GREEN ISLAND ECONOMIC STUDY



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GREAT BARRIER REEF MARINE PARK AUTHORITY

ECONOMIC ASSOCIATES AUSTRALIA Economic and Management Consultants

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1.0 SUMMARY

1.1 Introduction

This document forms the report arising from an economic study of Green Island, North Queensland. The study was commissioned by the Great Barrier Reef Marine Park Authority and was conducted during the period June - October 1979.

This chapter of the report contains a fairly full summary of the study. It is designed to serve as a separate presentation for those who do not wish to read the full technical report which constitutes the remaining sections of this document.

The objective of the study was to evaluate the existing and alternative uses of Green Island and its reef as a tourist/recreation resource. The assignment was conducted by discussions with many persons including all operators of commercial facilities on Green Island, by examination of various publications and documents, and by analysis of the information collected.

Two field surveys of tourists were conducted to supplement other data sources. One was made on-board the public ferries serving Green Island and the other in accommodation establishments in Cairns.

Acknowledgement is made of the information provided by the Green Island Management Committee. In particular, visitor surveys undertaken by the National Parks and Wildlife Service and the Queensland Fisheries Service have been useful data sources for this study.

Attention is drawn to the confidence margins associated with many of the quantitive estimates presented in the report such as the forecasts and the estimates of value in the economic evaluation. The figures should generally be interpreted as indicative of orders of magnitude only. Uncertainties have arisen for a variety of reasons including the usual error margins associated with all forecasts and surveys. Other particular concerns with reliability have been caused in this study by the paucity of research on tousism in Australia the consequence of which has been that some aspects have necessarily had to be based on informed judgements and subjective opinions.

1.2 The Island Today

Green Island is visited by about 130,000 persons per annum with up to approximately 1000 persons on a peak day. Visitors to the island can engage in a wide range of activities. The attractive natural environment encourages participation in swimming, sun-baking, snorkelling, reef walking, fishing, and walking around the island. Commercial attractions are an underwater observatory, reef viewing from glass bottom boats, a theatrette showing films of the Reef, and an aquarium plus artifacts display.

Most visitors to the island come for only one day. Comparatively few stay overnight at the hotel which has an 80 bed accommodation capacity. Visitation exhibits a markedly seasonal pattern with the patronage during the winter months, May to September, accounting for some 60% of the annual total.

Market research conducted during the study indicates that the appeal of the island is heavily dependent on its relationship to the reef with the island itself and the climate being of much lesser importance. The convenient location of the island and the commercial tourist facilities are other reasons underlying the popularity of the island as a tourist attraction.

The island is surrounded by a reef with an area of about 1200 ha. The reef forms part of the Green Island Marine Park which extends from high water mark on the island to 1.6 km beyond the outer edge of the reef. The park covers an area of about 3000 ha and within it marine products are completely protected, recreational fishing by hand lines is regulated and the use of spearguns and nets is prohibited. Though little published information is available on the marine environment, it is not known to have any unusual features. Human use is understood to have caused only minor impacts apart from a depletion in the stock of large specimens of some fish species.

The island itself is a low coral cay with an area of about 12 ha. Even though it has been in use as a holiday and recreational centre for all of this century most of the island still retains a relatively undeveloped character.

Some two-thirds of the island is a National Park where the vegetation is in a relatively natural state. The park is covered by a closed vine forest typical of tropical mainland Queensland and sometimes found on coral cays. Native fauna is similar to that on many coral cays located on the Inner Shelf north of Cairns.

Elsewhere on the island developments have been constructed so as to minimise the effect on the environment with, for example, an almost continuous tree cover being preserved. As a result a relatively natural or undeveloped character exists. Man-made facilities are concentrated in the western end of the island (ref. Figure 1.1). All private development is built under leases which have been granted under various tenure conditions and use restrictions.

Perpetual leases, equivalent in most respects to freehold tenure, apply to all private facilities with the exception of the underwater observatory and linked residential site. The leases applying to these two latter developments expire in 1991 at which time the lessees have no statutory priority right to a new lease.

While the terms of the leases generally prevent competition between operators on the island, there is no regulation with respect to such matters as standards or prices except for some conditions applying to the hotel lease.

Most visitors to the island make use of the commercial ferry services which operate daily from Cairns. Journey time for the approximate 27 kms distance averages about $1^{1/2}$ hours.

Erosion is taking place on the western fringe where the recent trend has been for the south-west corner to erode and the north-west corner to accrete. The erosion has led to the jetty being extended to maintain access and is currently endagering the dining room of the hotel.

Rain water is the only natural source of fresh water on the island. As this source is not adequate to meet the demands, supplementary supplies are ferried from the mainland. A number of possibilities are available to cater for future expansion including desalination of the brackish underground water sources.

Sewerage effluent is treated by detention in a holding tank and chlorination before being piped to an outfall located over the edge of the reef.

1.3 Current Employment and Income Effects

One way to view the economic importance of Green Island is through an examination of the employment and financial flows generated through tourist and recreation use.

The total value of sales for all operations on the island including transport from Cairns, is predicted to amount to \$1.9 m in 1979.

Estimates of the average employment and income effects are presented on Table 1.1 for both Far North Queensland (corresponds with Far North Statistical Division) and Queensland.

	Estimated Em Generated by G	ployment and I reen Island Sal	ncome les, 1979	
	EMPL FNQ ^(c)	OYMENT ^(a) QLD.	INCOM FNQ ^(c)	E (\$000) ^(b) QLD
Direct	83	83	640	640
Indirect Direct & Indirect Induced	44 127 37	49 132 69	282 922 231	375 1015 466
Total	164	201	1153	1481

(a) Full time equivalents

(b) Wages, salaries and supplements only, for 12 months

(c) Far North Queensland

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

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

It should be recognised that the economic impacts treated above are not equivalent to the immediate losses in employment and income which would arise if Green Island was "closed". To derive such a measure, account must be taken of the behaviour of tourists under this hypothetical circumstance. Insight into likely tourist reactions is available from evidence collected during the accommodation survey.

The survey showed that Cairns tourism seems not to be predominantly dependent on Green Island or the Great Barrier Reef. Climate and general scenery appear as more important attractions. Consistent with this finding is the fact that only 5% of the survey respondents stated that Green Island was so important an attraction that they would not come to Cairns if it were "unavailable". (ref. Table 1.2)

The view that Green Island tourism appears as a minor part of the full experience of a trip to the north is further reinforced by the alternatives tourists would have chosen if they could not get to Green Island. Most visitors surveyed indicated that they would simply substitute an alternative local attraction.



TABLE 1.2 Essential Attractions of the Cairns Region

ATTRACTION	% RESPONDENTS WHO WOULD NOT VISIT CAIRNS REGION IF THE ATTRACTION WERE UNAVAILABLE
Climate	19.2
General Scenery	6.7
The Reef	12.6
Green Island	5.0
Other Reef/Islands	1.4
Other	2.8

Using this evidence and making allowance for the implicit consequences in terms of changes in accommodation and other expenditures in Far North Queensland, a revised estimate has been made of the economic impacts generated by tourism on Green Island. The current value of expenditures with this approach is estimated to lie between \$2.6 to \$4.0 m. Estimates of the corresponding employment and income generated in Far North Queensland are shown on Table 1.3.

TABLE 1.3 Far North Queensland: Estimated Employment and Income Generated by Tourist Expenditure Dependent^(c) on Green Island, 1979

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

(a), (b) See footnotes to Table 1.1

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

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

The economic impacts discussed above need to be interpreted with care. Put simply, employment of labour can only be regarded as an economic benefit - that is a net gain to society — if other opportunities do not exist for employment of that labour.

1.4 Forecasting

An indicator of total visitation to Green Island is shown on Figure 1.2 along with a display of other indicators typical of general trends in tourism. Consistent with the apparent general trend in Reef oriented tourism (as distinct from tropical island tourism), the rate of growth of patronage of Green Island has progressively declined over the period, the annual trend rates of growth by period being 5.6% (1960-78), 3.6% (1969-78), 1.9% (1972-78) and -3.4% (1975-78).

Examination of all available evidence suggests that the recent plateaux in the level of usage is not a minor abberation on a much different long-term trend. While circumstances remain unaltered, little movement in current visitation levels appears likely.

Forecasts of patronage were prepared in a two stage process in order to minimise uncertainties and allow more reliable comparisons between visitation for various alternative use plans. The first step involved the estimation of a "basic" forecast equivalent to that for the "Status Quo" alternative (ref. Table 1.4). This alternative is based on the assumption that conditions on the Island are maintained comparable with the existing situation. The second stage consisted of preparing forecasts for each of the other use plans selected for evaluation, starting from the "basic" forecast as a common foundation for all these predictions.

PATRONAGE — Log Scale



Tourist Trends

For the Status Quo alternative, the total visitation is expected to grow from 135,000 persons in 1980 to 165,000 persons in 1990, and to reach about 200,000 persons by the turn of the century. This forecast represents the best estimate of future visitation and has a growth pattern which approximates to an annual compound rate of increase of 2%. The upper confidence bound for the estimate is set at a rate of growth of 3% per annum, while the lower confidence bound has a constant level of visitation equal to that at the present.

Because of the lack of appropriate research in Australia forecasts of visitation must necessarily be based on informed judgements. In deriving the forecasts account was taken of the widest range of available statistical data and background information. Factors recognised as having a bearing on patronage include general shifts in consumer behaviour and life-styles as well as movements in the size and geographical distribution of the Australian population. The likely trends in international tourism were also considered.

Three factors were seen as having special significance. One was related to the expected change in the relative balance between sea and land transport in determining the choice of a destination to view the Great Barrier Reef. The past emphasis on the sea journey is expected to lessen while land transport is anticpated to play a greater role with locations close to major population centres being favoured. A second factor was the anticipated growth in competition with opportunities for tourism becoming more widely available along the full length of the reef. The third factor was the incidental character of the visit to Green Island. A visit to Green Island appears for most people as a minor element in an extended visit to the north. One obvious implication of this factor is that actions taken on Green Island will have only a very minor influence on patronage unless the actions are of such major dimensions that the nature of the experience is altered.

1.5 Options Selected for Evaluation

After consideration of the constraints and opportunities which were seen to apply to the future use of Green Island as a recreational/tourist site, three options were selected for evaluation in addition to the Status Quo alternative. The conclusion drawn from this assessment was that the range of alternatives is heavily constrained. In addition to being limited by accepted policies aimed at preservation of the ecosystem and the unspoilt character of the island, the range of realistic alternatives is further reduced by many other constraints. Among the more important are seen to be the small size of the island, the conflicts between use by day-trippers and resort guests, perceptions of crowding, and the likelihood of restrictions on funds available from the Government.

Another important reason why options for major changes in use look to be heavily constrained arises from the position of commercial operators. They generally have to contend with declining comparative advantages, growing competition, tight lease conditions and limited areas for expansion. Facilities are becoming dated and their appeal appears to be declining. However, commercial motives for major modernisation programmes are not strong because other investments appear likely to yield higher returns.

Environmental carrying capacity does not appear as an immediate problem since it appears that the number of visitors to the island could be allowed to increase by up to 50% above current levels without any impairment to the environment.

Overall, the island appears unlikely to change significantly in the future unless existing leases are altered or other uses made of public lands. Knowledge about the consequences of such possibilities helps to provide a framework for proper decision-making even though particular options may not always be seen as practical or realistic. The three alternatives selected for evaluation along with the Status Quo option are defined in brief below:

- "No Resort" Alternative. Under this alternative the resort accommodation on the island is assumed eliminated and the land so released developed for public use by day-trippers.
- "Expand Resort" Alternative. This alternative hypothesis is that the island is primarily devoted to serving the interests of resort guests. The resort is expanded to 200 bed capacity and almost all day-trippers are excluded from the island.
- "Camping" Alternative. Compared with the Status Quo options the significant modification under this alternative is to provide for up to 50 tent sites within the National Park.

1.6 Evaluation

A number of different approaches could be used when seeking to "value" Green Island.

One way is through an examination of "economic impacts" as has been done in Section 1.3. The term "economic impacts" as used in this report indicates the extent to which tourism and recreational activity influences measures of economic activity such as employment, income, expenditures and business sales. These are financial and social measures familiar to most people and no further elaboration is required here. In the results of the evaluation presented in this section the impacts are estimated as the consequences of tourist expenditure on Green Island, rather than with the alternative perspective of what the losses on closure would be. The figures are thus consistent with those presented previously in Table 1.1. Again, as discussed previously, it is appropriate to draw attention to the care with which these impacts need to be interpreted because of possible confusion over their meaning.

Cost benefit analysis offers a second approach to "valuing" Green Island. In this approach the objective is to establish the "economic effects" which arise from use of the island and surrounding reef as a tourist/ recreation resource. "Economic effects" refer to the benefits and dis-benefits (costs) incurred by society. Using this approach benefits are measured in accordance with the strengths of preferences of each individual. Costs are measured as the value the resources (labour, etc.) have in their next best alternative use, that is, their opportunity cost. The total of all effects is called the net users' benefit which is a measure of the contribution to the welfare of society obtained from using the resource in a particular way.

An individual's strengths of preferences can be expressed in terms of the amount of money he would be willing to pay to participate in some activity or engage in the consumption of some good. Information on values associated with the use of Green Island was obtained through direct questioning of survey respondents, an approach which, if anything, may tend to lead to underestimates of benefits. The respondents were asked to state the maximum amount they would be willing to pay for each of the island's attractions and for the trip as a whole. The values so obtained were employed in the evaluation with adjustment only as appropriate to take account of the expected decline in the quality of vistor's experience over the time period for the analysis.

An evaluation was made of the four selected alternatives. As well, the economic benefit associated with each of the major attractions on the island was derived for the case of the Status Quo alternative. The results of the evaluations are presented on Tables 1.4 and 1.5. In calculating the values in Table 1.5 an imputed value for land rent has been included to reflect the fact that the land could have provided benefits through alternative use.

Examining Table 1.4 shows that the Camping alternative appears as the best solution in economic terms. However, neither the economic effects nor economic impacts of any alternative appears significant as compared with anticipated values of corresponding total measures for the region or State. The obvious implication of the result is that the choice of alternatives within the range considered will not be material from the viewpoint of economic considerations. Clearly, however, there are differences between the alternatives with respect to the flows of monies within the community as a whole.

From Table 1.5 it can be seen that the activities/attractions most closely related to the Reef provide the greatest net benefit. The other man-made attractions either attract few visitors or provide little or no benefit to the many who do visit. Another way of looking at the results presented in the table is to see them as the values of the losses which would be incurred if the particular activity was unavailable. Given that the main concern of planners is with society's welfare, accent in the future should be given to those activities which are reef oriented and more generally to those activities which are linked with the natural environment.

TABLE 1.4 Forecasts and Evaluation of Alternative Use Plans

Compa	rative St	uumary	or mea	surapie	e values)		
				Alternati	ive			
Visitation Propagate (0) (000)	Status (Quo	No Re:	sort	Expa Reso	ind ort	Camj	oing
VISITATION FOREcasts (2) (,000)								
	1990	2000	1990	2000	1990	2000	1990	2000
• Day-trippers	140	170	140	170	10	10	140	170
 Resort Guests Campers 	13	13			<u>30</u>	30	13 7	13 8
Measurable Economic Effects (b	⁾ (\$,000) (5	% discou	nt rate)					
Net Users' Benefits	5800)	450	0	380	0	61()0
Additional Resource Costs (c)	1700)	190	0		^	180	00
Economic Impacts (persons) in 1	Far North	Queensla	and	U.	380	V	430	10
• Direct & Indirect								
Employment	127		97		92		12	7

(a) Values rounded to the nearest thousand and measured in terms of visitor days expressed in adult equivalents. Where the same forecasts appear for a number of alternatives this should be taken as indicating only that within the accuracy of the estimates the difference between them appears to be negligible.

