For today's recreational angler at Heron Island an informative brochure is supplied by the resort entitled "Heron Island Fishing Guide" (see Appendix 2). The brochure contains a detailed map outlining the fishing localities for some of the most prized reef table fish. Those of the red emperor *(Lethrinus)* coral trout *(Plectropoma)* sweetlip *(Lethrinus)* and snapper *(Lutjanus)*. Half and full day fishing trips are scheduled daily from the island using seagoing launches. Rod fishing from the beaches yields whiting *(Sillago)* bream *(Lethrinus)* and flathead *(Platycephalus)*. Fishing in the lagoons of Heron and Wistari Reefs yields snapper *(Lutjanus)* and coral trout *(Plectropoma)*.

The resort management is developing a policy of conserving the fish resource by imposing a bag limit applicable to the amount the fisherman can consume daily and limiting his take home catch.

Recreational diving and swimming

Most Australian SCUBA clubs and magazine publications freely advertise the benefits of a Great Barrier Reef holiday on the island. SCUBA diving requires specialised equipment and backup facilities which offer the resort a favourable source of income. Diving guides are a permanent feature and certified recreational divers can visit many locally known dive spots. Activities include exploration and underwater photography. A comprehensive brochure provided by the resort advises depth, locality and danger. (see Appendix 2). Supervised dive boats operate day and half day scheduled trips. A code of diving ethics is expected to be followed. No decompression facilities exist either on the island or within easy distance of the city of Gladstone.

Shorkel swimming is available to all. Accessible localities include safe snorkelling along the Heron reef crests and over various coral boulders heavily populated with marine life.

. Boat trips

Viewing the coral reefs from supervised glass bottom boats is a daily attraction, but dependent on weather. Weekly cruises to nearby uninhabited islands for picnic lunches, and fossicking are also available.

Reef walking

This offers the tourist the opportunity to observe the fascination of coral formations and associated animal life.

Other

Idyllic island life combines with secluded tropical beaches, forests, walking tracks, sunbathing and socialising. The atmosphere is unpretentious. Guests and staff mix freely at recreational and social events.

4.2 Cultural - educational

A visit to Heron Island is often made with a purpose in mind - a goal. The resort management caters for an enthusiastic audience. It has a developing philosophy involving the guest with his environment. To the frequent visitor this may not have as high an impact as to the first time guest.

General brochures provide the guest with educational and interpretative information. The total island and reefs (Heron and Wistari) are National Parks where all fauna and flora is protected. Guests are encouraged to explore, but not to capture except in specified areas. Birds and turtles are totally protected.

Feature films about the Great Barrier Reef are a regular evening activity. Lectures and audio-visual programs are provided by resort staff and visiting scientists employed by the Queensland National Parks and Wildlife Service. A variety of supervised nature walks are provided daily. These include exploring the forest floor; exploring low and high tide reef areas; viewing seasonal bird and turtle life. Guests are invited by the research station to visit the library and shell/coral museum. Within the local areas photography is encouraged, fossicking is not.

Annual events offer scope for more specialised interpretative programs. Fishing and diving conventions are augmented by an annual ornithology school and a nature study week. Many of the published photographs of the Great Barrier Reef have been composed in the Heron Island locality.

4.3 Business and conferences

Although facilities do exist, management does not promote the resort for this use.

5. Tourist composition

Well defined occupancy of international and Australian guests is evident. During December 50-55% of resort guests are from overseas with Europe, Japan and the United States predominating. At some periods between November and March, as much as 80-95% tourist composition may be from overseas. Ad hoc surveys conducted by the Authority suggest that the majority of Australian visitors are accommodated at periods other than summer. The majority of Australian guests are from localities other than the Queensland coast.

Group bookings are unimportant to the resort as passenger transport from the mainland is limited by hourly helicopter flight schedules or an alternative and lengthy ferry ride. Most of the island is a national park where camping is not permitted. Advertising by both the resort and travel agencies is not calculated to appeal to those requiring cheap hostel type accommodation or noisy entertainment.

6. Seasonal aspects of tourism

Traditional holiday vacation periods and climatic factors influence peak/off-peak occupancy. Well defined periods December through to end of January (summer holidays) May (autumn) August, September (winter) represent peak occupancy. This is somewhat offset though as the period July through to end October is also a peak period. Seasonal troughs June and July, October and November are beginning to be offset by annual special promotions at discount rates. For example June and October accommodates annual fishing competitions, July and November annual SCUBA diving conventions. During the early weeks of December the resort caters for nature and birdwatching schools.

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7. Length of stay

Length of stay is flexible and dependent on the type of traveller, climatic conditions and economic cost. Average length of stay by overseas visitors is less than three days. Most travellers have booked well in advance. The Australian guest's average length of stay is 5 to 7 days.

8. Economic activities

Economic activities centre around the resort and the research station. Resort holiday activities only have been discussed to this point in the paper. In order to gain an overall appreciation of human impact on the island, it is necessary to discuss both the resort and the research station in the remainder of the paper.

8.1 Industrial and agricultural

There are no commercially oriented industrial or agricultural activities associated with either the resort or research station. Various attempts to grow subsistence fresh vegetables have proven uneconomic owing to natural water shortages.

8.2 Fisheries

A small fleet of Gladstone based commercial line fishing boats occasionally visit areas surrounding Heron and Wistari Reefs for pelagic fish.

The resort employs a professional fisherman who supplies fresh fish for resort consumption. Occasional overcatches by staff are purchased by the resort, however this practice is not encouraged.

8.3 Other

The research station provides accommodation, laboratory and field support activities for visiting scientists and students. The station has few long term resident staff or researchers although it does operate on a year round basis.

Electricity is generated by the resort's generator and supplied to both resort and research station on a 24 hour basis. Transportation facilities owned or operated for the resort are available on a "first-come first-served" basis to both establishments. Likewise during times of drought fresh water is shared by resort and research station. Resort guests are encouraged to visit the research station

library and museum facilities.

9. Size of permanent population

Since 1975 the island has had a permanent population of 64 persons. This is composed of 56 adults, spouses and children (resort) and 8 working adults and spouses (research station).

10. Employment

Management of both resort and research station advised employment had been stable since 1975.

Figure 5

Occupation as at June 1978	No. of persons Resort	Research Station
food and catering	13	-
household cleaners etc.	7	1
office and management	5	1
resident divers and management	2	-
dive guides	2	-
maintenance	7	1
guest activities; hostesses	3	-
professional fishermen	1	-
alcohol sales	4	-
island band	4	-
skipper	1	1
research station director	-	1
deckhand	1	1
research station manager	-	1
wives	4	1
children	2	-
	56	8

During accommodation peaks at the resort two temporary staff are employed. Specialised activities, for example fishing and diving events attract a further 2 to 3 unpaid temporary staff who receive free accommodation. Permanent staff harmony is ensured by management policy of employing males and females on a 1 to 1 basis. The average length of resort staff employment is 1 to 2 years. With both resort and research station, maintenance staff suffers a higher turnover than managerial staff. An interesting feature of the total island population is its permanency. The island

apparently offers an acceptable form of employment where time-off hours enable staff participation in all recreational activities.

B. ECONOMIC DIMENSIONS OF THE TOURIST INDUSTRY

1. Tourist accommodation capacity

1.1 Hotels

The resort has a total capacity of 203 beds but would cater for a maximum of 180 . The resort accommodation is single story on-ground cabin and suites. There are 26 four bed cabins and 41 suites.

1.3 Other

The research station has a total of 40 beds. The style is single story on-ground structures, consisting of : 2 eight-bed dormitories, 2 two-bed cabins, 5 self contained four-bed units.

2. Average cost of accommodation

. Resort

Tariff rates include accommodation, all meals, morning and afternoon tea, all guided walks plus free use of facilities (e.g. swimming pool, tennis courts) - Daily tariff per adult: Lodges with 2, 3 and 4 beds $A29; Suites - 2 to 3 and 4 beds $A40. Children under three years admitted free, children 3 to 14 years inclusive - half adult rate.

. Sole use: Single accommodation - normal adult tariff plus $10 per day.

. Group rates: For groups of 15 or more adults a 10% discount is given and a free tariff is provided for each 15 full tariffs. The concessions apply to the resort and connecting passenger launches and helicopter.

. Package holiday reductions: Special packages are arranged by Australia's two internal airlines Ansett and T.A.A. Also two of Australia's Motor Vehicle Clubs provide savings of up to 20% for members. These are available most of the year.

Research Station: Adults $A10 per day accommodation costs include dormitory style living but not meals. Communal kitchens provide cooking facilities. Self contained units are better equipped. Accommodation is limited by availability of beds and is restricted to researchers in marine biology and their spouses.

3. Average monthly occupation rate

. Resort: Average guest days have increased since the P & O shipping line took over operations of the resort in 1974. Actual monthly guest bed nights in 1973/74 were 1,703, with an increased building program providing better facilities plus an active promotion campaign, the monthly guest bed days in 1975/6 was 2,916. This has increased in 1977/78 to 4,167.

. Research Station: Total man-weeks for 1976 totalled 856. Scientists were present for a total of 375.9 man-weeks, students 455.2 man-weeks and children 24.9.

4. Ratio of second homes to tourist hotels

. not applicable

5. Ratio of camping sites

. not applicable

6. Number and capacity of recreational facilities.

Figure 6

Facility	Cost per Journey ½day	full-day	No. of passengers
. Coral viewing from glass bottom boat	$3 (adult) - $2 (child) -		15-18
. Dive boat trip	$5 (SCUBA) $3 (Snorkelling)		15
. Fishing trip	$8		8
.		$15	10
. Wilson Island cruise		$9 (adults) $5 (child)	32
. Helicopter sightseeing	$40 per hour		4

Figure 7

Hire charges equipment		Deposit	½ day	1day	other
Diving:	Wet suit	$10	$2	$3	-
	Regulator	$54	$2.50	$3.	-
	Air tank & back pack	$10	$2	$2.50	
	. air tank fills				$1.60 per tank
	. weight belt	$5	$1	$1.50	
	. face mask, snorkel & fins	$10	$1.50	$2.	$10 week
	. buoyancy compensator	$15	$2.00	$3.	
Tennis courts : racquets		$10			courts free

Figure 8

ITEMS PROVIDED WITHOUT COST BY RESORT

- Daily reef and island tours
  - walking sticks
  - sandshoes
  - reef viewing tanks
- Snorkelling tuition
- Saltwater swimming pool
- Fishing lines and bait (during fishing trips)
- Picnic lunches
- Camera tuition
  - nature photography
  - underwater photography
- Audio visual programs
- Feature film programs
- All entertainment
- Advice and descriptive brochures
  - fishing localities
  - diving localities
  - general information

A small harbour provides berthing facilities for day and overnight visitors. Boat owners are subject to a small charge by the resort manager in his capacity as Harbour Master. About 30 cruising boats per annum visit the island. Day trippers from Gladstone are uncommon.

7. Capacity of environment-related public services.

Few services have been provided by the public sector. All environmentally related services have been installed at resort or research station expense. Installation of facilities is subject to approval and inspection by the Local Government Shire of Calliope in which area Heron Island is located. Sewage and waste collection and disposal are an economic cost to the private sector, not the public sector.

7.1 Sewage type and efficiency of treatment plants.

. Resort

Twentysix lodges of four-bed capacity operate through three male/female ablution facilities which use both fresh and salt water. Each system is connected to a septic tank with a daily capacity of 60 persons. There are forty-one suites with ensuite facilities. One septic tank system accommodates each two suites.

Septic tanks also accommodate staff ablution and ensuite facilities, kitchen and entertainment areas.

. Research Station:

A male/female ablution block is serviced by one septic tank which also receives waste water from nearby communal kitchens. All self-contained units and staff quarters have individual septic systems.

7.2 Waste collection and disposal

All septics discharge effluent onto a coral sand and rubble base. Seepage is of no environmental consequence. External pressure through weight of water storage and septic facilities on coral subrock causes slight instability of the substrate as settling occurs. Odour escaping from septic systems at this time is an acknowledged problem with little solution.

Daily collection and removal of litter is made by both establishments. Edible scraps are dumped every second day at sea, non-edible material is incinerated then buried. Use of glass and aluminium food containers is discouraged. Timber from dismantled buildings is utilised for picnic barbecues. Routine maintenance includes raking of leaves in season and removal of orphaned hatchling turtles and fledgling birds.

8. Capacity of other public services :

A small harbour (width 50 metres) consisting of a dredged channel and swing channel cut through the coral reef was provided for the island at public and resort expense. It has limited berthing facilities for craft up to 80 feet long and is subject to dangers associated with bad weather and tidal range.

A buoy moored for the Queensland National Parks and Wildlife Service visiting ranger patrol is infrequently used by the public.

A desalination plant was installed in 1968 as a consequence of a recommendation by the State Government in 1966. The desalination plant operates at less than expected efficiency.

8.1 Utilities:

. Electricity is provided by the resort's diesel powered 240 volt generator. This operates on a 24 hour basis and supplies power to both resort and research station. Emergency back-up units are maintained by both establishments.

. Freshwater. The island is devoid of ground water and has seasonal patterns of spring drought. The problems of obtaining and replenishing adequate supplies of fresh water are limiting factors in overall development. Only limited supplies of fresh water can be collected from roof catchments and area limitations preclude the construction of impervious surface catchments that are a feature of larger island tourist resorts.

8.2 Communications:

The island is connected to the mainland by radio telephone installed at subscriber cost. Each establishment has one line with three extensions.

8.3 Transportation:

Passenger and freight transportation is catered for by a 76' ferry and two Bell 4-seat helicopters. Average time of journey being 4½ hours by ferry and 35 minutes by helicopter. The sea trip is dependent on weather. The ferry is owned and operated by the resort. Two return trips per week are scheduled. The helicopter service is provided by a private company on contract to the resort. Hangar facilities are at Gladstone airport. A helipad, constructed at the resort's expense, is located on the island beach fronting the harbour.

8.4 Health

There is slight demand for health services. Most anti-venenes are stocked by the resort. Serious accidents are immediately evacuated by helicopter to Gladstone. Typical accidents involving coral cuts and minor disorders are treated by island staff.

8.5 Law and Order:

If required, law enforcement officers will visit the Island from Gladstone. There is no demand for these facilities.

8.6 Other:

The harbour is cleared of accumulated sand when deemed necessary. The Queensland Department of Harbours and Marine tenders for a contractor to provide the service.

9. Size of Private Sector Resort:

All facilities within the resort are owned and operated by Heron Island Pty. Ltd., in which the P & O shipping line has a controlling interest. Within the entertainment complex a shop-

boutique retails souvenirs, clothing, reading matter and confectionary/tobacco. Two bars retail alcoholic beverages and soft drinks. Both banking and postal agencies are owned and supplied for island guests by the resort.

. Research Station:

The research station is owned and operated by the Heron Island Research Station Board which comprises the University of Queensland and the Great Barrier Reef Committee (a scientific organisation).

10. Average daily tourist expenditure

Total average daily expenditure excluding accommodation and meals is $17.00. Expenditure is based on the following:

$6.00	fishing and diving trips
$6.00	purchase of alcoholic beverages and soft drinks.
$3.00	purchase of items from boutique including souvenir clothing.
$2.00	Hiring of snorkelling equipment.
$17.00	

Purchase of food is not a major item as all meals are included in accommodation costs. The resort does not cater for research station personnel. All entertainment and cultural-educational activities are provided gratis. Souvenirs, apart from tropical style clothing are not stocked. Tobacco products and other boutique stock are sold and equipment is hired to guests and visitors.

11. Cost of living indices for tourism

No information was available.

12. Public revenues from tourism

. Local Government receives annual rental payable on land leased from the Shire, and collects local rates and taxes.

. Queensland Government imposes taxes ranging from sales and excise taxes on alcohol, fuel, food and beverages, and payroll tax.

. Commonwealth Government imposes taxes including company and individual income tax.

13. Investment of public services

The desalination plant was installed by State Government recommendation and expense. Initial cost of $75,000 was discounted

by 50% depreciation for purchase by the resort five years later (1973). The harbour was excavated at a 3/4 cost to the State and 1/4 cost to the resort. Overall cost (excluding overheads and staff salaries) of hiring the contractors and maintaining the harbour excavation free of sand has been $A150,000.

14. Operating costs for public services

There are no other services than those mentioned in 13.

15. Investment for private services

. Resort - Capital cost at current prices is estimated in the region of $A1.5 million. More specific information was deemed confidential by the resort management.

An annual contract ensures daily helicopter communication. Capital cost for purchasing each Bell 4 seat helicopter is $A.75 million. No other information was available.

. Research Station

Research facilities are provided by the Heron Island Research Board. Donations of laboratory and field equipment are made by various scientific and government bodies. Personnel are employed on a contractural basis by the Heron Island Research Board.

C. INSTITUTIONAL AND LEGAL INFORMATION

1. Public regulations affecting the tourist industry.

. Commonwealth Government

Tourism is a developing industry in Australia. A Select Committee initiated by the Commonwealth House of Representatives has held a series of meetings throughout provincial centres of Australia to record evidence on the economic role of tourism. Policy committments are still only within a developmental stage. There is no overall national tourist development plan.