(b) Values rounded to the nearest \$100,000.

(c) Covering all costs which are not covered by user fees with the exception of those public costs for water supply and sewerage.

TABLE 1.5Net Values of Activities for Status Quo Alternative

Activity	Net Present Value ^(a) (\$,000) Discount Rate		
	3%	5%	7%
Underwater Observatory $^{(d)}$	1100	650	450
Castaway Theatre ^(b)	300	200	100
Marineland Melanesia ^{(b)(c)}	0	0	0
Glass Bottom Boat Trip (d)	2300	1400	1000
National Park ^(b)	2000	750	250
Snorkelling ^(d)	1700	1000	700

(a) Values rounded to the nearest \$50,000.

(b) Including an imputed value for land rent equal to \$150,000 per ha.

(c) No values are shown because of uncertainties as to actual prices paid because of recent price increases. Actual calculations from the survey results and based on the current entrance fees (less discounts) indicated a negative value for this attraction.
 (d) It may be appropriate to subtract an amount from the figures shown to cover part of the administration costs for the marine

park.

1.7 Planning for the Future

Despite often repeated statements emphasising the major tourist potential of the Great Barrier Reef, there is as yet little evidence to support this view. In fact, reef oriented tourism has apparently declined in recent years. The drop in appeal may well be due to the public becoming dissatisfied with the available reef opportunities. The marine environment makes it difficult for the general public to have contact with the reef except through artificial and frequently sterile techniques. For as long as contact with the reef is reliant on existing techniques the role and importance of Green Island as a tourist/recreational resource appears unlikely to become significant.

The potential of the reef, if it exists, is likely to be realised only if some way can be found to involve the tourist with the reef more directly. That the majority of visitors to Green Island have expressed an interest in more information concerning the reef can be seen as some support for the view that the public is seeking an opportunity for more than a casual reef experience. The Queensland Fisheries Service has made a start on giving the public a better exposure to the reef by, for example, conducting guided reef walks. However the programme is limited and constraints on funding restrict development.

Experience overseas points to increased interest in the natural environment when properly "interpreted". While no factual evidence exists in Australia on the effects of interpretation at marine parks, it is generally accepted that there is a demand for and a merit in providing a full interpretative programme related to the Great Barrier Reef as a whole.

It is appropriate to query what part Green Island should play in such a programme. Is it, for example, still a good choice for one of the first major interpretative centres? As discussed previously, circumstances are pointing towards a shift in accessibility conditions with parts of the reef further south and closer to population centres becoming more prominent in site selection. The case for consideration of other sites is further warranted by the fact that a major interpretative centre is likely to have certain features which are competition with existing attractions on Green Island and so could affect their viability. Even if Green Island remains a favoured site it seems desirable to select the interpretative theme for the island and to decide on the scale, type and location of facilities after consideration of proposals for interpretation elsewhere on the Reef. Remaining questions such as these are outside the scope of this study and though not amendable to economic analysis at this time they appear likely to have a bearing on the economic value of Green Island as a tourist/recreation resource in the future.

2.0 INTRODUCTION

2.1 Background and Purpose

The Great Barrier Reef Marine Park Authority (Authority) is charged with the responsibilities, amongst others, of making recommendations on those sections of the Great Barrier Reef (Reef) which should be declared as parts of the Marine Park and of preparing zoning plans for the Marine Park. To meet these responsibilities, the Authority directs a research programme involving the assembly and analysis of data from a diverse range of specialists in the science and social fields.

As part of this programme, Economic Associates Australia was commissioned on the 15th June 1979 to undertake an economic study of Green Island and its reef as a tourist/recreation resource. This document forms the report arising from the project. It contains an economic assessment of the value of Green Island with and without changes to present uses together with an examination of the linkages of activities on Green Island with the economy of North Queensland and elsewhere in Australia.

The decision by the Authority to focus research on Green Island at this time arises primarily from the selection of the Cairns area for investigation as the next section of the Marine Park. With well over 100,000 visitors per annum, Green Island plays a major role in Reef tourism both in the northern sector and for the Reef as a whole.

A further reason for the study was that the research complements the concurrent investigations by the Green Island Management Committee (Committee). This body was established by the Queensland Government to assess present and future management of the island and its reef.

Thus, the report has three purposes:

- As a stand-alone document which, within the scope set by the Terms of Reference, presents an evaluation of future uses for Green Island and the consequential effects elsewhere.
- As an important input to the subsequent comprehensive research programme of the Authority for planning of the northern sector.
- As a body of information useful to the Committee.

In writing the report the Consultants have recognised that the minority of its readers will be specialists in environmental economics. The aim has, therefore, been one of minimising technical language and discussion of theory and other points which, though of interest to economists, are not central to the main purposes for which the report is intended.

2.2 Study Objectives

The broad description of the objective of the study was set down in the Terms of Reference as "an economic evaluation of the existing and alternative uses of Green Island and its reef as a tourist/recreation resource".

More specifically the aim of the research may be summarised in the following terms;

- A thorough appreciation of existing conditions on Green Island, particularly as they relate to tourism and general economic and financial matters.
- The identifiaction of possible changes to existing use arrangements which are of benefit to the public, are practical to implement and are politically acceptable.
- A comparison of the effects over the forseeable future of changing selected features of existing use arrangements. The comparison of effects to be in terms of:
 - The level of tourist use.
 - The value placed on the resource by the Australian public.
 - The impacts on the Cairns, Queensland and Australian economies (concentrating on employment as the main indicator).
 - The financial viability of tourist enterprises.

It is appropriate to draw attention to two aspects which, in accordance with the Terms of Reference, are outside the scope of the present investigation.

Firstly, the indentification of the optimum plan for the island is not a requirement of the study. Though the present study provides useful guidance on the best alternative, a final choice cannot be made without more detailed consideration of the context of Green Island within future plans for the Reef as a whole.

Secondly, management planning for the island is specifically excluded. Hence, there is no discussion in the report on the manner in which any envisaged changes would be implemented or on any general aspects related to management responsibilities and organisational arrangements. In the present study concerns with management are limited to broad estimates of management costs and to ensuring proposed changes are practical to implement. If managements actions are necessary for a change to take place, the proposals have been accepted as realistic only if the requisite powers are currently held by public bodies or could be obtained through the enactment of what was judged to be politically acceptable legislation.

2.3 Conduct of the Study

The assignment was conducted by discussions with many persons, examination of various publications and documents, and analysis of the information collected.

As the ability to undertake research of the kind faced in this study depends to a significant degree on the data base able to be accessed or established during the study, the assembly of information was given high priority. Information was obtained from many public and private organisations and through original field research.

Public bodies who formed major data sources were the Authority, the Committee and, through it, State Government Departments. An official meeting was held with the Committee during the course of the study to discuss the project and to define information gaps.

Information was collected from over 30 private organisations, most of which were centred in North Queensland. A visit was made to Green Island and Cairns from 17th to 21st July 1979. Interviews were held with owners/responsible senior management of each private facility on Green Island, and with representatives of accommodation establishments, tour operators and firms serving the tourist industry in North Queensland.

Two field surveys of tourists were conducted to supplement other data sources. One was made on-board the public ferries serving Green Island and the other in accommodation establishments in Cairns.

Analysis consisted of four main steps - estimation of the level of and value attached to usage of Green Island, comparison of alternatives, economic impact assessment, and overall evaluation. The approaches and techniques used in these steps follow accepted "best practice" procedures.

2.4 Acknowledgements

At this point Economic Associates would like to acknowledge the assistance which they received from many parties during the conduct of the study. Staff of the Authority, members of the Committee, operators of tourist facilities on Green Island and in Cairns, and officers of the North Queensland Development Board have all played an important part in the study through their assistance and co-operation.

Much information of importance to the study was obtained from these sources. The data was often of a highly confidential nature and for this reason does not always appear directly in the report.

2.5 Report Outline

Following the Summary and this introductory chapter there are five sections and a number of appendices in the report.

The next chapter, Section 3, contains a brief description of the main features of Green Island with most attention being given to tourist facilities. Section 4 explores visitor preferences and attitudes with respect to Green Island and the Cairns region. Section 5 examines the current effects of Green Island tourism on the economy. Prospects and options for the future are discussed in Section 6 along with a review of the historic trend in the patronage of the island. Section 7 contains the evaluations performed in the study.

The appendices provide supplementary information. They contain copies of the questionnaires employed in the study, together with details of the various analysis performed in the study.

3.0 GREEN ISLAND - CURRENT STATUS

3.1 General Description

Situated some 27 kms north-east from Cairns, Green Island is a low tree-covered coral cay which forms part of the Reef proper.

The island has an area of about 12 ha. Its shape approximates to that of a tear drop. The maximum dimensions of the island are 660 m long and 260 m wide. The long axis of the island runs almost due west.

The island is very flat, the highest point having a height of 4.5 m above seas level. On most of the northern shoreline there is a gentle slope from the general surface level of the island to the water's edge. Elsewhere there is a vertical drop to the top of the beach averaging about 1 m in height.

The island is fringed by a sandy beach unbroken to the waters edge apart from a narrow line of beach rock which becomes exposed at low tide along most of the southern side and in the north-east corner. The beach is most extensive in the north-west corner due to a build-up of sand in recent years.

The surrounding reef has an area of about 1200 ha.

The island experiences warm to hot summers and mild winters. Rainfall is high, the annual average being about 2200 mm. The wet season occurs in January to March, the period during which tropical cyclones are also prevelant. The island is subject to flooding by storm surge. Almost all of the island was reported to be covered by shallow water on one occasion within living memory.

3.2 Tourism

Green Island has been a holiday and recreational site since late in the 19th century when Cairns residents used the island for fishing and hunting parties. Expansion of this role has continued to the present. Green Island is now firmly established as an important tourist attraction in North Queensland, most notably because it allows the public an opportunity to see the Reef at first hand.

The pattern of recreational use was firmly set in 1906 when the island was proclaimed a Recreation Reserve and the first jetty was constructed. A passenger ferry service was commenced in 1924 by Hayles. Applications for the development of a tourist resort were called in 1938, leading in the early 1940's to the erection of the first buildings forming part of the Coral Cay Hotel. An underwater observatory was opened in 1955 and leases for the establishment of a theatrette and marine zoological gardens were granted in 1961.

The popularity of Green Island stems from its natural environment and convenient siting. These features led to and are now reinforced by the commercial tourist facilities. There are equivalent attractions elsewhere on the Reef; but, nowhere else are the attractions all grouped in the one location, nor can the alternative locations offer comparable accessibility. However, the island's long history of tourist use means that many of the facilities are now becoming dated. Some of the facilities also become overcrowded in peak periods, a problem which is by no means unique to Green Island and one for which economic solutions are often difficult or impossible to find when patronage, as here, is markedly seasonal.

Visitors to the island can engage in a wide range of activities. The attractive natural environment encourages participation in swimming, sun-baking, snorkeling, reef walking, fishing, and walking around the island. Commercial attractions are an underwater observatory, reef viewing from glass bottom boats, a theatrette showing films of the Reef, and an aquarium plus artifacts display.

Most visitors to the island come for only one day. Comparatively few stay overnight in the hotel on the island. Visitation exhibits a markedly seasonal pattern. The peak season occurs in the winter months, May to September, during which period some 60% of the total annual visitation takes place. The highest monthly level of visitation occurs in August when about 16% of the total annual visitation occurs. Patronage is at a high level in all school holiday periods though during the Christmas break most of the influx occurs after the New Year.

Examination of patronage levels by month over the last fifteen years indicates the seasonal pattern has remained reasonably stable. Patronage in the summer months is particularly volatile, reflecting the influence of weather conditions. Road transport is the dominant mode of tourist travel to and around coastal Queensland. Because of the northerly location of Green Island, tourism to the island is disrupted by flooding or cyclonic disturbances anywhere along the Queensland coast. The impact on tourist flows is not necessarily consistent with actual weather or road conditions; media reporting can distort the effect.

The peak daily visitation level is estimated to lie between 950 to 1000 persons. The commercial ferry services run to capacity on about 10 days of the year and act as a limit to peak visitation.

The treatment here of tourism is intended only as a broad introductory outline. Further information is presented in Section 4 of the report where the discussion draws from information collected in surveys of visitors to Green Island and Cairns.

3.3 Current Land and Reef Uses

3.3.1 Summary of Uses

Over two-thirds of the total island is reserved for public purposes, the main uses being a national park and a public esplanade. The remainder of the island is taken up by leases for commercial tourist facilities and residential purposes.

The surrounding sea and reef are a marine park. There is a lease situated within the marine park for an underwater observatory.

Summarised particulars on land use are presented on Table 3.1 and Figure 3.1.

	TABLE 3.1 Land Use	
Description	Area ^(a) (sq. metres)	Lease Holder/Responsible Authority
National Park	70 400	Qld. National Parks and Wildlife Service
Public Esplanade	n.a.	Cairns City Council
Hotel ("Coral Cay Hotel")	29 004	Hayles Magnetic Island Pty. Ltd.
Theatrette ("Castaway Theatre")	835	Castaway Enterprises Pty. Ltd.
Aquarium/Artifacts ("Marineland Melanesia")	4 188	G. & S. Craig
Underwater Observatory	1 012	V.N. & O.M. Vlassoff
Residential Site (linked to observatory)	582	V.N. & O.M. Vlassoff
Residential Site ("Monkman Lease")	632	Qld. Fisheries Service
Radio-Telephone	404	Commonwealth of Australia

n.a. not available

(a) Areas shown are those in the lease permits.

Source: Green Island Management Committee.

3.3.2 Public Reserves

The eastern end of the island is taken up completely by the Green Island National Park (N.P. 836 Trinity). The park covers some seven ha. The park is administered by the Queensland National Parks and Wildlife Service whose management philosphy is to maintain the environmental integrity and natural values of the area. In keeping with this objective, developments in the park have been kept to a minimum. Passive recreational use of the park is catered for by some 1300m of formal walking tracks, a few picnic tables and some informative signs. No camping is permitted. There are no staff associated with management of the park resident on the island.

An area of 404m² was excised from the park near its western boundary for use by the Commonwealth as the site for their radio-telephones (S.L. 36573). The lease commenced in 1974 and runs for a period of 30 years.

A 20 metres wide esplanade was provided around the western perimeter of the island. The esplanade was designed to separate private lease development from the beach for foreshore sand movements have caused the esplanade to disappear completely in the south-west corner and to build-up substantially in the north-west corner. Loss of the through-fare is more of a nuisance than a major impediment to the public since the beach allows full movement around the island. Responsibility for the esplanade is vested with Cairns City Council.

Green Island Marine Park (N.P. 1495) was proclaimed in 1974 and was one of the first two marine parks declared in Queensland. The park is administered by the Queensland Fisheries Service. The park covers an area of 3000 ha and extends from high water mark on the island to 1.6 km beyond the outer edge of the reef

fringing the island. Within the park, marine products are completely protected, recreational fishing by hand lines is regulated, and the use of spearguns and nets is prohibited.

In mid 1979 the Queensland Fisheries Department voluntarily acquired the perpetual lease covering 632 m initially held by Noel Monkman, a well known pioneer in underwater photography. A dwelling is built on the land, now a Reserve for Departmental and Official Purposes (R.1695).

3.3.3 Leases

All private development on the island is built under leases issued by the Crown. The leases have been granted under various tenure conditions and use restrictions. The developments consist of a hotel, a theatrette, an aquarium/artifact display, an underwater observatory and several residences. They are all located at the western end of the island.