. State Government

The State Government recognised tourism as an important industry for Queensland earning a conservative estimate of $A150 million per annum. There is relatively little investment incentive for private industry to establish tourism ventures because of high outlays and low returns. Incentive to industry through the State's Department of Commercial and Industrial Development consists of a provision contained in the *Industrial Development Act 1963-1976* for the granting of financial assistance

to industry under certain conditions. In practice such assistance is given to pioneering type industries only or to those in respect of which there is an unsatisfied demand. A prerequisite for eligibility is that the applicant must have made unsuccessful attempts through normal avenues to obtain the desired finance, for example, a bank loan. Assistance is usually granted by means of a guarantee which may be given to any bank, person or institution prepared to advance the required funds. Should an application be in regard to assistance for the provision of tourist accommodation, tourist facilities etc., sponsorship of the proposal by the Director-General of Tourist Services, Queensland Government Tourist Bureau, is necessary. Assistance can only be given by guarantee and then only for new tourist areas.

2. Public authorities responsible for implementing tourist policy.

. Commonwealth Government.

. The Great Barrier Reef Marine Park Authority:

All that area under Commonwealth of Australia jurisdiction and containing the Great Barrier Reef (including the submerged lands and reefs), and Commonwealth owned islands, is now contained within the Great Barrier Reef Marine Park Region (see figure 9). However, Commonwealth jurisdiction does not extend to those islands (such as Heron Island) which are vested in the State of Queensland.

The Great Barrier Reef Marine Park Region is administered by the Great Barrier Reef Marine Park Authority whose functions are:

(a) to make recommendations to the Minister in relation to the care and development of the Marine Park including recommendations from time to time, as to -

(i) the areas that should be declared to be parts of the Marine Park; and

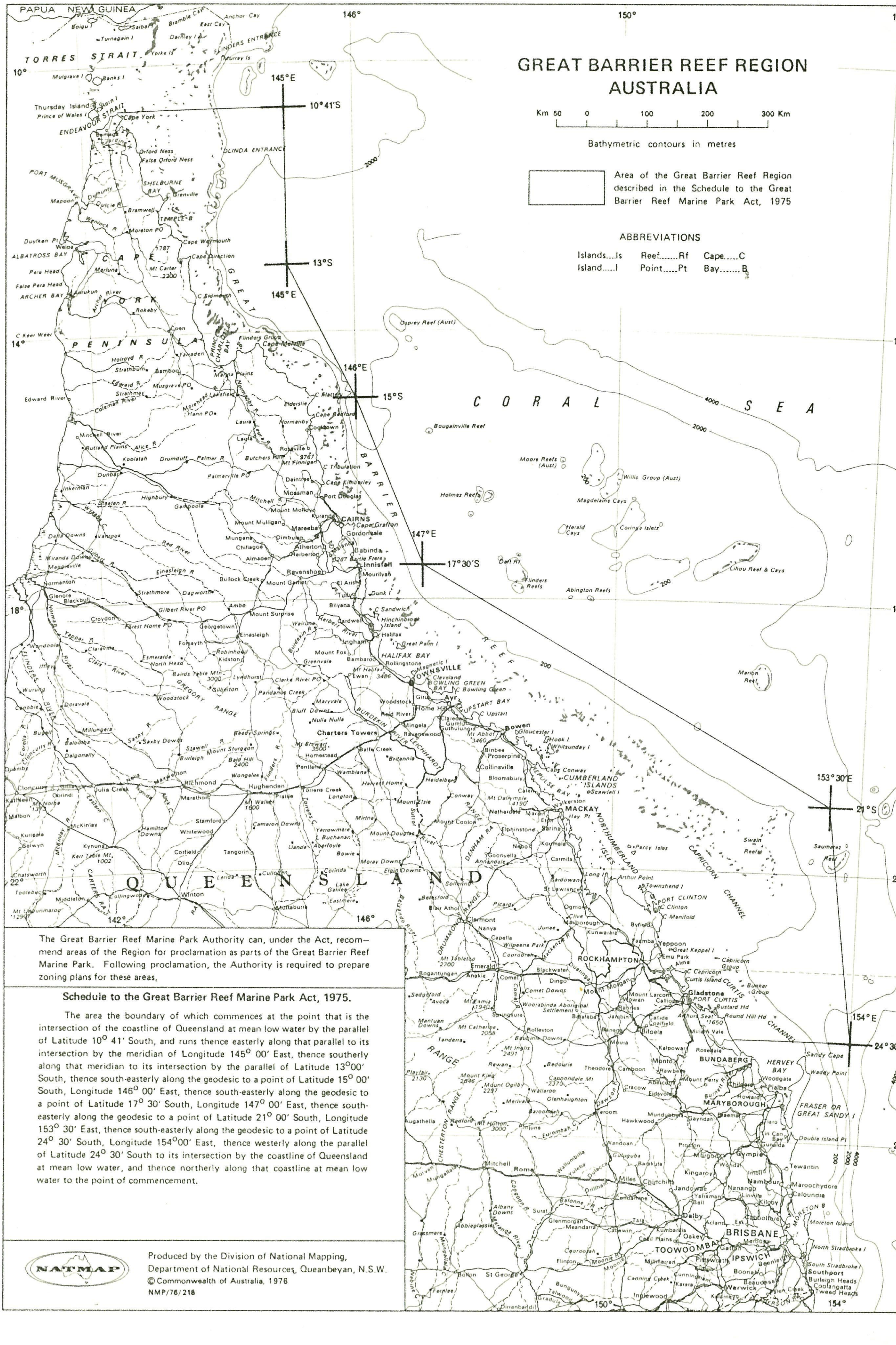
(ii) the regulations that should be made

(b) to carry out, by itself or in co-operation with other institutions and persons, and to arrange for any other institutions or persons to carry out, research and investigations relevant to the Marine Park;

(c) to prepare zoning plans for the Marine Park.

(d) such functions relating to the Marine Park as are provided for by the regulations; and

(e) to do anything incidental or conducive to the performance of any of the foregoing functions.



The Great Barrier Reef Marine Park Authority can, under the Act, recommend areas of the Region for proclamation as parts of the Great Barrier Reef Marine Park. Following proclamation, the Authority is required to prepare zoning plans for these areas.

Schedule to the Great Barrier Reef Marine Park Act, 1975.

The area the boundary of which commences at the point that is the intersection of the coastline of Queensland at mean low water by the parallel of Latitude 10° 41' South, and runs thence easterly along that parallel to its intersection by the meridian of Longitude 145° 00' East, thence southerly along that meridian to its intersection by the parallel of Latitude 13°00' South, thence south-easterly along the geodesic to a point of Latitude 15° 00' South, Longitude 146° 00' East, thence south-easterly along the geodesic to a point of Latitude 17° 30' South, Longitude 147° 00' East, thence south-easterly along the geodesic to a point of Latitude 21° 00' South, Longitude 153° 30' East, thence south-easterly along the geodesic to a point of Latitude 24° 30' South, Longitude 154°00' East, thence westerly along the parallel of Latitude 24° 30' South to its intersection by the coastline of Queensland at mean low water, and thence northerly along that coastline at mean low water to the point of commencement.

Produced by the Division of National Mapping,
Department of National Resources, Queanbeyan, N.S.W.

NMP/76/218

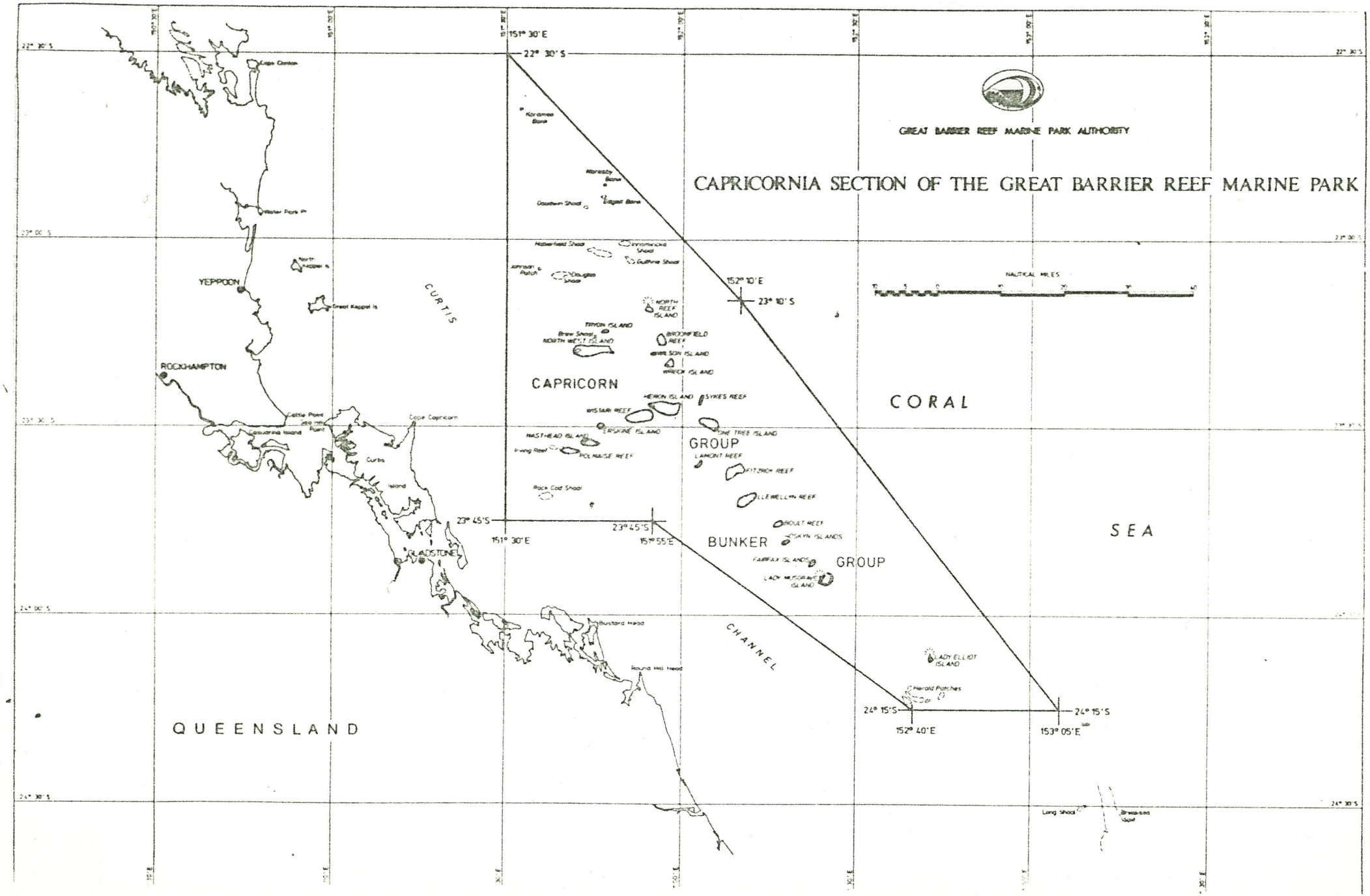

GREAT BARRIER REEF MARINE PARK AUTHORITY
CAPRICORNIA SECTION OF THE GREAT BARRIER REEF MARINE PARK
151° 30'E
22° 30'S
152° 10'E
23° 10'S
23° 45'S
151° 30'E
151° 55'E
152° 40'E
153° 05'E
24° 15'S
NAUTICAL MILES
YEPPOON
ROCKHAMPTON
GLADSTONE
CURTIS
Great Keppel Is
Cape Capricorn
Curtis Island
CAPRICORN
GROUP
CORAL
SEA
BUNKER
GROUP
CHANNEL
QUEENSLAND
NORTH REEF ISLAND
TRYON ISLAND
BROOMFIELD REEF
WILSON ISLAND
WRECK ISLAND
HERON ISLAND
SYKES REEF
WISTARI REEF
ERSKINE ISLAND
MASTHEAD ISLAND
PELICAN REEF
ONE TREE ISLAND
LAMONT REEF
KITZROY REEF
LLEWELLYN REEF
BOULT REEF
HOSKYN ISLANDS
FAIRFAX ISLANDS
LADY ELLIOT ISLAND
Herald Patches
Bustard Head
Round Hill Head
Long Shoal
Breaksea Spit

figure 10

The first section to be declared as part of the Marine Park encompasses the Lady Elliott Bunker and Capricorn Groups (see figure 10). Heron Island cay and reef and Wistari reef are contained within this area to be declared. Hence the Authority will play an increasingly important role in contributing to public regulations and tourist policy.

State:

Under Australia's federal system of government much of the responsibility for environmental and tourism matters rests with the State and Local Governments.(see figure 11)

. The National Parks and Wildlife Service:

An objective of the Service is to foster harmony between man and his environment. The strategies include conservation to secure the natural and cultural heritage in Queensland. In 1976, there were approximately 1.25 million hectares encompassing more than 300 National Parks. Considerable emphasis has previously been applied to Heron Island National Park. This included stationing two permanent rangers on the island, publishing information booklets on the history, marine flora and fauna, and conducting educational reef and island walks for resort guests.

. Queensland Government Tourist Bureau:

As part of the State Government initiative to promote tourism potential in Queensland, both tourist booking and information dissemination programs are provided. Included in the latter a series of brochures describing the Great Barrier Reef are supplied freely to potential tourists and agencies.

. Local Government:

Within the Gladstone region various initiatives are organised to promote local area interest. The Gladstone Regional Tourist and Development Association organises local displays and publishes information including tourist oriented brochures. This organisation will influence the local public and Local Government initiative in creating Gladstone as a future tourist centre.

D. IMPACT OF TOURISM ON THE ENVIRONMENT

1.1 The impact of waste

Unless properly managed, natural scavengers are attracted to feeding on disposed waste and foodscraps. A small flock of silvereyes *(Zosteropidae)* is regularly observed around the

Figure 11

State environment protection as it relates to Heron Island and surrounding areas.

Legislation	Principal area covered
. *Fisheries Act 1976*	Protection of coral and fish by issuing licenses to approved persons. Amateur fishermen require no licenses.
. *Forestry Acts 1959-1973; Forestry Amendment Acts 1964 - 1973.*	Declaration of National Parks. Contro of activities including permits to camp, fish and fauna protection.
. *Beach Protection Acts 1968-1970*	Protection of beaches including their restoration due to erosion or encroach ment by the sea. Penalties for removal of vegetation or interference with any beach protection works.
. *Motor Vehicles Act 1975*	Controls use of motor vehicles on sand dune areas.
. *Fauna Conservation Acts 1974-1976*	Fauna protection except during declare open season on individual species.
. *Native Plant Protection Act 1930*	Protection of native plants on Crown land or National Parks.
. *Aboriginal Relics Preservation Act 1967*	Preservation of Aboriginal relics.
. *Harbours Acts 1955-1964*	Illegal to remove without authority stone or shell grit etc. from Queensland waters.
. *Rural Fires Acts 1946-1964*	Control of the use of fire in National Parks.

resort's beer-garden attracted by sweet smelling drinks and liquor. The same flock is resident during meal times in the communal dining halls of both the resort and the research station. Larger predators - silvergulls *(Larus novaehollandiae)* are attracted to the island during garbage dumping at sea by either the resort or research station. Marine scavengers well used to this cyclical dumping surround the garbage boat on its scheduled run to the deeper channels between Heron and Wistari Reefs.

- change in quality of soil

Daily removal of leaf litter surrounding *Pisonia* species occurs. Preventing this localised formation of humus may eventually lead to soil sterilisation aided by leaching caused by seasonal rainfall.

- sewage seepage outflow

There is no evidence of alternative growth patterns by resident corals surrounding areas of seepage outflow. There is no other biological increase or decrease of species due to enriched seepage. Occasional odour from broken septic systems is an acknowledged problem.

- landscape

Building scrap material is stored out of sight for emergency use.

1.2 Permanent restructuring of the environment

Most cays change morphologically as a result of continual erosion of sand by natural agents. This is most noticeable on eastern, southern and south-eastern beaches. Subsequent deposition of sand is found on western and north-western beaches.

Cyclonic storms are a natural phenomenon causing morphological change to seaward edges of reefs. Similarly landward flora is easily uprooted or defoliated by cyclonic and fire hazard. These hazards present no permanent long term alteration to the local environment.

The impact of man on the environment is most noticeable on Heron Island as his alterations seem more "permanent".

. A concrete retaining wall constructed during the 1960's on the northwestern corner of the island is responsible for erosion of the western beach. The wall alignment reflects and refracts onto the western beach those waves approaching the island from a northwesterly and northeasterly direction and thereby increases the erosive energy of waves in the area.

. The erosion problem was heightened in 1967 by the dredging of the boat harbour into the reef flat to provide better access to the resort and the research station. Previous access was limited to high tide as no scour channels large enough to accommodate the tourist ferry was available.

Even before cyclone "Emily" (April 1972) the retaining walls of the harbour were breached in several places, allowing sand from the western end of the island to move into the harbour and to the deeper water beyond. The boat harbour was redredged in late 1972. Approximately 20,000 cubic metres of sand was placed adjacent the concrete retaining wall on the north western corner of the island in an attempt to lessen the erosive influence. The sand is migrating westward by longshore drift under the influence of the South-East Trade Wind. Thus not only geomorphological, but biological damage to the micro-environment is evidenced. Fish and coral life within the harbour area are at a minimum and the harbour channel acts as a drainage channel to the surrounding reefal lagoon.