There are three perpetual leases and two special leases, the latter applying to the underwater observatory and linked residential site. The granting of a perpetual lease confers rights equivalent in most respects to freehold tenure. Provided the lessee pays the rent and complies with the conditions of the lease, a perpetual lease is as secure as freehold, and in the market place these two forms of tenure are generally regarded as being virtually identical. One difference, however, is that the transfer of a perpetual lease is subject to the approval of the Minister for Lands.

The two special leases expire in 1991 at which time the lessees have no statutory priority right to a new lease. The living quarters lease has a condition that the Crown may resume any part or the whole of the area at any time on giving six months notice and compensation for improvements only.

The conditions under which the leases have been granted tightly regulate the types of uses permitted on the sites. The leases prevent competition between operators except in respect of some minor items which a number of leases are permitted to sell. Lease conditions do not usually cover such items as quality standards, hours of operation or admission charges for tourist attractions. The exception is the hotel lease which contains conditions making the standard of the tourist accommodation and the ferry service to the mainland (a condition of the lease) subject to acceptance by the Director-General of Queensland Tourist Service.

The terms of a lease may be varied with the mutual agreement of the Crown and the lessee. Any changes to lease conditions which are not acceptable to the lessees could lead to legal actions seeking redress. For example, such action could arise if moves were made to impose more onerous lease conditions.

Major features of the leases are as follows:-

Coral Cay Hotel (N.C.L. 2048 held by Hayles Magnetic Island Pty. Ltd.). This perpetual lease covers an area of 2.9 ha and is by far the largest parcel of land held under lease on the island. About fifty percent of the site is built on.

The hotel has a dining room, bar, kiosk and games room in a central block. These cater to both over-night guests and day-trippers to the island. The hotel has the exclusive right to sell food and alcoholic drinks on the island. No entertainment is provided for patrons.

The central block is threatened by erosion with one corner of the 200 person capacity dining room being on the edge of the eroding bank.

There are 30 accommodation units in cabin-type buildings dispersed throughout the northern side of the lease. The practical maximum capacity of the hotel is about 65 persons though beds are available for up to some 80 persons. In the period June 1978 to May 1979 room occupancy were 52.2% and 57.9% respectively. Most units contain their own toilet and shower. Rates vary with the season and the standard of the unit. The peak occurs in the May-September period when daily adult rates lie between \$24 to \$26 for dinner, bed and breakfast. The rates drop by about \$2 per day in the off-season. These rates are somewhat lower than those applying at most other Queensland island resorts, reflecting both the differences in accommodation standards and the conflicts on Green Island between over-night guests and large numbers of day-trippers.

As mentioned previously, the lessee is required to maintain the Green Island jetty and to provide a satisfactory transportation service to the mainland.

Marineland Melanesia (N.C.L. 2590, G. and S. Craig). With a site area of 4188 m^2 this lease is second in area to that of the hotel. The site serves as an exhibit for marine zoological specimens and primitive artifacts from Papua-New Guinea. Zoological specimens include live coral, reef fish, turtles, sharks, and rays as well as a major collection of saltwater crocodiles captured in Papua-New Guinea. The entrance charge for adults is \$2.

Other improvements on the site are living quarters and workshop.

Under the terms of the lease, permitted activities are limited to the erection and maintenance of a marine zoological garden, the sale of souvenirs and brochures covering attractions within Marineland, the sale of a few other items and the hiring of boats, surf skis, surfboards and diving equipment.

Underwater Observatory (S.L. 25496, V.N. & O.M. Vlassoff). Opened in 1955 the underwater observatory is located at the seaward end of the jetty. The lease area is 1012 m².

Access to the viewing chamber is by a long unbroken flight of steps which is not wide enough to permit twoway movement. The viewing chamber has a floor space of approximately 20 m^2 and has 22 viewing windows. The single adult entrance charge is \$1.60. This entitles unrestricted access on the day of purchase.

The best viewing time is usually in the morning when water turbidity and light conditions are more favourable. The capacity of the observatory, about 25 to 30 persons, is strained by existing patronage levels. A queue time of 10 minutes is understood to be not uncommon in the mornings during the main tourist season.

The lease conditions permit the sale of souvenirs and postcards depicting the observatory's attractions plus the sale of some few other items.

Residence (S.L. 40190, V.N. & O.M. Vlassoff). This lease has an area of 582 m². The lease permits the site to be used only for residential purposes and for the storage of equipment and stock used in connection with the underwater observatory. It is improved with living quarters and an engine room.

Castaways Theatre (N.C.L. 2331, Castaway Enterprises Pty. Ltd.). Covering an area of 835 m² the lease is for the purpose of a theatrette and for the sale of photographic goods and publications associated with the reef. Improvements are a 196 person capacity theatre, dwelling quarters and storage sheds.

The theatre shows three films on the Great Barrier Reef. The films are dated and plans are on hand to replace them with later Ben Cropp productions. With the new films the lessee hopes to be included again in the 'package' tickets covering most of the commercial tourist attractions on the island. The theatre was dropped from the package apparently because of unfavourable visitor reactions.

The property has been on the market for some time. The present asking price is understood to be about \$175,000.

3.4 Transportation

Commercial ferry services from Cairns are the dominant form of transport to the island, currently carrying about 120,000 paying passengers per annum. Journey time varies with sea conditions and ferry speed but averages about 1¹/₂ hours. Sea conditions are often choppy to rough, making the trip unpleasant.

Two organisations operate daily passenger services to the island. The longest established operator is Hayles Cairns Cruises Pty. Ltd. which commenced a passenger service in 1924. The fleet of this operator is made up of 3 conventional hull vessels with a total capacity of 686 persons. Seating is mostly on wooden benches which are well protected from sea and wind conditions. Between May and October ferries depart at 9.00 a.m. and 10.30 a.m. Return times are staggered with arrival at Cairns being between 4.30 p.m. and 5.30 p.m. In the non-peak period of the year the service is cut back to a single depature time of 9.00 a.m. Passengers may buy tickets for the launch trip only (\$6.50 per adult), for the trip and selected attractions or for an all inclusive ticket covering the return trip, glass bottom boat, underwater observatory, Marineland Melanesia and lunch at the Coral Cay Hotel (\$15.50 per adult). Concessional fares apply to children. Half-fares are charged for those in the 5 to 14 age group. Children under 5 are carried free.

A competing service is offered on the 'Coral Seatel' a motorised catamaran vessel with a capacity of 168 passengers. The service commenced in 1975. It departs Cairns at 11.00 a.m. and returns at approximately 5.30 p.m. The boat is licensed. An on-board smorgasbord lunch is provided as part of the package covering the trip and a glass bottom boat inspection. Cost of the package is \$14 per adult. Rate reductions for children apply, similar to those offered on the Hayles service.

A recent attempt to commence an additional service is understood to have failed after being in operation for less than one week. From press reports the venture was based on the use of a converted fishing vessel with a capacity for 22 passengers.

For a fare of \$21 passengers were offered lunch on board, a glass bottom boat inspection, admission to Marineland Melanesia and Underwater Observatory, and the use of snorkeling gear. It is believed that lack of patronage was the cause of the failure.

Other commercial services are available on a demand basis. There is a seaplane service charging \$25 per person return as well as a number of boats usually employed on cruising and fishing charters. The available evidence would suggest these services taken together carry very few passengers at the present time, perhaps 3000 passengers per annum.

The island can be reached from the mainland with private small powercraft and many local residents visit Green Island and other parts of the Reef using their own boats. On the basis of statistics collected by the Authority from the Cairns Coast Guard, it is estimated that about 5000 persons per annum go to Green Island by this means of transport.

At one time large cruise ships anchored off the island. This practice has not occurred recently and is not expected to re-commence in the future because of changes to cruise schedules and to ownsership of resorts on other Reef islands.



3.5 Environmental Features

Very brief commentary is made in this report on the natural environment since concern with this subject is largely outside the scope of the study. Some attention has been given later in the report to an estimation of the environmental carrying capacity of the site because of the obvious link with the evaluation of alternative futures for the island.

Environmental surveys covering the vegetation and fauna in the National Park were undertaken in 1978/ 79 on behalf of the Queensland National Parks and Wildlife Service. The major findings were reportedly as follows:-

- The island is covered by a closed vine forest typical of tropical mainland Queensland and sometimes found on coral cays nearby.
- Vegetation in the National Park is in a relatively natural state.
- Native fauna are species typical of many coral cays located on the Inner Shelf north of Cairns.
- The fauna is considered unimportant in total and in terms of conservation of any particular species.
- Little published evidence is available on the marine environment surrounding the island. No unusual features are known to exist. Human use of the reef is understood to have caused only minor impact except that heavy fishing pressure has depleted the stock of large demersal carnivores.

In view of the above, there appears to be little reason to adopt a strong preservation policy because of only the intrinsic characteristics of the ecosystem. Arguments for supporting an active conservation stance must be recognised as based on other grounds. Possible reasons are the appeal of the natural landscape to visitors, the role of vegetation in stabilizing the island and the usefulness of the environment in its present form to an interpretative and educational programme on the Reef.

3.6 Erosion

Erosion is taking place on the island. The main problem occurs on the western fringe where the recent trend has been for the south-west corner to erode and the north-west corner to accrete.

The erosion has led to the jetty being extended to maintain access and is currently endangering the dining room of the Coral Cay Hotel. Another effect of the erosion is the unsightly appearance of the beach front. The visual impairment results from the uprooted trees spoiling the landscape as well as the disfigurement to the natural appearance caused by emergency mitigation works.

The loss of beach area may be a further disbenefit of erosion because it leads to a concentration of beach usage at other sites. However, the build-up in the area of the beach elsewhere may well completely compensate this effect.

3.7 Public Facilities and Infrastructure

Under this heading are treated public toilets, the jetty, power supply, rubbish disposal, water supply and sewerage scheme.

3.7.1 Public Toilets

The public conveniences are located on the esplanade adjacent to the most popular bathing area. They were built in 1972 by the State Government and contain toilets, changing rooms, and cold brackish water showers.

The facilities become overtaxed during peak tourist periods but otherwise are adequate. They are comparable in standard to those at many tourist areas on the mainland.

3.7.2 Jetty

The jetty was built in 1961 with concrete piles and deck. It is a public jetty which is under the overall control of the Department of Harbours and Marine. Maintenance is the responsibility of the hotel lessee (Hayles). The lessee recoups some of his costs through levying a charge on other ferry operators using the jetty. The charge is currently set at ten cents per passenger. As well, the lessee of the underwater observatory pays a levy to Hayles of \$50.00 per month. These levy charges are subject to the approval of the Minister for Lands.

An entrance channel and swinging basin have been dredged to allow access to the jetty. The jetty has three berths which is below the number of commercial ferries using the facility during part of the year. When these conditions apply, ferries either double berth or stand-off in the swinging basin.

3.7.3 Power supply

There are three generators on the island at present, owned by the Coral Cay Hotel, Marineland Melanesia and Castaway Theatre. The hotel is understood to be planning the installation of a new generator which will have sufficient capacity to meet the total island demands.

3.7.4 Waste disposal

Hayles collects rubbish from the hotel lease and, acting under contract to responsible agencies, from all public areas on the island. Other lessees are responsible for their own waste disposal.

Food wastes are either dumped into the sea or buried. Combustible wastes are mostly burnt and the residue together with non-combustible wastes are taken back to the mainland for disposal.

3.7.5 Water Supply

Rain water is the only natural source of fresh water on the isalnd. Underground water exists but is brackish.

The hotel supplements its rain water supplies by ferrying up to 23000 litres of water per day from the mainland. Other leases rely entirely on rain water. The public conveniences use an underground water source for all water needs during the majority of the year.

A number of investigations have been made of the alternatives for upgrading the water supply. Possibilities considered include rainwater storage, treated well water, transportation from mainland, and pipeline from Cairns. The treatment of well water is understood to offer the most economic solution with annual costs being dependent on the amenity level of the supply.

Some uncertainty surrounds the quantity of water which each day visitor uses.

3.7.6 Sewerage

The Coral Cay Hotel and the public toilets are connected to a sewerage system. The effluent is treated by detention in a holding tank and chlorination before being piped to an outfall located over the edge of the reef in the south-west corner of the island. The reticulation system serving the public toilets needs replacement because the pipes and manholes have suffered severe chemical attack. This work is unavoidable and must be done irrespective of future plans for the island.

Other leases have septic systems at the present time. There are proposals to connect these leases to the sewerage system because of dangers posed by the possibility of the effluent contaminating the underground water sources. The cost of the connections is estimated to be \$20,000.

4.0 VISITOR ATTITUDES ABOUT GREEN ISLAND

4.1 Data Sources

Data employed in this study have been obtained from a variety of sources. In particular, use has been made of the results of Green Island visitor surveys conducted by the National Parks and Wildlife Service (N.P.W.S.) and the Queensland Fisheries Service.

The two N.P.W.S. surveys were carried out during August 18 - 21, 1978 and April 20 - 23, 1979 and the sampling frame covered visitors arriving by all transport modes and included those staying at the Coral Cay Hotel. The Fisheries Service survey was carried out during May, June and July 1978 and covered visitors using the public ferries.

Each of these surveys provides very useful information about certain characteristics and attitudes of visitors, but their results need to be interpreted with caution since, even collectively, they fail to cover adequately likely seasonal variation. Given the time frame and budget for this current study it has not been possible to undertake any survey sufficient to overcome this deficiency. However some further survey work has been undertaken to provide additional confirmation of the earlier results and to obtain data relating to preferences, expenditures and other aspects not covered in the earlier surveys.

4.2 Study Surveys

Two surveys were carried out specifically for this study. One survey — referred to hereafter as the accommodation survey — covered tourists (holiday/recreation visitors only) staying in commercial accommodation (hotels, motels, flats, caravan parks) in Cairns and the adjacent beach areas.

This approach of conducting a survey away from Green Island was necessary for a number of reasons. Firstly it was considered that responses to certain questions relating to factors prompting the holiday decision, the relative values of alternative attractions, etc. could be considerably biased if the questions were asked during the respondent's trip to the island. As well it was useful to obtain an estimate of the proportion of Cairns tourists who visit Green Island.

This survey was carried out over three weeks from July 21. Accommodation units stratified by type (motel or flat etc.) and by area were employed as the sampling units. Questionnaires were distributed by a trained interviewer; some personal interviews were conducted, though because of the difficulty in contacting visitors at their accommodation, many of the questionnaires had to be left for completion and subsequent collection and checking.

Because of some uncertainty as to the purpose of travel of the occupants of some accommodation, calculation of the non response rate was not possible, but it is believed it was around 50%. A total sample of 207 holiday/recreation visitors completed questionnaires. However the precision of the survey results was improved through employing some post-sample stratification. Estimators were constructed using weights based on prior estimates relating to certain tourist characteristics obtained from previous larger scale surveys, particularly the National Travel Survey (Bureau of Transport Economics).

Being based on commercial accommodation this survey failed to cover visitors staying with friends or relatives and excluded local residents who take day trips to Green Island. Based on data from the National Travel Survey it is estimated that visitors staying privately account for only 8% of Cairns tourists as defined earlier. As well, their attitudes might not be markedly different on average from those of other tourists.

However when deriving expenditure estimates it was necessary to take account of the fact that the sample had excluded these visitors. The exclusion of local residents from coverage in this survey was not of concern since the primary interest of this study was to obtain data relating to the relationship between Green Island and the ability of Cairns to attract tourists. Where required, estimates of the numbers of local day-trippers and their attitudes etc. was obtained from other surveys including the ferry survey undertaken as part of this project.

The questionnaire used in the accommodation survey appears as Appendix A. A much simpler questionnaire (Appendix B) was employed in a survey of ferry passengers (hereafter referred to as the ferry survey). This survey covered all passengers on one of the return journeys from Green Island on each of the three days from July 19 to July 21. In that way one trip by the Coral cay Seatel and two by Hayles' ferries were covered. In addition, in deriving estimates, responses were appropriately weighted to take account of any disproportionate sampling.

The questionnaires were distributed and collected during the return ferry journey. In all a total of 154 completed questionnaires was obtained.

4.3 Some Findings of the Accommodation Survey

4.3.1 Tourist Patronage of Green Island

The results of the accommodation survey indicate that most holiday visitors to Cairns and nearby do make a trip to Green Island. 81.4% of respondents stated that they either had or would be visiting Green Island during their current holiday. However this varied depending on the origin of visitors and, in particular, overseas visitors appear more likely than average to visit the island while Queensland tourists appear less likely. Only 3.9% of the former group but 45.6% of the latter group reported they would not be visiting the island.

Those who have been to the island during a previous holiday seem somewhat less attracted to it. Approximately one quarter (25.2%) of respondents had visited Green Island on a previous occasion; and of those, 29.4% were not intending to repeat the visit, whereas only 9.9% of other respondents stated that they would not be visiting Green Island.

4.3.2 Factors which attract tourists to Cairns Region

The above results show that Green Island has general appeal, though responses to other questions suggest that it may be somewhat less important as an attraction in the context of the whole trip to Far North Queensland.

As shown in Table 4.1, only 14% listed it as the most important specific attraction which prompted their visit to the Cairns Region. Even considering responses "Reef" and "Green Island" together, it is found that the climate and general scenery appear more often as specific attractions.

TABLE 4.1 Attractions Which Prompted Visits to Cairns Region					
ATTRACTION	% RESPONDENTS WHO RANKED EACH ATTRACTION				
Climate	FIRST 21.1	SECOND 10.5	THIRD 11.2		
General Scenery	23.5	30.5	10.2		
The Reef	16.8	12.5	4.9		
Green Island	14.0	10.4	4.4		
OtherReefs/Islands	3.5	4.3	2.7		
Beaches, Swimming	0.1	3.0	5.0		
Relaxing, Atmosphere, People	0.0	1.7	1.2		
Other	13.9	5.9	2.2		
None Stated	7.1	21.2	58.2		

Consistent with these results is the fact that only 5% of respondents stated that Green Island was so important an attraction that they would not have come to Cairns if it were "unavailable". Table 4.2 shows somewhat more (12.6%) held the Reef to be so important, though again the climate is mentioned even more often.

TABLE 4.2Essential Attractions of the Cairns Region					
ATTRACTION	% RESPONDENTS WHO WOULD NOT VISIT CAIRNS REGION IF THE ATTRACTION WERE UNAVAILABLE				
Climate	19.2				
General Scenery	6.7				
The Reef	12.6				
Green Island	5.0				
Other Reef/Islands	1.4				
Other	2.8				

Thus currently Cairns tourism appeal seems not to be predominantly dependent on Green Island — or the Reef. This is further substantiated by the fact that most of those surveyed who had already visited the island said that they would have substituted some other local attraction if they had been unable to get to Green Island. The alternatives chosen by respondents on the assumption that they could not get to Green Island were —

Shorten holiday by a day	8.8%
Substitute some other activity/visit in Cairns Region	63.1%
Substitute some other activity/visit elsewhere in Cairns .	11.7%
Other	16.4%

4.3.3 Valuation of the elements of a trip to Green Island — time trade-offs.

In order to assess relative preferences for the various elements of the visit to Green Island visitors ^(a) were asked to specify which of the various activities etc. they would first give up if faced with additional time constraints. In the choice between less time on the ferry and less time on the island only 5.7% chose the latter. While in some circumstances a boat trip may provide a major part of the enjoyment in the total recreational experience, clearly this is not the case here.

A significant proportion of respondents (16.6%) reported that if time allowed on the island had been reduced by an hour, they would not have wanted to take the trip. If the time on the island was to be reduced by three hours this proportion increases to 57.2%. Being retrospective views, caution is needed in translating these responses into likely decisions by potential visitors actually faced with such constraints. But it seems that any substantial reduction in time allowed on the island could directly, or indirectly through dissatisfaction created among some visitors, result in significant decline in visitor numbers.

Table 4.3 provides some indication of the popularity of each attraction and its relative value in the eyes of participants. Castaway Theatre appears to be relatively unpopular in that only a small proportion of respondents visited it. As well, most of these would delete the Theatre visit if time on th island was reduced by an hour, indicating that Theatre customers held that attraction to be of lesser value than were others. Clearly glass-bottom boat trips and the underwater observatory attract the highest proportions of island visitors; and for the vast majority of these respondents these attractions are relatively highly valued. Only small proportions would give up the glass-bottom boat trip or a visit to the observatory if they made the trip to Green Island.

ATTRACTION/ACTIVITY	% WHO VISITED/ PARTICIPATED IN	% ^(a) WHO WOULD DELETE IF TIME ON ISLAND REDUCED BY ONE HOUR
Underwater Observatory	85.1	8.3 (+ 18.9)
Castaway theatre	11.3	63.4(+19.4)
Marineland Melanesia	52.9	7.0(+20.9)
Glass-bottom boat trip	87.9	4.5(+18.8)
National Park	58.3	41.4(+ 8.8)
Snorkelling	12.8	20.3(+11.1)
Other beach/reef activity	48.0	26.4(+-)
Coral Cav Restaurant/Bar	64.9	20.5(+10.5)

(a) Here and in subsequent sections of 4.3 responses reported relate to only those tourists in the survey who had already visited Green Island.

TABLE 4.3 Island Attractions — Patronage and Preferences

(a) Of those who had visited/participated in the particular attraction/activity. The bracketed figures in the column show the percentages that would not visit Green Island, so that total patronage lost would be the sum of the two figures as indicated.

The National Park appears popular in that 58.3% of Green Island visitor respondents claimed to have made use of it. However, very many (41.4%) of those using the Park stated that they would neglect that activity given additional time constraint. This does not necessarily imply dissatisfaction or otherwise with the Park, but it does indicate that for very many users it was of less value than were other activities they wished to participate in. This result may be compared with that for Marineland Melanesia. It seems somewhat similarly popular but relatively more highly valued by its customers since only a small proportion stated that they would not visit that attraction if faced with the particular time constraint. Note that the results shown in the first column of Table 4.3 are a little different from those reported for the two surveys conducted by the National Parks and Wildlife Service. This is not surprising given the different timing of the surveys and the likely seasonal variations in the character of tourists. However, significantly, the results here and the N.P.W.S. results do agree in terms of orders of magnitude.

Using actual sales data supplied by some operators and ferry passenger traffic plus estimates of arrivals by other modes it has been possible to cross-check visitation rates for some attractions. Based on this comparison the survey results of this study for the Theatre and Marineland appear quite accurate, though the visitation rate of 85.1% shown for the Observatory appears to be a considerable overestimate of what was achieved in 1978.

4.3.4 Congestion

The majority of those who had visited Green Island reported it was at least slightly crowded during their trip. Responses were as follows:-

Overcrowded	11.6%
Crowded	22.2%
Slightly crowded	36.9%
Not at all crowded	29.4%

4.3.5 Valuation of Green Island — Visit Willingness-to-pay.

Direct questioning of individuals to assess their willingness to pay (and hence relative strengths of preference) for commodities, effects, etc. is a method frequently used in cost-benefit analysis. This approach was employed in the accommodation survey. Detailed analysis of the response to their direct questioning is deferred to later in this Report, but some results obtained are presented below in Table 4.4.

TABLE 4.4 Valuation of Attractions — Willingness-to-Pay

Attraction	Av. Max. Price (per Adult) Visitors said they would pay	Normal Current ^{(a} Entrance Fee (per adult)
	\$	\$
Underwater Observatory	1.84	1.60
Castaway Theatre	1.61	1.20
Marineland Melanesia	1.77	2.00
Glass-bottom boat trip	2.08	1.50
National Park visit	1.25	0.00
Snorkelling	2.38	0.00
Overall Island trip	15.12	15.50 ^(b)

(a) In practice the actual fee paid by many visitors, such as those on packaged tours, is less than the figures quoted.
 (b) Hayles 'all inclusive', except Castaway Theatre.

The figures in the first column indicate a ranking of attractions similar to that resulting from other responses. However the apparently low values for average willingness-to-pay, particularly as compared with actual entrance fees, suggests that certain of the attractions — and indeed the overall experience — might not be considered as contributing a positive net benefit on average.

Certain difficulties arise in such interpretation of these responses and these will be discussed later in this Report.

4.4 Some Ferry Survey Findings

As stated earlier, the survey of Green Island ferry passengers sought additional information relating to the actual visit to the island to supplement that obtained from other surveys.

4.4.1 Features Attracting Visitors to Green Island

From Table 4.5 it is clear that Green Island's appeal depends heavily on its relationship to the Reef. A majority of visitors surveyed reported that the Reef, marine life, or related activities/attractions were the features which actually prompted their visit to the island. And it is perhaps significant that most of these expressed interest in the Reef per se, rather than particular man made attractions.

TABLE 4.5Attractions which prompted visit to Green Island

ATTRACTION	% WHO RANKED SPECIFIC ATTRACTION		
	FIRST	SECOND	
Reef, including marine life	35.7	7.8	
Underwater Observatory	10.4	11.7	
Glass bottom boat	7.1	5.8	
Marineland Melanesia	1.3	2.6	
Tropical Is./Coral Cay	5.8	9.1	
Day boat trip	1.3	3.2	
Swimming, sunbaking	1.9	5.8	
Snorkelling, reef-walking etc.	1.9	1.9	
Walking, shell collecting	1.9	4.5	
Friends' advice	5.2	0.6	
Part of organized tour	7.1	<u> </u>	
Other	7.7	1.2	
None stated	12.7	45.8	

This apparent appeal of the natural phenomena is further substantiated by the replies to the question "Considering your whole visit to the Island, would you have liked an opportunity to see and hear more about the coral reefs and marine life?"

23.4%
69.5%
7.1%

4.4.2 Rating of Attractions

Table 4.6 shows visitation rates for some of the attractions similar to those obtained from both the accommodation survey and the surveys conducted by N.P.W.S. The ratings of attractions are also mostly similar to that implied in the N.P.W.S. results. e.g. Castaway Theatre appears least popular — though the figure of 20.1% patronage is considerably higher than found in other surveys — and attracts the highest rate of critical comment from customers. 47.2% suggest that the Theatre needs improvement. The area receiving the next highest level of criticism by customers was the dining and bar facilities.

TABLE 4.6 Rating of Certain Attractions/Facilities					
	MICHEODO	RAT	RATING OF EACH ATTRACTION		
FACILITIES	VISITORS	VERY GOOD	SATISFACTORY	NEEDS IMPROVEMENT	
	%	%	%	%	
Underwater	Q1 Q	69 9	24 A	197	
Castaway	01.0	04.4	44.4	19.4	
Theatre	20.1	22.2	30.6	47.2	
Marineland					
Melanesia	58.4	70.6	26.4	3.3	
Glass bottom	01.0	CO 9	9C A	4 77	
Dining & bar	01.0	09.3	20.0	4.1	
facilities	67.5	37.0	38.9	24.1	
Boat trip to	~	7.77			
Island		54.7	38.7	6.6	

The Observatory and glass bottom boats were most heavily patronised. However it is significant that the Observatory attracted a larger proportion (13.4%) of responses suggesting improvements were needed.

Note the small proportion (6.6%) responding that the boat trip to the island needs improvement indicates a somewhat more favourable attitude than in the N.P.W.S. surveys. For example in the August 1978 N.P.W.S. survey, 24% of respondents, 94% of whom travelled by ferry, indicated the journey to the island decreased their overall enjoyment. As well, the result in the table might appear to conflict with the accommodation survey result where the vast majority of visitors to Green Island said they would rather have less time on the ferry than on the island. However, this preferred trade-off implies relative values or an order of preferences, and need not imply absolute dissatisfaction.

4.4.3 Additional Facilities etc. Needed

To obtain further comment on any need for improvement respondents were asked via an open question to list the additional facilities, attractions, services, etc. they believed should be provided. Responses are listed in Table 4.6.

Of note is that just over half the respondents suggested a needed improvement and almost all of these made only a single suggestion. This is in contrast to the N.P.W.S. surveys where respondents, faced with a list of possible improvements, apparently indicated substantial demand for such improvements. This contrast indicates a need for some caution in interpreting the N.P.W.S. survey results so as to avoid the biases inherent to the "closed" question approach.

A further point of interest is the low proportion (6.5%) of respondents who listed the need for additional information as an answer to this question whereas 69.5% indicated an interest in further information in answer to the direct question. This apparent conflict may be partly explained by respondents not seeing a need to repeat an expression of their view on this matter.

TABLE 4.6Suggested Improvements

IMPROVEMENTS	FREQUENCY (%)	
More time on island	3.9	
More information	6.5	
Keep island natural	10.4	
Improve public amenities	9.7	
Improve man-made attractions	3.9	
Upgrade ferries	2.6	
Upgrade hotel	7.8	
Provide low-cost accommodation	0.6	
Less regimentation	1.3	
Other	5.8	
No alteration needed	17.5	
No response	29.9	
•		

4.4.4 Provision of Public Amenities

Respondents were asked to state their attitudes to charging for the use of public amenities on Green Island.

Most (61.9%) reported that they would be opposed to paying for the use of public toilets.

With respect to public showers, of those who said they would make use of them 72% reported that they would be willing to pay for fresh water while the remainder would choose free salt water showers.

5.0 ECONOMIC IMPACT OF GREEN ISLAND TOURISM

5.1 Basis for Estimates

To obtain data needed for estimation of the economic impact of Green Island tourism, a survey of operators both on the island and those engaged in related production on the mainland was undertaken. This survey sought data on sales, types and amounts of expenditure and employment levels for each operation. From the results of this survey it has been possible to obtain reliable estimates of the initial effects of the relevant tourist expenditure, i.e. numbers directly employed, income generated and the extent of operators' purchases from other sectors of the economy.

Obviously, to supply the commodities purchased by the tourism sector, production in other sectors is required, and this in turn generates further employment, income and purchases from still other sectors. And so a process generating output, income and employment continues through the complete production chain. Thus, for example, the total number of persons locally employed at all stages in the production of the Green Island tourism product will be greater than just the number directly employed by the tourism operators. Estimates of these total effects were obtained with the aid of input-output (1/0) tables.

An 1/0 table is simply a matrix representation of interrelationships among the various sectors of an economy. Under certain assumptions the various effects on all sectors of a change in the demand for the output of a particular sector can be calculated by performing certain operations on that matrix.

The 1/0 tables employed here are based on the GRIT Tables produced by Jensen, Manderville and Karunaratne. The complete set of GRIT Tables is defined in a Report titled "Generation of Regional Input-Output Tables". For this study the nineteen sector Queensland and Far North^(a) Region tables were modified by the inclusion of a separate (twentieth) sector for Green Island tourism. As well, alterations were made to other sectors in the light of updated information collected since the preparation of the GRIT tables.

In addition to the direct and indirect effects as described above, the 1/0 tables provide a means of estimating what are termed induced effects. The induced effects refer to the series of output, income and employment effects generated as a result of the spending of income earned in production.