Construction of a helipaid located on the beach adjacent to the harbour has caused no environmental damage. Wind erosion of beach sands surrounding the helipad results in a visual deterioration of the helipad retaining wall.

Construction of dirt tracks presents some hazards to flora and fauna especially during nesting and hatching seasons. The only mode of wheeled transport on the island is less than half a dozen tractors and accompanying trailers. Construction of new dirt tracks by unsupervised staff has in the past caused localised vegetational losses and minor erosional problems. Operation of the large wheeled tractors on the beach front seems to present no great problems.

Construction of walking paths in both research station and resort areas could constitute dangers to local flora and fauna. However it has been observed that once a path has been established, the tourist stays generally on the path and thus minimises other dangers. The range of height on the island is approximately 7 metres and inland there are few landmarks to encourage creation of numerous paths.

Other major construction centres round excavations for water and septic tanks, pipelines and foundations for buildings. Due to the location of leases for both resort and research station, all constructional activity and indeed the majority of human activity is confined to the western half of the island.

This construction has of necessity removed some of the native *Pisonia* forest as well as restricting the natural burrowing tendencies of the nesting wedge tailed shearwaters.

. Permanent visual deterioration is marked. Helicopter approach reveals a rusting hulk at the harbour entrance, telecommunications tower and poorly camouflaged cabins. Reef walking is a noticeably permanent impact when confined areas receive high visitation. Reef walking is restricted by access, low tide and coral type. Many branching corals will not support human weight. This results in wounds to lower limbs. Commonsense restricts many reef walkers to sandy patches.

. Day visitors to surrounding reefs and cays cause minimal impact on the ecosystem. Island barbecue facilities are provided by the resort as is the wood fuel for the barbecues. Some bodywaste can only be of benefit to the natural environment. Most other garbage is collected by resort staff for removal back to Heron Island.

1.3 Impact of permanent restructuring of the environment - habitats and populations of biological species

. Birds : Alteration of the environment with the encroachment of man has reduced the amount of ground nesting terns using the island. Occasional use is made of ground nesting areas by petrels and shearwaters, however little documented evidence is available. It could be that Heron Island has never been used by ground nesting birds in any large numbers. The Black-nape tern *(Sterna sumatrana)* no longer nests on the island and has shifted to the more secluded safety of the harbour wreck. Blacknape terns are observed to be declining in numbers. Management of the resort seems unaware of this condition. The cay has a permanent population of about 100 silvergulls attracted by promiscous feeding. Surrounding cays have no permanent populations of silvergulls.

. Turtles: Hatching begins during December, peaking from February to March and continues spasmodically through to May. Actual human encroachment along beach and inland nesting areas is not marked. The annual storm period February to March could have a greater devastating effect than human or bird predation. Presence of the silvergull as predator is minute as each bird is not capable of consuming more than one or two hatchling turtles per day. The turtles greatest predator is reef fish. Some concern has been expressed by scientists that

24 hour lighting during hatching periods may obstruct hatchling movement towards the open sea. Studies are in progress to establish a preventative system. Complete degradation of the Heron Island rookery would not be detrimental to the total Great Barrier Reef turtle population.

Island vegetation Removal of island vegetation is obviously necessary for the construction of accommodation for both research station and resort. Softwooded *Pisonia* trees present obvious danger to human life and capital investment. However, irresponsible removal of *Pisonia* trees has not been attempted. Tourism has not been accompanied by the introduction of too many palm trees and other stylised vegetation reminiscent of "tropical" islands. Exotic species perform poorly owing to lack of permanent water supply.

2. Individual and collective responsive to environmental change

. Individual

Management throughout the guest's holiday tries to instill the feeling of man and his environment. During reef walks marine life is closely inspected, and during island walks guests experience flora and fauna at close quarters. With the fishing trips, the professional fishermen show the sportfishing guests that fish are something more than a tasty meal. By setting a bag limit, guests are encouraged to return smaller or unwanted fish to the sea, where they can be seen to swim away. A portion of the deeper dwelling fish survive their rapid ascent to the boat and can return safely to their normal habitat. Snorkelling on the reef or over deeper waters, the guest develops a respect for the animals and plants of the sea. Even sharks gain respect as a necessary scavenger, not a big killer fish to be caught and destroyed. the city dwellers inbuilt fear for the unknown is relaxed.

. Collective:

Both P & O and the management of Heron Island Resort are creating Heron Island as an "environmental island". This is made clear to guests on their arrival by the introduction of environmental descriptions in all brochures (see Appendix 2) Fishing is not allowed in an area known as a "fish habitat" which is the area of channel between Wistari and Heron Island reef, and includes the harbour and coral boulder snorkelling area. The island tours and the audio-visual and film presentations further influence the resort guest to understand the meaning of man and his environment, and not man apart from his environment.

Research scientists occasionally give lectures at the resort. This further enables the recreationer an insight into a perhaps hidden world.

Perhaps exposing tourists to the "environmental deterioration" on Heron Island will make for a more sympathetic audience when other more critical environmental problem areas are discovered on the Great Barrier Reef or elsewhere.

APPENDIX 1

This Appendix contains two questionnaires administered to the organizations on Heron Island

GREAT BARRIER REEF MARINE PARK AUTHORITY
Commonwealth Bank Building, 370 Flinders Street, Townsville
P.O. Box 1379, G.P.O., Townsville, Qld 4810 Telephone (077)712191

23 June, 1978

Personal Interview for the Manager of
Heron Island Resort

The questions presented below seek clarification of a number of environmentally related problems that could be relevant to Heron Island.

The Questionnaire is part of a survey being conducted by the Authority to complete a paper for an O.E.C.D. group of experts on the environment and tourism.

All material answered by you shall remain confidential and shall not be used without your agreement.

NOTE: References refer to O.E.C.D. guidelines

QUESTIONNAIRE

Q. 1 (a) What present tourist activities are available on and around Heron Island and reef.

(a.4)

(b) Aside from these, do you see any potential for developing alternative tourist activities - Yes/No (A.3.2)

(c) Please list these

Q. 2 In your own estimation, which of the areas referred to in 1(a) and 1(b) are areas of scenic beauty. (A.3.3)

Q. 3 (a) What do you think allows guests/visitor satisfaction (A.4 definition of tourism)

(b) Would you rank your interpretation of the following as it relates to "visitor satisfaction". This will have to be averaged as some activities would be more specialised. Great Barrier Reef ( ) diving ( ) fishing ( ) food ( ) accommodation ( ) natural island and reef beauty ( ) business and conference facilities ( ) surrounding areas ( )

Q. 4 (a) Does Heron Island resort promote a particular image or concept

Yes/No

(b) Would it be against management policy to discuss the "environmental island" concept.

Yes/No.

(c) If so, what image will evolve (A.4)

Q. 5 During the period 1967/68 to 1976/77;

(a) what is the annual number of Australian to overseas guests to visit the resort.

(b) what is the number of guests from the Americas, Asia, Europe and U.K. to visit the resort.

(c) what is the number of guests from Australian states to visit the resort (answer to be guests by State)

(d) what is the number of guests using Heron Island for; part of their annual holiday, part of a package deal holiday, a mini holiday, other.

../2

Q. 5 (Cont)

(e) what are the ratio of age, sex and marital status for visitors from; Australia, America, Asia, Europe and U.K. (Answer to be ratios of age, sex, marital status, by country.)

(f) What is the ratio of single guests, couples, and families.

Q. 6 Seasonal aspects of tourims (A.6)

Holiday habits

(a) What period of the year does peak occupancy occur.

(b) Does peak occupancy coincide with:

* School holidays
* Climatic factors
* Special events such as diving, fishing, package holidays.

(c) Are booking variations caused by package tours

Yes/No

(d) Are guests encouraged to visit during off-peak periods

Yes/No

(e) How much use is made of the resort's facilities for business conference (%)

Q. 7 (a) What is the average length of stay utilised by guests visiting the Island.

This question is to be answered in the following terms:

Ages 25 35 45 55 65 75 75+

Marital status for single or married

No. of children 0 1 2 3 4+

Season: Off-peak, peak

Length of stay 2/3 days, 1 week, 2 weeks, 2 weeks+

../3

Q. 7 (Cont)

(b) Average length of stay of guests (days) by seasons over the period 1967/68 to 1976/77.

Q. 8 Economic Activities (A.8)

(a) Does the resort supplement its mainland purchases for human consumption, with local fish and shell-fish produce.

Yes/No.

(b) Is a professional fisherman employed by the resort

Yes/No.

(c) Are guests or staff encouraged to sell fish and shellfish to the resort.

Yes/No

Q. 9 Size of Permanent Population (A.9)

(a) Numbers of persons employed, by male/female, persons

(b) Occupational breakdown (the answer to this question to be over a series of three periods.)