5.2 Expenditure on Green Island

The total value of sales for all operations on the island, including sea and air transport from Cairns, for the calendar year 1979 is predicted to be \$1.9 million. Labour directly employed is equivalent to 83 full-time employees and household incomes earned for the year will be \$640,000.

As indicated earlier there is also what is termed an *indirect effect* of this tourist expenditure in that labour is employed (income is earned) in the production of goods and services which comprise any part of the inputs required by the Green Island operations. As well, to derive the total effect an estimate is needed of the effect of household spending out of income, i.e. the consumption *induced effect*.

Inputs of goods and services purchased by the Green Island operators were classified in accordance with the definitions of sectors used in the GRIT tables. This data was then used to form the separate (twentieth) column for the Green Island sector in the tables. To insert the Green Island row, sales had to be split between local (Cairns Region or Queensland) and exports. Estimates of the origin (usual place of residence) of Green Island visitors vary widely among the various surveys. As best estimates the proportions of visitors coming from the Cairns Region have been taken to be 10%, while for Queensland overall the figure used was 40%.

Some transactions data for the Far North Region are shown in Appendix C. Included there also are estimates of the employment and income effects in each sector for that region. Tables 5.1 and 5.2 below show estimates of the total employment and income effects derived using the adjusted I/O tables for both the Far North Region and Queensland. The likely ranges of errors in the estimates as shown in the tables are intended to reflect uncertainties arising out of the data collection, the sector classification of some items and the assumptions involved in the construction and application of the I/O tables. This error specification is not based on statistical estimates of sampling errors.

TABLE 5.1 Far North Region: Estimated Employment and Income Generated by Green Island Sales, 1979

	EMPLOYMENT ^(a)	INCOME ^(b) (\$,000)
Direct	83 (± 4)	640 (± 30)
Indirect	44 (± 4)	282 (± 26)
Direct + Indirect	$127(\pm 8)$	922 (± 56)
Induced	37 (± 4)	$231 (\pm 22)$
Total	164 (± 12)	$\frac{1153}{(\pm 78)}$

(a) Full-time equivalents.

(b) Wages, salaries and supplements only, for 12 months.

TABLE 5.2 Queensland: Estimated Employment and Income Generated by Green Island Sales, 1979		
	EMPLOYMENT ^(a)	INCOME ^(b) (\$,000)
Direct	83 (± 4)	$640(\pm 30)$
Indirect	$49(\pm 5)$	$375(\pm 40)$
Direct + Indirect	$132(\pm 9)$	$1015(\pm 70)$
Induced	69 (± 7)	466 (± 45)
Total	$\frac{1}{201}(\pm 16)$	$\overline{1481}$ (± 115)

(a), (b) See footnotes to Table 5.1

Table 5.1 shows that in addition to the 83 persons directly employed in the Green Island sector, a further 44 are employed indirectly in support industries within the Far North Region. As well, consumer spending out of resultant wages and salaries earned generates further employment for 37 persons.

To put these estimates into perspective it is useful to compare them with the total numbers in the workforce in Cairns and Far North Queensland. As at the 1976 Census the total work-force in the Cairns Statistical District was 14,155. For the Far North Statistical Division the figure was 49,426. Based on these figures Green Island directly employs only about 0.6% of the Cairns work-force, but including employment in support industries this figure rises to 0.9%. Considering the whole of the Far North Division, Green Island direct and indirect employment makes up about 0.3% of the work-force. In addition a further 0.1% are employed through household spending of wages and salaries.

5.3 Average Daily Tourist Expenditure

The analyses so far has defined the Green Island tourism sector to cover only that expenditure relating to the actual visit to the island, including the transport from Cairns. But in some circumstances it could be appropriate to attribute to Green Island tourism at least some other mainland expenditure by certain visitors.

Estimates of these other expenditures were obtained from the accommodation survey. Estimated expenditures per person per day are as follows:—

Accommodation	\$1	0.	9	1
Food and drink	\$	8.	.04	1
Sightseeing and tours	\$1	0.	.28	8
Incidental items	\$	3.	8	1

This data covers only those using commercial accommodation. For tourists staying with friends or relatives certain of the expenses would obviously be lower. In the analyses which follow the estimated 8% of tourists staying privately are assumed to spend an average of \$4 per head per day on food and drink and amounts as above for sightseeing and tours and incidental items. Average length of stay for all visitors to the Region is taken as 7.6 days and is based on data obtained from the accommodation survey.

5.4 Green Island Sector Revised

Except in the case of local residents, it would seem that a visit to Green Island would involve some expenditure for accommodation and food on the mainland, since at least one overnight stay in Cairns would usually be required given the existing transport schedules. Such expenditure, and its impacts, might therefore be included within the Green Island tourism sector. But to attribute this expenditure to Green Island it would have to be assumed that similar expenditures would not have arisen if the island had not been accessible. In fact survey results suggest that such an assumption would be incorrect for many visitors. 63% of respondents reported that they would substitute some other activity in the Cairns Region if they could not get to Green Island and so might incur similar overnight expenses.

More importantly, these arguments suggest that the earlier results might give an improper picture of the economic significance of Green Island for the region's tourist industry. Obviously, for example, if the 'closure' of Green Island led to no reduction in visitors and visitor spending in the region, there would be no impact on the size of the local tourism industry. This leads to the proposition that the best measure of the economic significance of Green Island tourism would be obtained by examining the hypothetical question — What would be the immediate loss in employment and income if Green Island was 'closed'? Using this approach, the Green Island sector was redefined to cover tourist expenditure deemed to be dependent on the "appeal" of the island.

From the accommodation survey it was found that 5% of respondents claimed they would not have visited the Cairns Region if the trip to Green Island was unavailable, but this figure could be increased by up to a further 12% if it was assumed that some respondents considered "Reef" and "Green Island" as equivalent answers. For such visitors it was considered appropriate to attribute their total expenditure during their stay in Cairns to the Green Island was unavailable, that part of their mainland expenses dependent on their island visit was attributed to the island's tourism. In the subsequent calculations it was assumed that an average of one extra overnight stay on the mainland was required for such visitors.

To be consistent, expenditure by visitors who would simply have visited elsewhere in Cairns had to be excluded form the definition of tourist expenditure deemed to be dependent on the appeal of Green Island. As noted above, 63% of respondents said they would choose an alternative activity in the Cairns Region if unable to visit Green Island. In the revision of the Green Island sector it has been assumed that such tourists would have thereby incurred similar amounts of expenditure, with similar impacts, as they did for their visit to Green Island.

Based on the above considerations the estimated current value of tourist expenditure for twelve months for the revised Green Island sector is estimated to lie between \$2.6 m. to \$4.0 m. Table 5.3 shows estimates of the impacts of this expenditure for Far North Queensland. These were derived using I/O tables as for the previous analysis, but with the twentieth row and column (the Green Island sector) altered in accordance with the revised definition of that sector. In addition to covering possible errors as before in Tables 5.1 and 5.2, the ranges in the estimates specified here reflect uncertainties arising out of possible ambiguities with respect to survey respondents' answers regarding the importance of Green Island.

TABLE 5.3

Far North Queensland: Estimated Employment and Income Generated by Tourist Expenditure Dependent ^(c) on Green Island, 1979

	EMPLOYMENT (a)	INCOME ^(b) (\$,000)
Direct Direct & Indirect Induced	$ \begin{array}{r} 143 - 220 \\ 177 - 269 \\ 51 - 78 \end{array} $	954 - 1359 1195 - 1836 303 - 466
Total	288 - 347	1498 - 2302

(a) (b) See footnotes to Table 5.1.

(c) i.e. in the sense that expenditure (or similar amounts of expenditure because of substitute tourist activities) in the region would

not occur if the trip to Green Island was unavailable.

Similar considerations to those employed in producing the estimated impacts for Far North Queensland could apply with respect to impacts for Queensland as a whole and for Australia. However, to do this, estimates of the extent to which tourists would be prepared to substitute other Queensland or Australian recreational experiences for part or all of their visit to the Cairns region would be needed. The survey data were insufficient to provide precise estimates for all combinations of substitute activities.

However, the responses clearly indicated that of those who might not substitute an activity in the Cairns region, a substantial proportion would substitute an experience elsewhere in Queensland. The loss to the State is therefore correspondingly lower.

Hence, the consequences in terms of employment and income in the tourist industry in Queensland as a whole and in Australia would be less than those which are estimated to apply to the Far North Region. When account is taken of the full range of substitutes both within and external to the tourist industry, it is clear that the effect on total employment and total income in Queensland as a whole and in Australia would fall far short of those estimated to apply to the tourist industry. It is also worth drawing attention to the lesser significance any such losses have with respect to the larger economies of Queensland and Australia.

In the context of consideration of impact on the Australian economy, the relationship between Green Island and expenditure by international tourists also needs to be examined. Any consequence for Far North Queensland which would result from international visitors chosing a substitute elsewhere in Australia is already accounted for in Table 5.3. However, again the survey results point to the fact that the vast majority of international visitors to the Cairns region do not see Green Island as being so important that without it they would not have visited Australia. Hence in that sense Green Island per se can be considered to have minimal significance fo international tourism in Australia.

5.5 Interpretation of Impacts

Since some labour is employed in the production of the goods and services consumed by tourists, it is appropriate to describe that employment as an impact generated by the tourist expenditure. Any data relating to such impacts is obviously useful in planning for the implementation of some particular strategy and in relation to examination of the likely social and political consequences of such a strategy.

However, it is necessary to distinguish between the notions of economic impact and economic benefit, the latter being defined as the net gain to society over and above any resource costs involved. The net benefit to society of any production is the value of the goods or services produced minus the opportunity cost of resources, including labour employed. Opportunity cost refers to the benefit that could otherwise have been obtained by employing the resources in some other activity.

At a particular time and for a particular region it may be argued that the labour concerned would not otherwise have been employed and thus has no opportunity cost attaching to it. Alternatively, more generally and in the longer term, labour would not be regarded as having no alternative use. In that case, the employment of labour in a particular activity involves some cost in terms of the alternative opportunities foregone, and this has to be taken into account in deriving the net benefit earned from the activity (production) actually undertaken.

To summarise, this in effect means that employment of labour in, for example, the tourist industry can only be regarded as a benefit, that is not a cost, in the event that other opportunities don't exist for employment of that labour. These alternative opportunities may exist in the particular region of interest or elsewhere. However, if the community attaches special value to the promotion of a particular region, in this case Far North Queensland, it could be appropriate only to consider that region's employment opportunities. Thus, if it is assumed that alternative opportunities don't exist for the development of Far North Queensland, the employment levels attributed to Green Island in Table 5.3 can be interpreted as an economic benefit.

6.0 PROSPECTS AND OPTIONS

6.1 Historical Trends

Before looking to the future of Green Island, it is instructive as a first step towards this task to examine past trends in tourism generally and more particularly at Green Island.

6.1.1 Green Island Visitation

The number of paying passengers on regular ferry services to the island is a good indicator of total visitation and has the advantage of reliable statistics being available from 1960 onwards. The relevant statistics are shown on Table 6.1 and are displayed graphically on Figure 6.1 along with other typical indicators of trends in tourism.

TABLE 6.1 Passengers on Green Island Ferries ^(a)			
YEAR	PASSENGER NOS. (,000)	YEAR	PASSENGER NOS (,000)
1960	48	1969	88
1961	47	1970	97
1962	57	1971	99
1963	60	1972	99
1964	73	1973	118
1965	75	1974	118
1966	82	1975	130
1967	78	1976	123
1968	83	1977	115
		1978	118

(a) Fare paying passengers on regular services only. Source: Ferry Operators.

Taking the period 1960 to 1978, visitation to Green Island, as measured by this indicator, has exhibited very strong growth. Visitation increased from a level of about 48,000 passengers in 1960 to some 118,000 passengers in 1978. This is a total increase of 148% and represents an average compound growth rate over the period of 5.6% per annum.

This growth has not occurred uniformly over the period. Some of the irregularity is clearly associated with weather conditions and is not of interest to this study. Of more relevance to the present purposes is the pattern evidenced in recent years. From a peak of some 130,000 passengers in 1975, visitation declined to about 115,000 persons in 1977. Patronage recovered slightly in 1978 but the level is still well below the historic peak. Patronage has recorded a negative trend since 1975 equal to an annual average compound rate of 3.4%.

The comments above relate to fare paying passengers on the regular ferry services. Such figures should not be confused with total visitation to the island. Estimates of the total number of persons currently going to Green Island vary widely. Visitation has been reported to range between a low of 120,000 persons per annum and a high of 180,000 persons per annum. Much of the spread in these estimates appears to stem from the confusing total visitation with passengers and from a lack of a standard definition of visitation.

A satisfactory definition of visitation must include a minimum period of stay on the island. The definition of a 'recreational day' adopted in the Supplement No. 1, U.S. Senate Document 97 (1964) employs "a standard unit of use consisting of a visit by one individual during any reasonable portion or all of the twenty-four hour period". For the purposes of this study, three hours is taken to be a reasonable portion of a day. Using this period as the standard, visitation is defined here to mean the number of return trips made to the island by persons of all ages whose length of stay on the island during any one trip exceeds three hours.

With this definition, the level of total visitation in 1978 is estimated at about 130,000 to 135,000 persons. This figure has been derived by adding the recorded number of fare paying passengers on regular services to estimates of (a) the non-fare paying passengers on regular services (mostly children 4 years and under), (b) the passengers carried on sea plane services and occasional boat charters, plus (c) the persons using private craft.

Fare paying passengers represent over 90 percent of the estimated total visitation in 1978. Given this importance, it is reasonable to expect that the historic trend in both series would correspond quite closely. Some deviations between the two series would be attributable in the past to calls from large cruise vessels and more recently to the growth in persons using private craft. The growth in small craft ownership will have tended to increase visitation by local residents. Their custom will have been attracted away from the commercial services, with the result that the true decline in total visitation since 1975 may be slightly overstated by the drop in paying passengers. The difference would be expected to be slight and certainly would not by itself constitute a plausible explanation for the apparent reduction in use of Green Island.

6.1.2 Trends in Tourism

Examination of the trends in recreational/tourist activity at other locations serves to put the pattern of visitation to Green Island in perspective.

Unfortunately, the ability to obtain insight into the comparative performance of Green Island is severely restricted by the dearth of statistics on tourism. Research on tourism in Australia is severely hampered by shortcomings in the available data set and the discussion here is subject to a further limitation arising from confidentiality restrictions applying to some information held by the Consultants. Such limited data as is available and able to be reported often suffers from serious deficiencies. The problems arise from inconsistencies in the extent or definitions employed in time series and through limitations in the period covered. Because of these and other problems, care in interpretation is necessary.

The need for caution applies with particular force to the two data sets which provide reasonable geographic coverage. One series deals with accommodation and the other with traffic levels at airports. Each series has been recorded using procedures which make the data amenable to only broad analysis. A further difficulty with both of these sets is that in neither is there a breakdown of the totals according to purposes of travel. Thus, the holiday/recreational component is not separately identified and trends in this component may be masked by developments taking place in other sectors.

Other available data useful as indicators of tourism relates to specific sites or attractions. In this category are statistics on passengers to Kuranda by rail, visits to the observatory on Hook Island, the number of persons calling at Ayers Rock.

Summarised details of the available data able to be reported are presented in Tables 6.2, 6.3 and 6.4. The trend growth rates shown in Tables 6.3 and 6.4 may be compared with those of the number of paying passengers on regular ferries to Green Island. The annual trend growth rates for Green Island by period are 5.6% (1960-78), 3.6% (1969-78), 1.9% (1972-78) and -3.4% (1975-78).