1967/68 1971/72 1976/77

Q. 10 Employment

(a) Total number of persons employed (the answer to this question is to be for the period 1967/8, 1971/2, 1976/7).

(b) Does staffing fluctuate with periods of peak and off-peak guest intake.

Yes/No

(c) What is the average length of employment of staff by occupation

(d) Is staff accommodation and keep supplied free or at nominal rental

Yes/No

../4

Q. 10 (Cont)

(e) Do skilled staff, e.g. accountant, chef, have equal accommodation facilities as unskilled staff.

Yes/No

(f) Are staff both skilled and unskilled carried over accommodation troughs to enable the island to function at peak periods.

Yes/No.

(g) What is the ratio of casual to permanent staff over the three periods. 1967/68 1971/72 1976/77

Males and females

B. Economic Dimension of the Tourist Environment

Q. 1 (a) Tourist accommodation capacity (B.1)

What has been annual visitor numbers to Heron Island over the past ten years 1967/68 to 1976/77

(b) Show actual guest/bed nights over this ensuring period (B.1)

(c) If possible, show numbers of guest/nights in occupied rooms by month (B.1)
(This to be over the periods 1975 to 1977)

(Ensuing to that question, show introduction of new accommodation facilities.)

(d) Do guests know the locality or type of accommodation they are buying at the time of the holiday booking.

Yes/No

(e) Has management re-appraised accommodation facilities

Yes/No

(f) If yes, what are some of the innovations (e.g. poolside cabins).

Q. 2 (a) The table below list recreational facilities provided for Heron Island. Please complete the table and add any more facilities (B.6)

Facility	Duration of Journey ½ day	full day	No of Persons	Cost per day ½ day	full day
Glass bottom boat					
Diving boat					
Fishing trips					
Cruising/Barbecue					
Helicopter charter					
Reef walks					
Island walks					
Diving equipment					
a) Scuba					
b) Snorkelling					
c) Airfill					
d) Scuba diving courses.					
Tennis					
Other					

Q. 2 (b) The following recreational facilities are provided with no charge. Please complete the list (B.6)

Reef walks
Reef walking sticks
Reef viewing tanks
Sandshoes
Fishing lines and bait
Island walks
Beaches
Swimming

(c) The following facilities are also available (please complete table)

Picnic areas	Swimming Pool	Reef walks
Bush walks	Beaches	Island walks
Packed lunches	Snorkelling	Visits to Research Station
Diving sites		
Visits to surrounding islands and reefs		

(d) The following activities are available after dark: Please complete the list

Bingo
Feature films
Educational films
Dancing
Turtle watching
Bar facilities

Q. 2 (Contd)

(e) Are prices paid by guests, e.g. accommodation, food, beverages and accommodation facilities comparable to other island or coastal resorts in Queensland.

(f) What educational/participation activities are available for the guests interpretation of the island's facilities.

(g) What educational/participation activities are envisaged for the future.

Q. 3 Capacity of Environment related/public services (B.7)

(a) What is the present sewage system (B.7.1.1)

(b) Are ablution and bathroom outlets sewered (B.7.1.1)

Yes/No

(c) Is waste-water discharge included in human wastage disposal or is it via a separate system (B.7.1.2)

(d) Do all sewage treatment systems operate within the conditions of relevant Public Health Act (B.7)

Yes/No

(e) Do sewage treatment systems cope with peak accommodation (B.7.1.1)

Yes/No.

(f) Does sewage odour present any environmental type problems to guests/management/surrounding environment e.g. smell, seepage. (B.7.1.1)

Yes/No

(g) If yes, what improvements on the present system are envisaged

(h) Complete the table (B.7.1)

No. of Rooms	Type of Facility	
	Ensuite	Ablutions

../7

Q. 3 (Cont)

(i) With what frequency is garbage collected from the following areas: (B.7.2)

Accommodation Units ( ) Kitchen ( )
Entertainment areas ( )

(j) With what frequency are outside areas maintained (B.7.2)

Walkways free of leaves and litter ( )
Beach front ( )

(k) What methods are used to dispose of the various types of solid waste e.g. (B.7.2)

Food and scraps
Tins, bottles and cartons
Building materials, etc.

(l) Has sewage disposal altered during the resort's 40 odd years existence.

Yes/No

(m) If yes, could you give me a brief resume.

Q. 4 Capacity of other public services (B.8.1.8.2)

(a) What public services are provided on the island e.g. Post Office, Telephone Booth

(b) Are any law and order conveniences supplied (B.8.5)

Yes/No.

(c) Is there a need for island enforcement officer (B.8.5)

Yes/No.

(d) Is any provision made to provide medical services for guests (B.8.4)

Yes/No.

../8

Q. 4 (Contd)

(e) What do these provisions consist of e.g. (B.8.4)

- Waiting room
- Trained nurse
- Chemist shop

(f) What communication exists with the mainland (B.8.2)

Q. 5 Size of Private Service Sector (B.9)

(a) Is the shopping complex owned and operated by Heron Island Pty. Ltd.

Yes/No.

(b) What plans are there to alter the complex

(c) Are there plans to stock convenience foods to supplement existing meal routines.

(d) Are any refreshments provided free of charge.

Yes/No.

Q. 6 Average daily tourist expenditure (B.10)

(a) Do retail facilities contribute to an overall operational profit.

Yes/No.

(b) Please rank the most/least lucrative facility.

(c) How much dedicated expenditure occurs with regard to supplying periphal activities for example:

- Fishing boat
- Diving boat
- Weekly cruise/barbecue
- Shop/boutique

(d) What would the average expenditure per tourist be for:

- Refreshments
- Recreational activities
- Souvenirs

../9

Q. 7 Public Revenues from tourism (B.12)

(a) What operative taxes does Heron Island Pty. Ltd. (show whether local, state or Commonwealth taxes).

(b) Is any commodity tax which in the view of the management is exorbitant or unnecessary.

(c) Investment for public services (B.13)

- What public services have been provided by Government Investment.

  Please show amounts invested and dates of investment (Sewage, waste collection/disposal, utilities, communication, transportations, health, recreational facilities, other).

(d) What additional services have been provided by Heron Island Pty. Ltd. (B.13)

Please show amounts invested and dates of investment (sewage/waste collection/disposal, utilities, communication, transportation, health, recreational facilities, other.)

Q. 8 What are approximate proportions of annual income to investment (any year) (B.14 and B.15) for:

- Sewage and treatment plants
- Solid wastes collection and disposal
- Utilities for communication
- Transportation
- Health
- Recreational facilities
- Water storage/desalination/transportation/pumping
- Power generation
- Building and accommodation
- Plant and machinery
- Shopping complex
- Any other - please specify

Q. 9 (a) Does the location of Heron Island present any communicative or transport problems in comparison with the operation of say more coastal resorts (B.15)

If yes, please show example of extra investment required.

END INTERVIEW

GREAT BARRIER REEF MARINE PARK AUTHORITY
Commonwealth Bank Building, 370 Flinders Street, Townsville
P.O. Box 1379, G.P.O., Townsville, Qld 4810 Telephone (077)712191

23 June 1978

PERSONAL INTERVIEW FOR THE DIRECTOR OF HERON ISLAND RESEARCH STATION

The questions presented below seek clarification of a number of environmentally related problems that could be relevant to Heron Island.

The questionnaire is part of a survey being conducted by the Authority to complete a paper for an O.E.C.D. group of experts on the environment and tourism.

All material answered by you shall remain confidential and shall not be used without your agreement.

(REFERENCES REFER TO O.E.C.D. GUIDELINES)

1. Heron Island has been occupied on a continuous basis for over 50 years.

(a) Of the occupied areas, such as the resort, the research station, is there evidence of actual environmental deterioration.

Yes/No.

(b) If yes, please illustrate with examples, taking into account natural phenomena (waves, wind, rain); human usage (walking, fossicking) indigenous and introduced flora and fauna.

(c) Of the unoccupied natural areas, for example the forest, the surrounding reef, surrounding waters, is there evidence of actual environmental deterioration.

Yes/No.

(d) If yes, please illustrate with examples taking into account natural phenomena (waves, rain, wind) human usage (walking, souveniring) indigenous and introduced flora and fauna.

(e) Do you consider a certain amount of environmental deterioration a normal adjunct to human development on any island.

Yes/No.

(f) If yes, would you expand your answer.

(g) Is wildlife, marine and terrestrial, encouraged in certain areas.

Yes/No.

(h) If yes, please expand your answer.

(i) Are birds and turtles endangered by the islands buildings, night lighting, people, tractors and introduced fauna.

Yes/No.

(j) If yes, on any of the above points in (i), could you please expand.

(k) In relation to the above (i), can you suggest any logical solutions, e.g., altering the colour of present night lights.