Examination of all the statistics shows that some of the trend indicators yield apparently inconsistent results while in other instances the data is not sufficient to allow firm conclusions to be drawn. Even so a number of observations of importance to the study can be made.

Accon	TABLE 6.2 nmodation Takings
STATISTICAL DIVISION	GROWTH IN TAKINGS ^(a) 1973/74-1978 (%)
Far Northern (Cairns)	108.3
Fitzroy	115.0
Northern (Townsville)	30.9
Mackay	96.5
Moreton	139.7
Queensland	185.9
Australia	159.3

(a)Covering hotels, motels and caravan parks.

Source: ABS.

TABLE 6.3General Tourism Trends

ATTRACTION	CURRENT ANNUAL VISITATION	TREND GROWTH RAT PERIOD) (a)
	(,000)	1960-78	1969-78	1972-78	1975-78
Ayers Rock	65	17.5	10.1	5.4	4.9
Hook Island Observatory	44	—	—	4.1	- 4.8
Kuranda Rail	90		11.4	9.2	- 2.2

(a) Calculated by fitting a curve of the form $Y = AB^{x}$ using least squares regression fitting technique.

Source: N.T.P.W.S., Q.T.B. and Q.R.D.

TABLE 6.4Air Passenger Movements

AIRPORT	1978 TREND GROV PASSENGER I		GROWTH RATE (PERIOD	% p.a.) ^(a)
	NUMBERS(,000) =	1969-78	1972-78	1975-78
ALL PASSENGERS				
Brampton Island	16		<u> </u>	16.9
Brisbane	2523	9.7	6.8	1.6
Cairns	342	12.2	8.6	6.1
Coolangatta	430	15.2	12.3	13.2
Gladstone	46	10.0	4.8	1.4
Hayman Island	26	11.4	6.8	5.8
Mackay	245	12.5	9.6	- 0.2
Proserpine	54	7.8	12.6	50.5
Rockhampton	213	12.5	11.7	5.7
Shute Harbour	16			0.9
Townsville	355	8.6	7.1	2.1
INTERNATIONAL PASSENGERS				
Brisbane	272	26.6	25.5	4.6
Cairns	16		<u> </u>	18.1

(a) Calculated by fitting a curve of the form $Y = AB^x$ using least squares regression fitting technique.

Source: Queensland Year Books and Department of Transport.

Long-term Experience

• The rate of growth in tourist activity in most of Australia has progressively declined over the last two decades.

Recent Experience

- The level of tourist activity in northern areas of coastal Queensland has not kept pace with that in Queensland or Australia as a whole.
- The Cairns area has performed as well as or better than other coastal regions in north Queensland.
- Tropical island tourism (i.e. the "relaxed holiday in the sun" market) has outpaced general tourism in North Queensland.
- Incidental Reef oriented tourism (i.e. activity which id directly linked with the Reef per se and which is a small part of a total holiday experience) has declined comparative to tropical island tourism and possibly absolutely. The relative performance of general north Queensland tourism and incidental Reef oriented tourism is not clear but they appear to have experienced similar trends.

The trends in usage of Green Island are consistent with those observed elsewhere in the tourist industry when the nature of tourism to Green Island is taken into account. As discussed previously, Green Island mostly occupies a minor part in an extended holiday in North Queensland. Although there is a resort on the island the hotel is comparatively unimportant in influencing total usage levels. Thus the growth of tropical island tourism, if it applied to Green Island, is obscured by other events. Indeed there is some reason to doubt that the general trend in tropical island tourism has applied to the resort on Green Island. Competition has increased and the success of other resorts lies in part in offering a more "sophisticated" product. This product development has been absent on Green Island and the essential image could not be attained while the influx of day-trippers continues.

Any attempt to explain the reasons behind many of the changes in the tourist market would have to be based heavily on speculation. The necessary research and data collection have not taken place. Thus, interpretation of past trends and the preparation of forecasts are mainly matters of judgement. It appears that the recent plateaux in the level of usage of Green Island seems not to be some temporary phenomenon peculiar to the island or a minor aberration on a much different long-term trend. While conditions remain unchanged, the available evidence suggests visitation will not alter significantly from current levels.

6.2 Forecasting Methodology

6.2.1 Approach to Forecasting

Changes to the current level and pattern of usage of Green Island may arise in the future through events or shifts of two types. Firstly, patronage might alter through the influence of general trends in consumer behaviour and life-styles. These national or "macro" level trends might arise from such factors as population movements, shifts in attitudes towards work and leisure, and developments in international tourism.

The second type of influence can be expected to result from changes in the recreational opportunities offered on Green Island. These local or "micro" level factors might take many forms. They might involve, for example, new ways of experiencing and interpreting the natural environment, variations in the standards or types of commercial attractions and facilities, or changes in management emphases.

These remarks on some of the factors which could cause patronage changes serve to illustrate the difficulty of making a prediction for a date even a few years hence. Obviously the difficulty of the task and the uncertainty associated with forecasting increases the longer the prediction period. The time horizon on this study must look at least to the turn of the century as forecasts over this time period are the minimum necessary for valid economic evaluation.

As discussed earlier in the report, forecasts of visitation to Green Island must be based heavily on judgements of the analyst because of the lack of appropriate research in Australia. In order to minimise the problem caused by the long-term perspective and the reliance on informed opinion, the Consultants chose to use a two stage process for the preparation of forecasts.

The first stage involved the estimation of a "basic" forecast for the island. This forecast focused only on the effects of the "macro" level factors on visitation and was based on the assumption that conditions on the island are maintained comparable with the existing situation. This assumption embraces the notion that the island is not given preferential treatment by way of promotion, subsidies, level of public amenities, etc. over alternative tourist centres.

The second stage consisted of preparing forecasts for each use plan of the island selected for evaluation. The "basic" forecast served as the common foundation for all these predictions in order to ensure comparability between them.

6.2.2 Trends and Influences

In preparing all forecasts the Consultants sought to give appropriate weighting to all factors which were precived to have an impact on visitation. The most important of these factors were seen to be:—

• Population Trends. Procjeted population growth is expected to average approximately 1% per annum in Australia up to the turn of the century. This rate is slower than experienced in the last two decades with clear implications on the future level of tourist activity.

• Age Distribution. Apart from the post-war baby boom the Australian population has shown a consistent movement towards higher proportions in the older age groups.

The expectation is for this trend to continue and to have particular significance here because the propensity to holiday in north Queensland appears to be highest for these individuals. One of the more noteable features evident in the travel industry in recent years has been the trend by older people to take extended holidays, the popularity of which has been fostered by the growing role played by organised group toruism. It is of interest to speculate what the level of visitation to Green Island may have been over the last few years in the absence of tour groups.

• Geographical Distribution. The rate of growth of population in Queensland is likely to be above that for Australia as a whole. Recent estimates suggest that Queensland residents comprise about 75 percent of Australian tourists in the north though they form a much lower proportion of the visitors to Green Island. This situation appears likely to continue given transport cost considerations.

Within Queensland it is anticipated that the tendency for higher proportions of the population to reside in the south-east corner will be maintained.

- Leisure Time. Continuing growth in productivity as a consequence of technological change will produce increased demands for shorter working weeks, longer annual leave and earlier retirement. Each of the latter two factors will have obvious significance for tourism generally.
- Disposable Income. Despite the expectation that high rates of unemployment will continue for some considerable period, it is generally accepted that productivity gains will be sufficient to achieve real increases in per capita disposable income approximating 2% annually. With increasing prosperity there has been evidence of relative increases in the demand for services in general and recreational activity in particular. However, recent economic instability has tended to dampen this trend and for as long as the present state of uncertainty persists the propensity of households to consume non-essential items will remain depressed.
- Transport Costs. Though there has yet been little response to sharp fuel price increases for work trips and other essential purposes, the prospect is for transport costs to constitute a major proportion of longdistance travel expenditures. The public perception of high and increasing transport costs allied with the remoteness of Cairns from major population centres in Australia will continue to inhibit the growth of tourism to the region.
- International Tourism. International tourism by both Australians and other nationalities will continue to grow.

Over recent years, indications are that overseas arrivals through Cairns airport has grown and this trend is expected to continue. However, the influence game fishing has had on this trend, rather than Reef tourism, should not be overlooked.

Overseas visitors are expected to remain a relatively small proportion of visitors to the region pending the provision of a major international airport nearby.

The frequency of overseas travel by Australians will continue to influence the level of tourism in North Queensland. Market research suggests that in the absence of any new developments to make the Reef more attractive, many of those Australians most likely to take long-distance travel will continue to prefer an overseas trip.

• Reef Accessibility. Historically, Green Island has provided the major opportunity for people to see and appreciate the features of a coral cay. The proximity of the island to a coastal centre has been an important, if not the most important, reason for Green Island's popularity.

Correspondingly, the major deterrent to visiting other coastal cays and reefs has been the time and cost associated with the sea journey. Land transport has played a lesser role in the choice of Reef destination.

The relative balance between the land and sea transport links will change in the future with the development of improved means of transportation between the mainland and the Reef. The cost and speed of sea and air craft is expected to move to favour the cross sea journey in comparison with movements over land. The result will be a much greater accent on land transport and at the same time a widening of opportunities for Reef tourism. The competitiveness of Green Island will diminish relative to other sites closer to large population centres even though more distant from the mainland.

• Other Developments. The position that Green Island used to enjoy as the dominant focus for Reef tourism, particularly among international visitors, has been declining. This trend is anticipated to continue because of actual an proposed developments along the full length of the Reef and adjacent coastal areas. The expanding interest in other resorts and tourism more generally by major national and international companies can be expected to accelerate this trend. Companies of this type seek to apply their substantial capital resources and management skills to situations where they can control the development and style of the resort. Such a position is not at present possible on Green Island nor is it likely to be in the future.

• Attitudes and Preferences. The current attitudes and preferences of holiday makers have been discussed in Section 4 of the report and need not be repeated in full here. Suffice to reiterate that the reasons underlying most Green Island tourism, and to a lesser extent to Cairns as well, are not such that they could not be satisfied at a variety of other locations. Green Island currently appears as a minor part of the full experience of a trip to the north. Most visitors surveyed indicated that they would simply substitute an alternative local attraction if Green Island was not available. One implication is that Green Island is dependent on tourism in North Queensland; it can only react not lead. Another implication is that Green Island as a tourist attraction is more than usually vulnerable to competition.

The incidental character of the visit to Green Island is not expected to change and consequently the implications for tourist use of Green Island will continue to apply for as long as current circumstances remain unaltered.

6.2.3 "Basic" Forecast

The "basic" forecast for total visitation to Green Island is shown on Table 6.5 along with associated confidence bounds. The best estimate forecase approximates to a rate of growth of 2% per annum. The upper confidence bound is set at a rate of growth of 3% per annum while the lower confidence bound has a constant level of visitation equal to that at present.

The forecasts and analyses of each of the selected use plans are presented together in Section 7.

TABLE 6.5 "Basic" Forecast Total Visitation Green Island (,000 persons)						
Forecast	1980	1985	Year 1990	1995	2000	
Best Estimate	135	150	165	180	200	
Confidence Limits Lower Upper 	135 135	135 155	135 180	135 200 ^(a)	135 200	

 (a) Constant at this level from 1994 onwards as this figure represents the environmental carrying capacity of the island. See Section 6.4 for detailed discussion.

6.3 Constraints and Opportunities

6.3.1 Practical Alternatives

Assuming for the moment that the status quo as represented in the "basic" forecast is not the preferred future for Green Island, how might the island be bettered for use as a tourist/recreation resource?

In theory at least, there are a very large number of use possibilities for Green Island spanning between minor shifts in accent to major alterations to the landscape and present pattern of use. A wealth of ideas exist on such possibilities originating from tourists, facility operators and others. But most of these proposals fall outside practical boundaries or deal with matters beyond the scope of this study.

In the ultimate, the purpose of this study hinges around the assessment of the economic merit and effects of realistic plans. Judgements about the realism of plans are of course not always straight forward. What may be seen as practical to the Consultants may not be similarly viewed by others, and equally the reverse position may apply. Any such differences of opinion are likely to arise because of the grading or level of importance attached to particular aspects or elements.

A simple two level grading system was adopted in this study, the two classes being termed "essential" and "other".

6.3.2 Essential Policies

The Consultants have accorded a ranking of absolute or essential to three policies. These policies are considered of such importance that they are set as common elements in all realistic alternative use plans. In so grading these policies, account was taken of the survey findings as well as the views expressed by staff of the Authority and member of the Committee. The policies are:

• An active conservation policy, aimed at retaining as much of the natural landscape and marine habitat as is necessary to ensure stability of the ecosystem. Even though this policy places a significant

restriction on the possible spectrum of alternatives, the Consultants adopted this perspective because of the belief that the vast majority of the Australian public regards the safety of the Reef as paramount. It was also considered that actions contrary to this policy would be unacceptable politically.

Because of the special interest in the stability of the island and the related issue of the environmental carrying capacity of the island, this matter is given separate and more extensive treatment later in the report.

- A policy seeking to encourage the preservation of the unspoilt character of the Island to the maximum extent consistent with each alternative use plan. Planning and management control of the Island would make use of 'best practice' to minimise environmental damage and to avoid the construction and presentation of man-made facilities in an overly commercial manner.
- A policy directed towards encouragement of Reef tourism and presentation to the general public.

6.3.3 Other Constraints and Opportunities

Other constraints and opportunities are not seen as having equivalent status. Most arise not from policy judgements but rather from forces acting or expected to act as a result of normal market mechanisms, historical events and the like. The classification of factors into this group should not necessarily be seen as suggesting that these factors will be insignificant in influencing the use made of Green Island in the future. Indeed, many are expected to have a major bearing in shaping future activities.

The more important constraints and opportunities falling within this class are considered to be:

• Island Size and Physical Characteristics. The small size of the island prevents developments requiring extensive land areas unless they are conceived as substitutes for the resort or National Park. Existing leases have little area available for expansion with the possible exception of the hotel site. Multi-storey structures are ruled out as their intrusion above the tree canopy would lead to a highly unfavourable visual impact. Similar space constraints do not apply to off-shore developments with low physical profiles.

The lack of any topographic relief on the island means that the ability to screen or isolate one activity from another is limited to measures based on preserving a dense vegetal cover. Maintenance of the vegetation lessens the impression of the scale of man-made facilities and of the intensity of human use. Even so, the islnd, other than during the night, can never be envisaged as a place which appeals to persons who enjoy activities which gain from long periods of low levels of inter-personal contacts.

The possibility of overtopping by tidal surge during storms is a further physical feature which influences the type of appropriate land use because of the potential for personal injury and material damages.

As a coral cay, the island could be seen as appealing to those with special interests in the Reef per se. Groups of this kind represent a growing market. But the island would be expected to have limited appeal to these groups because Reef opportunities of at least comparable standard are available in more favoured surroundings at several other locations.

• User Conflicts. While the demands of day-trippers and resort guests do not approach complete incompatibility, both suffer a lessening of enjoyment as a consequence of the other. The resort acts to limit the area open to day-trippers thereby exacerbating crowding. The experiences of resort guests is diminished through day-trippers intruding in both the psychic and physical senses. Patronage of the hotel will continue at a depressed level unless resort guests can isolate themselves from other visitors and have a section of beach set aside exclusively for their use.

Other conflicts are occurring in some sections of the beach and water. Management actions seem to offer an opportunity to alleviate these problems.

• Crowding. Market research indicates that the majority of visitors during the peak season are perceiving some feeling of crowding. The problem is caused by the intensity of use and by the concentration of activities on the western end of the island. As patronage increases, the quality or level of enjoyment from a visit will decline unless activity can be dispersed more evenly on the island either spatially or temporally. Eventually, if the problem becomes so great, crowding could form to set the effective limit on visitation because other opportunities will become preferred.

Attempts to induce a more uniform temporal pattern of usage seem to offer little promise of success. The seasonal pattern has been relatively constant for many years and is unlikely to change significantly in the future because few persons are likely to transfer their north Queensland holiday to the summer season. Staggering ferry times is a partial solution; but the apparent concerns by ferry owners about the safety of night travel and the acceptable span of time for starting or completing a trip will act to limit the effectiveness of this approach.

• Commercial Operations. Commercial operators on the island generally face many constraints. They generally have to contend with declining comparative advantages, growing competition, inflexible and restrictive lease conditions, limited areas for expansion and correspondingly difficult circumstances if modernisation or redevelopment were proposed.

The declining comparative advantages of operators arises mainly from the apparent shift in Reef accessibility discussed earlier in the report.





Facilities are becoming dated and as a result are apparently losing their appeal. However, commercial motives for major modernisation programmes are not strong. The injection of substantial funds to expand or modernise, even is no physical constraints applied, would not appear to offer returns as high as those from other investments with comparable levels of risk. Acting singly each attraction is unable to have any noticeable impact on total patronage to the island. Even acting in unison the level of visitation cannot be stimulated to any marked extent primarily because of the nature of the Green Island experience, but also due to the high proportion of tourists to Cairns who already go to the island. Thus, a modernisation programme would have to be largely founded on attracting a higher proportion of visitors, a hypothesis of doubtful validity because of the high current levels of visitation at the major attractions, the limited time most visitors have on the island as well as the greater emphasis likely to be placed in the future on direct Reef contact rather than via an artificial attraction.

The growth of competition at other islands and along the coast is another important factor influencing the prospects of commercial operators. The intensification of competition has been discussed earlier in the report in general terms. More specifically each of the major attractions faces strong and growing competition. Taking into account existing plus known proposals only within Queensland, the Coral Cay Hotel competes with some 15 other island resorts and represents about 3% of total tropical island resort capacity; the observatory competes with tow others, one at Hook Island and the other at Middle Island in the Keppel group; Marineland Melanesia competes with aquaria located at Cairns, Magnetic Island and on the Gold Coast while the display of crocodiles is similar to that offered at Hartleys zoo just north of Cairns; and many day cruises to the Reef or tropical islands are available through such centres as Cooktown, Port Douglas, Cardwell, Lucinda, Townsville, Shute Harbour, Mackay, Yeppoon, Gladstone and Bundaberg. Other facilities will undoubtedly be built and nor should the possibility of man-made platforms be overlooked. Overseas competiton will also grow.

Many of the facilities on the island compete with similar operations on the mainland. An island location carries with it a number of disadvantages. Island construction costs are of the order of 50 percent higher than those on the adjacent coast while annual staffing costs are estimated to be about \$5000 higher per person. Facilities on the island are effectively in use for only short perios each day forcing inefficiencies in operations. Many costs are fixed or insensitive to hours of operation. For all these reasons higher charges must be levied on the island in comparison with equivalent mainland operations in order to recoup costs.

Some particular constraints apply to the hotel and the observatory. Expansion of the central block of the hotel to better service day-trippers and resort guests appears to offer a satisfactory level of return but is unlikely to proceed while erosion continues to threaten the existing structure. In regard to the observatory, a deterrent to a major capital investment in a new facility arises from the uncertainty of events when the lease expires in 1991.

• Government. The role played by the three levels of Government will be conditioned by the extent of their powers and by the level of funding able to be allocated to Green Island.

In relation to available powers, the Committee has advised that under current legislation Government has the powers to limit visitor numbers to the island and to impose a levy on visitors. However, the political and public acceptability of any such moves at this time is unknown.

Visitor fees could be introduced to regulate patronage and/or to generate revenue for park management authorities. The collection of a charge from park visitors is not usual practice in Australia but is more common in some overseas countries where the view is apparently more strongly held that park users should make a contribution towards the costs of the resources used by them. The issue of visitor fees is not as straight forward as a "user pays" explanation might suggest as it involves question of equity and economic efficiency and the inter-relationship between the two (Hundloe 1979).

Even so, the application of entry fees offers a practical device whereby any funding problems of Government can be reduced. Tight constraints on public expenditure can be expected to continue for at least some years to come, both because of actions by Government to control inflationary trends and because the resources available to Government are being employed in meeting an ever increasing array of services being sought by the public.

The establishment of information centres and interpretative programmes in parks is an example of the trend towards a broadening of Government's role and is one which has particular application in this study. An impediment to the expansion of Reef tourism is that most of the public are unable to have direct contact with the Reef. The marine environment prevents the majority of the community from having other than indirect contact through artificial and frequently sterile techniques. It is therefore not surprising to find many people have little interest in visiting the Reef when their actual Reef experience is perceived to be little different from that of watching a film about the Reef on television. Whether at Green Island or elsewhere, an interpretative programme suited to the location may offer hope for changing the experience into one which has greater interest.

Government could play an important role in this respect stimulating interest in the Reef and increasing the value attached to a Reef visit. An additional benefit is the flow-on which takes place in respect to management of the Reef.

However, in the absence of a levy or priority treatment, the development and maintenance of public facilities and services on Green Island appears likely to be subject to a degree of constraint occasioned by Government spending limits. Not that these remarks should be taken to suggest that the level of funding required will be all that large unless the notion were to be considered of increasing public ownership on the island. The acquisition of any of the major commercial facilities would require substantial amounts of money. But the logic of any such step appears questionable and in any case would seem to be politically unacceptable.

Overall, there appear to be few opportunities for significantly developing the role of Green Island as a tourist-recreation centre. A useful way to summarise the position is to draw the analogy between Green Island today and Coolangatta in the early fifties. Coolangatta was then a long established holiday centre with an important position in the tourist industry of the area. Over the last two decades the focus for tourism has shifted elsewhere and development has spread along what has come to be known as the Gold Coast. The forces which caused Coolangatta to experience a diminishing role appear to have many parallels to those presently shaping Green Island's future. The reasons include shifts in accessability and preferences for locations which offer comparable natural attractions but which are unhindered by existing old fashioned facilities.

6.4 Island Stability

In addressing the subject of the stability of the island, there are two main aspects which warrant consideration in this report. They are the role of the vegetation cover and the effect of tourist use. In preparing the assessment, the Consultants have had access to summarised specialist reports on the different components of the island-beach, reef ecosystem, especially G.B.R.C. (1979). An environmental specialist from the study team has not visited the site.

Unconsolidated sand will eventually erode through the action of wind or water, or both. Thus, vegetation plays a major role in maintaining the stability of an island such as Green Island quite apart from its aesthetic appeal. A short cover of grass is sufficient to fill this role, but it must be a continuous cover over the whole area above high water mark. This continuous cover is difficult to maintain unbroken under use by people in practical situations. Trees and other larger vegetation exclude wind from small areas of bare sand thus preventing the start of wind erosion. They also provide shade and shelter. Thus, in a situation such as Green Island which is under heavy use by people the best practical form of vegetal cover is through the maximum use of trees and shrubs. A cover of grass or other herbaceous plants is still necessary at the fringes where the wind can penetrate under the canopy.

Some control of pedestrian traffic (by use of fenced and surfaced pathways) is necessary for the protection of this grassy cover on the fringes just above high water mark. For the purposes of stabilisation the vegetation used can be either native or introduced.

The problems of environmental carrying capacity at Green Island relate primarily to stability of the shoreline at the western end. The important factors here are the placement of the island in relation to the surrounding reef and in relation to the approach of waves generated by the major prevailing winds.

Under natural conditions the leeward end of such an island can be expected to have a promontory of "mobile" sand deposited beyond the comparatively stable main mass of the island. The position of this promontory can be expected to oscillate across the end of the island over time. The rate of such oscillation is best established by long term observation. At Green Island there is thought to be a 30 year cycle, but the effects of this could be offset or masked by some of the works installed.

Use of the island for tourist and recreational purposes alters the manner and the rate of operation of shoreline processes, but to an extent which still has to be judged rather than calculated. Tourist use has exacerbated the effects of natural forces through the placement of service buildings and other structures close to the relatively unstable leeward end; it also has lead to the concentration of foot traffic and other use on the part of the island least able to withstand such use.

This concentration of activities on the western end may well be unavoidable because it relates to the best access from the sea. The position is unlikely to alter in the future. The location of the best approach from the sea, the exising commitment of capital expenditure and the reservation of the eastern portion of the island as National Park combine to indicate a continuance of greatest pressure of land use at the western end.

The erosion problem which exists on the island shows that in the natural state the western fringe has been unable to support the present intensity of land use and the associated works found necessary. Similar problems are not in evidence elsewhere on the island indicating that the remainder of the island ecosystem has a carrying capacity greater than the western end.

The carrying capacity of the western fringe can be lifted to the present level of use or increased beyond that level by appropriate expenditure on remedial works. The works could employ either "soft" or "hard" solutions. The best long-term solution is the continuing augmentation of natural processes through placement of extra sand. Additional measures are necessary such as sand stabilisation by vegetation and some guidance of pedestrian movement between foreshore and beach. This is the "soft" solution.

The "alternative" hard solution entails construction of fixed structures such as groynes and rock-walls. With sandy shorelines anywhere in the world such solutions inevitably lead to the need for continual extensions beyond the original works.

Considering the economic analysis, the main points of interest centre around questions on the costs of corrective works, the inter-relationship between these costs and visitor levels, and the upper limit carrying capacity.

Corrective works involve a choice between periodic large injections of capital expenditure (the "hard" solution) or continuing expenditure of smaller amounts on maintenance type work (the "soft" solution).

The "hard" solution of groynes or rock-walls should be avoided if this is at all possible. If hard works are unavoidable then the economic analysis will need to incorporate allowance for further expenditures on extension of the works, i.e. apart from any expenditure on maintenance of the first set of works. Annual weather patterns and frequency of storm events will determine the timing of these extensions. This makes accurate prediction impossible.

Costing for such extensions could be assessed as a first crude estimate on the basis of having to extend the hard works around the entire length of the western end (approximately 300 metres). Such works would be multiple groynes or continuous rock wall. Again, for the economic analysis, first approximations could be taken that such works would have to be completed within 10 years or within 20 years.

The "soft" solution would be based on winning sand from offshore and its placement to achieve a seaward extension of High Water Mark with an appropriately sloped beach. There would be an associated need for stabilisation of sand above high water mark by establishment of sand-binding plants. There would also be a need for establishment of fenced pathways with surface protection to guide foot-traffic on and off the beach.

The Queensland Beach Protection Authority has investigated the capital and maintenance costs of a wide range of alternatives and has made a comparison of the advantages and disadvantages associated with each of the options. The recommended scheme is a "soft solution"; it seeks to achieve effective property protection during storms and heavy weather, and to refurbish the western beach in order to eliminate unsightly evidence of erosion and recreate a reasonable recreational area. The scheme entails either the Cairns City Council or Cairns Harbour Board pumping sand from the swing basin and approach channel onto the degraded beach area. The laternative is the least cost solution in present value terms, the estimated costs amounting to \$47,000 initially and \$1,500 annual maintenance with visitation held at present levels.

Expenditures on regular maintenance can be expected to increase with patronage levels. The effect of more visitors will create the need for additional effort on winning and stabilization of sand at the western end, for renewal of pedestrian accessways and pathways at the western end and possibly within the National Park. On these grounds the Consultants have interpreted the level of maintenance expenditure required for varying levels of usage to be as follows:

Usage Level	Annual Maintenance Cost (\$)
Current	1500
Current + 25%	3500
Current + 50%	8000

Given a commitment to immediate corrective works and continuing expenditure on maintenance, it seems likely that the number of visitors to the island could be allowed to increase by up to 50 percent above current levels without any impairment of the environment. Any increase beyond that should be based on experience gained.

This estimate of carrying capacity is based solely on environmental criteria; the limit to carrying capacity may well be set by the degree of crowding on the western end of the island which leads to the maximisation of visitors' satisfactions of the experience of going to Green Island.

7.0 EVALUATION

7.1 Evaluation Concepts

Evaluation implies a search for the 'best' among available alternatives. In the context of this study best is defined as that which provides the greatest net benefit to the community — or in the jargon of economics that which maximises society's welfare. Accepting that man is the best judge of his own welfare, society's welfare is interpreted as some aggregation of that for each individual, where the latter is dependent on individual preferences.

An individual's strengths of preference among a variety of commodities or effects are shown by the rates at which he or she would be prepared to exchange them, and therefore can be expressed by valuing each in relation to some common dimension. As is the practice in cost-benefit analysis the unit of measurement employed here is money. Society's valuation of a particular commodity or effect is then defined as simply the sum of individual monetary valuations. However a point to note is that this approach is only valid if it is accepted that individual ability to influence the outcome should be a function of market power.

As discussed earlier, the accommodation survey sought monetary valuations concerning Green Island by asking respondents to state how much they would be willing to pay, at most, for each of the island's attractions and for the overall trip. The amount an individual would be willing to pay in excess of that actually paid is a measure of his net benefit or consumer's surplus. The total for all persons is termed consumers' surplus.

Consumers' surplus (or net users' benefit) may not be a correct measure of the net benefit to society, since the price paid by consumers may not adequately reflect the resources costs incurred in providing the attraction. For example, in the case of the National Park, visitors pay no entrance fee, but the community bears some costs through the employment of labour for administration and because the relevant land is not available for other use. Obviously society's net benefit from the Park is reduced by the extent of any such resource costs. It should be noted that, as explained in Section 5, resource costs in this context refer to the value the resource has in the best alternative use — i.e. opportunity cost. However in many cases this may be taken as equal to the market price of the inputs.

Even if the above basic philosophy and approach is accepted as theoretically sound, certain practical difficulties arise in connection with direct questioning to ascertain willingness to pay. Given that respondents were asked for valuations only after the event, there can be little objection to the approach on the grounds of their lack of experience of the attractions. However, it is possible that some respondents understated their willingness to pay, for fear that the survey was simply a part of a process designed to justify price increases. As well, downward biases may have occurred because respondents mistakenly answered with respect to their valuation of a possible subsequent trip, rather than the visit recently completed.

Thus, there is some reason to believe that the values reported in this section may tend to underestimate benefits. A further point to bear in mind is that because of the limited time period covered by the accommodation survey, responses may not accurately reflect the attitudes of the visitor population over the whole year. Considering also some uncertainties in the forecasts of future patronage, as noted earlier, the resultant estimates of total net benefits presented here must be regarded as accurate in terms of orders of magnitude only.

As implied above, the emphasis in this study has been on recreational use and this is consistent with the terms of reference which required the valuation of Green Island as a tourist/recreational resource. An implicit assumption has been made in the analysis that there would be no opportunity loss arising from conflict with possible uses of the surrounding reef for scientific or other purposes. An imputed value for land rent has been used to reflect the fact that the land could have provided benefits through alternative use. Note however that the inclusion of land rent as a resource cost does not effect the comparison of recreational alternatives evaluated here. However it is relevant when comparing the net benefits derived from the various attractions.

In addition to the measurable effects as already discussed there are certain non-measurable economic effects which need to be considered. The major component of these is what is termed "option value". Development tends to be irreversible — the natural environment may not be re-created — whereas preservation leaves open the option to preserve or develop in a particular way in the future when better information relevant to the decision becomes available. It is argued that this option should be given some value. Comments with respect to qualitative valuation of this option value have been included in the evaluation of alternatives.