(l) Are there any estimates of the number of fledglings birds and turtles destroyed due to natural (including attack by scavengers) causes

Yes/No.

(m) Are pisonia trees included in this estimate

Yes/No.

(n) If yes, could you supply references.

(o) Are there any estimates of flora and fauna destroyed by human interference.

2. (a) Have Heron Island and Wistari Reefs a low tolerance to human visitation

Yes/No.

(b) Could you please expand.

3. (a) Does the landscape on the island (national park, dunes, habitated areas) have a low tolerance to human visitation

Yes/No.

(b) Could you please expand.

4 (a) Does the Research Station plan any collaborative programs with the resort to provide to public interpretative facilities for both research visitors and resort guests.

Yes/No.

(b) If yes, please expand your answer.

5. Size of permanent population (A.9)

(a) Number of persons employed

(b) Occupational breakdown (occupations are to be presented in three periods

1967/68 1971/72 1976/77

6. Employment

(a) Total number of persons employed

Answer to be presented in three yearly periods

1967/68 1971/72 1976/77

7. (a) Is staff accommodation and keep supplied free, or is a nominal rental charged

Yes/No.

(b) Do skilled staff have equal accommodation facilities as unskilled staff

Yes/No.

7. (Cont)

(c) Are staff both skilled and unskilled carried over accommodation troughs to enable the research station to function at peak periods.

(d) What is the ratio of casual to permanent staff over the three periods.

1967/68 1971/72 1976/77

8. (a) If possible show number of guest/nights in occupied rooms by months of the year over the periods 1975/6/7 (B.1)

9. Capacity of environment related public services (B.7)

(a) What is the present sewage system (B.7.1.1)

(b) Are all ablution and bathroom outlets sewered

Yes/No. (B.7.1.1)

(c) Is wastewater discharge included in human wastage disposals or is it a separate system (B.7.1.2)

(d) Do all sewage treatment systems operate within the conditions of relevant Public Health Acts. (B.7).

Yes/No.

(e) Do the sewage treatment systems cope with peak accommodation (B.7.1.1)

Yes/No.

(f) Does the outflow present any environmental problems to research station personnel e.g., smell, seepage (B.7.1.1)

Yes/No.

(g) If yes, what improvements on the present system are envisaged.

(h) Complete the table (B.7.1)

No. of Rooms	Type of facility	
	Ensuite	Ablutions

(i) With what frequency is garbage collected from the following areas
Accommodation units ( ) kitchen ( )
Entertainment areas ( )

(j) With what frequency are outside areas maintained (B.7.2)
Walkways free of litter and leaves ( )
Beachfront ( )

(k) What methods are used to dispose of the various types of solid wastes e.g. (B.7.2)

Food and scraps
Building materials

(l) Has sewage disposal altered during the research stations 27 years of existence

Yes/No.

(m) If yes, could you give me a brief resume.

10. Is there any provision made to provide medical services to research station personnel (B8.4)

(a) What services are obtained from Heron Island Resort Services which can be of a recreational, social, communicative or medical nature.

END OF QUESTIONNAIRE.

APPENDIX II

Heron Island Fishing Guide.

Heron Island. It's no coincidence it was named after a bird that loves fish.

Heron Island, one of the Capricorn group and part of the Great Barrier Reef, is a true coral cay and its natural charm appeals to both tourists and fishermen.

The island is 1.2 km (¾ mile) long, 0.8 km (half mile) across and has been built up from the surrounding reef over thousands of years.

Heron, a National Park, occupies 42 acres and has ample vegetation with trees up to 12 metres in height.

The island was pioneered by the Poulsen family in the 1920's and in 1974 the P& O Shipping Line acquired a share-holding.

Good fishing is enjoyed most of the time but is influenced by weather conditions.

Reef fishing was confined to bottom species but recent surveys have shown that there is an abundance of surface fish in these waters.

These include Mackerel, Turrum, Golden Trevally, Black King, Tuna, and Yellowtail Kingfish.

Certain areas of the reef are fish habitats but there is still plenty of scope for the angler.

In rough conditions, the calm water of Heron Lagoon which is completely surrounded by coral reef, provides good fishing.

An area within the lagoon named the Tennis Courts because of its shape, produces sand snapper and coral trout.

The lagoon is about 1.6 km (1 mile) from the resort.

Those anglers who prefer light gear fishing are well catered for as whiting, bream and flathead may be caught from the beach at high tide.

Heron's fleet of boats includes two launches capable, between them, of accommodating a large number of reef fishermen as well as trolling for surface fish to and from the fishing grounds.

Tourists at Heron enjoy motel style living with a communal dining hall, and fishing trips to near or distant reefs.

Surface fishing enthusiasts are well catered for with two small, fast, aluminium boats capable of trolling close to the reefs.

Like many of the other Barrier Reef islands, Heron has colourful coral formations inhabited by brilliantly-coloured fish.

Heron can be reached by a seven hour drive from Brisbane to Gladstone and a journey to the island can be made by boat or helicopter.

The Good Gear.

Whilst it is no doubt true that fishing gear is only as good as the angler who's holding it, it's also true that good gear can make or break your fishing holiday. Basic fishing gear, like handlines, hooks and sinkers are included in the cost of boat trips, but you'll probably like to consider catching a fish on your own outfit.

If you intend trolling or jigging for the surface species you need a good strong boat rod in about the twenty or thirty class preferably with a roller runner at the tip, or at least with high-speed guides throughout. Good brands like Butterworth, Mitchell, and Jarvis Walker all have rods like this in their ranges. You then need to match this with a good trolling reel capable of holding 3-500 yds. of 20/30 lb. line. Reels like the Penn Senator 4/0, Penn Jigmaster, Abu 8500 or Abu 10,000.

At a pinch you can get by with one of the larger eggbeater type reels although line twist can become a problem with high-speed trolling.

Be sure to bring adequate supplies of wire trace, game swivels and trolling lures. It's far better to bring too much and take some home, than run out halfway through your holiday.

As far as lures go, there are a million to choose from. Any of the imitation squid-type lures are good for medium to high-speed trolling as are feathers, Xmas-trees, small Konaheads and Knuckleheads, and other similar lures.

For slower trolling the fish-shaped Rebels and Abu Killers are tops, or you could try the flashing type Drone spoons.

For jigging, the large 4-7 oz. painted metal jigs are taken with great gusto by a large variety of surface and bottom feeders.

For bottom fishing on the reefs, the previously described outfits are also very effective, or you could use the normal Southern States Snapper type gear, or handline and gloves.

It doesn't however pay you to go much lighter than 30 lb. gear because of both the coral and some of the heavy fish that live there.

For beach fishing for the whiting, bream and flathead, light outfits can be used to great effect. The new Zebco range of reels look ideal for this kind of fishing.

If in any doubt at all ask your tackle shop, but make sure it's a tackle shop that specialises in quality sport-fishing gear, otherwise they just might recommend something quite unsuitable. It's happened before.

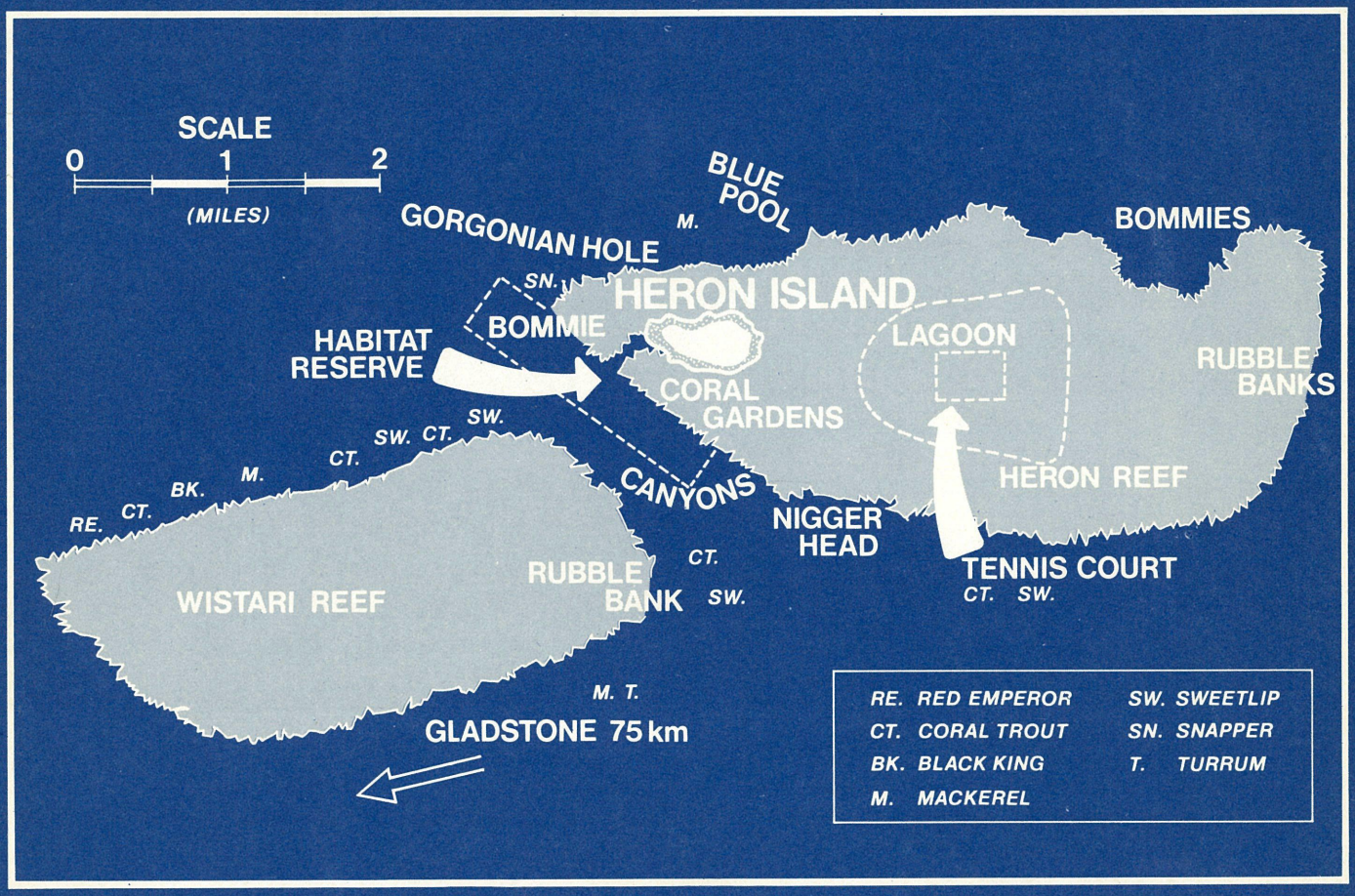
Top Angler's Own Map.

It's not often that top anglers will let people in on their spots, but Brisbane Tackle Dealer and fishing expert, Len Mossop has kindly allowed us to print his Heron Island Map together with a key to what fish you find where.

Now all you need is a little bit of the proverbial fisherman's luck and you're in business.

And don't forget that if you break any of the existing Heron Island records on recognised sport-fishing gear (including handlines) you'll win a one week holiday on Heron Island on the house.

Good fishing!



Heron Island Reservation Centre.
P.O. Box 72, Hamilton, Queensland, 4007.
Telephone (07)268 4922, 268 5590.
Telex 41678.
Or contact your nearest travel agent.

Heron

. . . right on the Great Barrier Reef

DIVERS' GUIDE TO HERON ISLAND

Heron Island is serviced from Gladstone, some 600 kilometres north of Brisbane. Gladstone can be reached by air, road and rail.

For reservations: Call Ansett or TAA, any branch of the Queensland Government Tourist Bureau or your Travel Agent.

DIVING LOCATIONS & GENERAL INFORMATION (See Map)

1. Heron Island.
2. Reef flat to the south of the island. This part of the reef receives a great deal of attention from the scientists who stay at the Research Station and who are interested in the fauna found in this type of environment. Good snorkelling can be found to the left of the wreck. However, one should check regards tides, etc.
3. The reef flat on the northern side of the island is in many ways similar to the southern section, except that the coral clumps are larger with deeper sandy areas between. Reasonable snorkelling, and very calm when the prevailing winds are blowing hard. Both sides are equally interesting and provide as good coral fauna as can be found anywhere else.
4. This is a very popular dive location known as the "Bommie". It is located about a third of the way from the Harbour entrance to the western tip of the reef. It is just opposite a rubble bank that is out of the water from about half tide. The Bommie in fact consists of a number of large coral heads which rise abruptly from the sea bed. A good location for the underwater photographer. The fishes are extremely tame and can be hand fed. Manta Rays are quite common as are other rays. A large Wobbygong Shark is always in residence as are two Moray Eels. The area is also good for close-up photography with colourful nudibranchs, tubeworms, etc. Good diving can also be found as one swims away from the Bommies towards the western tip of the reef. The water is often clearest during a dropping tide. If there is a large tidal movement be wary of strong currents.
5. Off the reef edge from 5 to 8 can be found some of the most interesting and diverse coral growths along the reef edge. Good for general interest diving and fish photography. This area – the channel between Heron and Wistari – is subject to strong currents (tidal stream), especially during the spring tides. With a wind blowing against the current a very steep sea can develop. The visibility is often best during the high tide or a rising tide. Part of this section is known as the Coral Gardens.
6. This area, which is just opposite a rubble bank on Wistari Reef, is of interest because there is a fairly steep drop-off. Depths of about 125 feet can be found. Large Gorgonia coral fans can be found. For the experienced diver/ photographer this can be an interesting dive.
7. Interesting and safe diving. Good place to go in a strong south-east wind. However, the underwater visibility is seldom exceptional. The reef is very uneven, providing one with varied underwater scenery. Good for close-up photography.
8. At this location there is a large coralhead on the reef which can be used as a landmark, plus determine the height of the tide. From this section towards Heron Island there are a series of grooves in the reef. It can provide some interesting diving. This 'groove and buttress' system is known as the Canyons.
9. This area which is called the Gorgonian Hole or the Caves is a very interesting diving location. Here the reef falls away into deep water in an irregular cliff, the face of which has a multitude of interesting organisms growing and living there. Abundant fishes. Some small caves and 'bridges'. By aligning the left hand post on the Gantry with the high tower one can find this area.
10. A large cleft in the reef commonly called the Blue Pool. During low tides one can walk out to this area. There are several small shallow enclosed pools which often contain interesting fish trapped by the falling tide. Good safe snorkelling, especially for the newcomers to the sport.
11. During south-easterly weather, one can get a very good lee at this location. Calm water and many coral bommies, surrounded by sand. Good selection of fishes.
12. From about half tide several rubble banks are exposed, the diving is poor. During the strong south-east winds one should avoid the area between 8 and 12.
13. Wistari Lagoon. Generally not very interesting, poor visibility.
14. Heron Reef Lagoon. Much the same as Wistari. The deepest part of both lagoons would be about 18 feet.

The water is often most clear around high tide, especially during neaps. The poorest visibility is normally found during the spring tides, at low tide and in the lee of a reef having a lagoon; this is especially so in windy weather or with a swell running. The best visibility is normally in the morning.

Walter Deas and his wife, Jean, were born in Scotland. Walt began diving in 1950 and was a pioneer of the sport. They came to Australia in 1959 and established themselves in the diving scene in the Great Barrier Reef. They later travelled overseas again, exploring the waters of Florida, the Bahamas, UK, Tahiti, New Zealand, Fiji and the Red Sea off the Sudan.

Both Walt and Jean are active members of the Underwater Research Group of N.S.W. and Walt is a member of the British Society of Underwater Photographers, The Fauna Preservation Society and the Australan Society of Authors.

An internationally-known underwater photographer, Walt's photographs have won awards in Italy, Japan, Portugal, the UK, and in 1969 he became Australian Photographer of the Year. He was elected to the Academy of Underwater Photographers Hall of Fame in the U.S.A.

His photographs have appeared in books and magazines all over the world, including Animals, The National Geographic, Skindiving in Australia, Sea Secrets, Triton, Sub Aqua and many others.

He was the co-author and photographer of the book, Beneath the Seas, and author/photographer of Seashells of Australia, Australian Fishes in Colour and photographer of Life on Coral Reefs of the Seychelles, lead photographer of the Time/Life book, Great Barrier Reef and A.U.P.'s The Great Barrier Reef. With Jean he was co-author and photographer of Natural Life of the Barrier Reef.

He also shot footage for the Canadian Broadcasting Commission film, Wonders of the Aquarium World for the Vancouver Public Aquarium.

Walt and Jean are at present the Resident Divers on Heron Island holiday resort where they instruct and guide visitors around the surrounding Great Barrier Reef.

DIVING EQUIPMENT AVAILABLE FOR HIRE

The undermentioned diving equipment is usually available on the island and is hired to certified divers who should be in possession of their C-Cards. Subject to weather conditions, the dive boat operates twice daily.

MASK, FINS AND SNORKEL
WET SUIT JACKET OR SHORTY SUIT
SCUBA TANK WITH BACK-PACK
WEIGHT BELT AND WEIGHTS
REGULATORS (Buy and sell back basis)
INFLATABLE DIVE VESTS
REPLACEMENT CARTRIDGES FOR VESTS
SCUBA AIR TANK FILLS

DIVING LOCATIONS AT HERON ISLAND