7.2 Valuation of "Status Quo" Alternative

The usual procedure in calculating consumers' surplus is to first derive the relevant demand curve — i.e. the mathematical function showing the quantity that would be bought (no. of visitors who would participate) at various prices. By forming a cumulative frequency distribution of responses for willingness to pay for the day trip to Green Island and then plotting the price frequency points the sample demand relationship was observed to be approximately linear. A linear fit for the relationship was obtained as

1.685 — .0783 p α = proportion of visitors to Green Island where q and p _ price (dollars) for the day trip.

As shown earlier in Table 4.4, the implication of this is that respondents indicated that, on average, they would be willing to pay a maximum of \$15.12 per adult for their day trip. Total price actually paid varies depending on the attractions visited etc., but the estimated average total cost per adult is \$13.49. Consumer's surplus on average is therefore estimated to be \$1.63 per adult.

In calculating overall consumers' surplus this estimate has been used for all day trippers, including those, such as visitors staying with friends and relatives, who were not covered by the sampling frame. For resort guests estimates have been derived through a priori reasoning since insufficient survey data were available for this purpose. Estimated current average surplus per person per night for resort quests is \$5. Total surplus currently accuring to all visitors over twelve months is estimated to be \$254,000. Note all values here and subsequently are expressed in terms of current prices, that is no allowance has been made for inflation.

To assess the total value of any project or amenity some aggregation of present and future returns is needed. However, a simple addition of all the values in the stream of returns is an invalid approach. Accepting that the prospect of earning a dollar in the future is presently worth less than a dollar, it is necessary to discount future returns to derive present values before adding. The choice of appropriate discount rate for this purpose provokes considerable argument. For that reason rates of 3%, 5% and 7% have been used here to provide a range of estimates.

A stream of future per annum benefits and costs has been predicted up to the year 2005, taking into account the present situation, forecast growth in patronage and declining net user benefit in line with expectations of depreciating quality of visitors' experience. Beyond 2005 and to infinity per annum costs and benefits are held constant.

Table 7.1 shows estimates of the net present value of the stream of benefits less costs accuring from Green Island, assuming the island and its attractions are retained substantially in their current state, that is, the "Status Quo" option. As noted previously, costs included as land rent are imputed values and are set to reflect the notion that the land has value in some alternative use.

Item	Net l	Present Value (\$,0 Discount Rate	00)
	3%	5%	7%
Net Users Benefits	9700	5800	4100
Additional Resource Costs ^(b)	3100	1700	1200
Imputed Land Rent ^(c)	1800	1800	1800
NET BENEFIT ^(d)	4800 (±20%)	2300 (±20%)	1100 (±20%

TABLE 7.1

(a) Values rounded to the nearest \$100 000.

(b) Covering all costs which are not covered by user fees with the exception of those for water supply and sewerage.

(c) The value nominated is an order of magnitude estimate only based on expected land value in alternative use.

(d) The percentage figures shown in brackets are confidence limits for the estimate of Net Benefit. Similar error margins apply to the preceding items.

7.3 Assessment of Individual Activities

While the above results indicate that visitors on average gain some net benefit from their day trip to Green Island, the responses also suggest that for many the trip is worth less than the cost to them. Based on survey responses an estimated 37% of day visitors would, in retrospect, judge that they had incurred a net loss through their visit to Green Island.

From analysis of willingness to pay with respect to each of the major attractions it was estimated that the average respondent earned a total surplus of \$1.79 from the Observatory, Marineland Melanesia, Castaway Theatre, National Park, snorkelling and glass bottom boat, i.e. 16 cents more than that earned on average from the whole trip (note that, as above, average here takes into account variation in attractions visited as well as valuations). Thus, the implication is that the average visitor suffers a loss in total from the remaining activities. Assuming that some benefit is derived from other beach and reef activities it could be suggested that this result indicates that the restaurant and/or ferry trips actually provide a net loss of benefit for the average day visitor. It should be noted that the latter refers to the Cairns-Green Island sea journey generally, and does not necessarily imply anything about the ferries per se.

Table 7.2 shows estimates of the net present value of the predicted stream of future benefits for each of the major current attractions. As elsewhere, net benefit is defined as consumers' surplus less resource costs, including imputed land rent, not covered by fees paid.

It is obvious from the table that those activities/attractions most closely related to the Reef provide the greatest net benefit. The other man-made attractions either attract few visitors or provide little or no net benefit to the many who do visit. Another way of looking at the results shown on the table is to see them as evidence of the losses which would be incurred if the particular activity was unavailable. It appears that in any free choice of future development, emphasis shall be given to those activities which are more Reef oriented.

TABLE 7.2

Activity Net Preser Dis	resent Value ^(a) (\$, Discount Rate	000)	
	3%	5%	7%
Underwater Observatory	1100	650	450
Castaway Theatre	300	200	100
Marineland Melanesia ^(b)	0	0	0
Glass Bottom Boat Trip ^(c)	2300	1400	1000
National Park	2000	750	250
Snorkelling ^(c)	1700	1000	700

(a) Values rounded to the nearest \$50 000.

(b) No values are shown because of uncertainties as to actual prices paid because of recent price increases. Actual calculations from the survey results and based on the current entrance fees (less discounts) indicated a negative value for this attraction.

(c) It may be appropriate to subtract an amount from the figures shown to cover part of the administration costs for the marine park.

The activity with the highest estimated return is the glass bottom boat trip. From all evidence available to the Consultants it appears that there would be no justification for making any major alteration to this activity at this time except possibly for the inclusion of opportunities for additional trips over other reefal areas. As well there is some suggestion that the visitor satisfaction could be increased if the "regimentation" associated with the embarkation for the trip was avoided.

Of the other commercial attractions the theatrette and the aquarium provide little net benefit to the community. There is no evidence to suggest that the experience offered by the theatrette can be improved sufficiently to attract enough increased visitation for it to become a source of major benefit to the public. The situation with respect to Marineland Melanesia is somewhat paradoxical. While a large proportion of visitors go to the aquarium many of these apparently value the experience at less than the amount paid. However this conflicts somewhat with the fact that most customers said that they would not give up their visit to the aquarium if their time on the island was shortened. While no precise conclusion can be drawn there is a certain implication that this attraction contributes very little or nothing to the aggregate net benefit. The opening of the aquarium in Cairns is likely to affect adversely the value of the facility to society.

Available evidence suggests that the Obervatory has considerable prior appeal to most visitors. However, their retrospective valuations imply that at present it provides a lesser experience than might have been anticipated. There is reason to conclude that part of the lessening of their enjoyment arises from the small size (cramped conditions, limited viewing area, difficulties of entrance and exit) of the observatory.

A much larger observatory with more viewing portholes is necessary for the experience to be significantly enhanced. The Consultants have estimated that the order of magnitude cost would be \$650,000 for an observatory in the form of a 3 m wide annular ring of 8.5 m diameter. This estimate of cost provides for separate entrance and exit stairways. Above-water the estimate allows for an observatory along traditional lines and does not, for example, include for any major elevated platform.

Considering the conditions of the existing lease, the prospects for growth in the numbers of visitors to the island and the return being earned from the current operation the Consultants doubt that an investment in such an observatory would be financially sound from the point of view of the owner. An improved facility is thus unlikely to be built for some time unless the current facility starts to give rise to major maintenance difficulties.

A value for the boat trip cannot be estimated directly from existing data sources but a possible interpretation of the available evidence is that a net loss is associated with this part of the visit to Green Island.

Improvements to the ferry service by using faster vessels and with higher levels of amenity may be expected to increase public satisfaction with the trip. There are, however, certain negative characteristics of the voyage which are difficult to avoid. Rough sea conditions and the limited scenery of interest will continue to impair this part of the visit to Green Island.

7.4 Evaluation of Other Alternatives

As discussed previously in the report the range of alternative recreational or tourist uses of Green Island is heavily constrained. Unless existing leases are altered or other uses made of public lands the possibilities consist only of the same types of attractions but with altered standards or qualities.

Alternative use plans for Green Island may be broadly divided into two categories. One set involves no fundamental change to existing land use. This group has been evaluated in Sections 7.2 and 7.3. In this section the other set of alternatives are evaluated. These alternatives contain the implication of some changes to lease conditions and/or the use of public lands. While some of this set of propositions may not always be seen as practical or realistic, such alternatives are considered necessary to provide a framework for proper decision-making. In part these alternatives are set deliberately as extremes for this purpose. The alternatives in this group are defined as follows:—

- "No Resort" Alternative. Under this alternative the resort accommodation on the island is eliminated. In the evaluation it has been assumed that the relevant part of the hotel lease area is acquired by Government at a fair market price. Facilities for public use by day-trippers are provided on the land so released. For example, picnic facilities are envisaged. The kiosk/bar/restaurant facilities in the central amenity block are retained for serving day/trippers and the block expanded to provide an improved level of service. A basic information centre is included adjacent to the visitor arrival point. Elsewhere on the island is conceived as being the same as for the "Status Quo" alternative.
- "Expand Resort" Alternative. This alternative hypothesis that the island is primarily devoted to serving the interests of an increased number of resort guests. A resort of 200 bed capacity is assumed. Only a limited number of day trippers is permitted to visit the island since the expanded resort would not otherwise be financially viable. Other commercial facilities are assumed not to operate.
- "Camping" Alternative. Compared with the "Status Quo" alternative the significant modification under this alternative is to provide for camping within the confines of the current National Park. The maximum number of camp sites provided for is 50. Additional toilet facilities are built within the National Park to serve campers and other members of the public.

The results of the evaluation of the alternatives are shown on Tables 7.3 to 7.5 respectively.

The definitions of the terms used under the heading Measurable Economic Effects are consistent tith those employed earlier in the report. Under the heading of Economic Impacts, estimates are given of the effects on employment of persons directly and indirectly involved in providing for visitors to Green Island.

TABLE 7.3 Forecasts and Evaluation of "No Resort" Alternative

Category	1980	YEAR 1990	2000
• Day Trippers			
- Vistation $(,000)^{(a)}$	115	140	170
— Quality Factor ^(b)	1.05	1.05	1.05
— Net Users' benefits (\$,000) ^(d)	190	220	240
Resort Guests			
— Vistation (,000)	0	0	0
IEASURABLE ECONOMIC EFFECTS (c)	NET PI I	RESENT VALUE DISCOUNT RATI	E (\$,000) E
	3%	5%	7%
Net Users' Benefits	7700	4500	3200
Additional Resource Costs (e)	3400	1900	1300
Imputed Land Rent ^(f)	1800	1800	1800
Net Benefit (Confidence Limits ±20%)	2500	800	100
ECONOMIC IMPACTS			
Direct and Indirect Employment in Far North Queensland		$97(\pm 10)$)) persons

Option value possibly slightly higher than that for the "Status Quo" alternative.

Distributional consequences may be appreciable through the closure of the resort. Low income families may be precluded from a tropical island holiday as the Green Island hotel is one of a limited number of resorts offering "low cost" accommodation.

Financial transfers arise through closure of the resort and through users not paying for all costs.

(a) Values measured in terms of visitor days expressed in adult equivalents and rounded to the nearest thousand.

(b) The factor expressing the relative quality of the experience with this alternative compared with that in the corresponding year under the "Status Quo" alternative.

(c) Values rounded to the nearest \$100 000.

(d) Values rounded to the nearest \$10 000.

(e) Covering all costs which are not covered by users' fees with the exception of those public costs for water supply and severage.

(f) The value nominated is an order of magnitude estimate only being based on expected land values in alternative use.

	Foreca	n			
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	uation o		I L I I	TAT	
	I Expa	C ((T)	BLALA 6.T	RE71	
	nd Kesort	1 7			
	Alternative	9 4 1 4			

Category	1080	YEAR	2000
	1300	1330	2000
• Day Trinners			
Visitation (000)	10	10	10
- Visitation (,000)	10	10	10 1 99
- Quality Factor ⁽⁶⁾ Not Users' Percenter (6, 000) (d)	1.4	1.1	1.23
— Net Users Belletits (\$,000)	- 20	20	20
Resort Guests			
- Visitation $(,000)^{(a)}$	13	30	30
— Quality Factor ^(b)	1.60	1.30	1.45
— Net Users' Benefits (\$,000) ^(d)	110	190	190
MEASURABLE ECONOMIC EFFECTS ¹⁰	NET PR D	RESENT VALUE DISCOUNT RAT	E (\$,000) E
	3%	5%	7%
Net Users' Benefits	6500	3800	2700
Additional Resource Costs ^(e)		—	
Imputed Land rent ^(f)	1800	1800	1800
	4500	8000	000
Net Benefit (Confidence Limits ±20%)	4700	2000	900
ECONOMIC IMPACTS			
Direct and Indirect Employment in			
Far North Queensland		$92(\pm 12)$ n	ersons

By siting all facilities away from the area where the natural environment is currently little changed, option value would appear to be comparable with that of the "Status Quo" alternative.

The local residents who currently use Green Island as a recreational site would be disadvantaged by the restriction on day trippers under this alternative. No comparable location is available to this group of recreationalists.

Owners of commercial attractions are involved in financial transfers.

(a), (b), (c), (d), (e), (f) See footnotes to Table 7.3.

TABLE 7.5 Forecasts and Evaluation of "Camping" Alternative

Category	1980	YEAR	
		1990	2000
Day trippers			
- Visitation $(,000)^{(a)}$	115	140	170
— Quality Factor ^(b)	0.95	0.95	0.95
— Net Users' Benefits (\$,000) ^(d)	170	200	220
Resort Guests			
- Visitation $(,000)^{(a)}$	13	13	13
— Quality Factor ^(b)	0.9	0.9	0.9
— Net Users' Benefits (\$,000) ^(d)	60	60	50
Campers			
- Visitation $(,000)^{(a)}$	5	7	8
— Net Users' Benefits (,000) ^(d)	20	30	30
MEASURABLE ECONOMIC EFFECTS ^(c)	NET PR D	ESENT VALUE ISCOUNT RATI	2 (\$,000) E
	3%	5%	7%
- Net Users' Benefits	102000	6100	4400
Additional Resource Costs ^(e)	3300	1800	1300
mputed Land Rent ^(/)	1800	1800	1800
Net Benefit (Confidence Limits ±20%)	5100	2500	1300
ECONOMIC IMPACTS			
Direct and Indirect Employment in			
Far North Queensland		$127 (\pm 8)$) persons
CINANCIAL AND OTHER CONSIDERATIONS (compared A negligible change in option value arises with this alternation No significant distributional effects occur with this alternation Financial transefers arise through users not paying for all co	with "Status ve. ve. sts.	Quo"alternative)

(a), (b), (c), (d), (e), (f) See footnotes to Table 7.3.

Impacts as described are equivalent in definition to those on Table 5.1 but do not include any induced employment. The estimates of employment changes cannot be interpreted as the loss of employment from tourism in the Far North region since insufficient information is available for account to be taken of the alternative behavious of tourists if activities on the island are modified or closed. Nor, as discussed previously in Section 5, can the impacts be taken as indicating the true effect on overall employment in the Far North region.

As noted elsewhere, various uncertainties are associated with the forecasts. Thus, for example, where the same forecasts appear for a number of alternatives this should be taken as indicating only that within the accuracy of the estimates the difference between them appears to be negligible.

From an examination of the results of the evaluation of all three strategies in this set along with that for the "Status Quo" alternative presented earlier in the report (ref. Tables 5.2 and 7.1) a number of conclusions can be drawn. With respect to measurable economic benefits the ranking of strategies in descending order is "Camping", "Status Quo", "Expand Resort" and "No Resort". Though the magnitude of the values varies by a relatively significant amount depending on the discount rate the order of alternatives is unaltered with the discount rate chosen. The values of net benefits varies little between the first two alternatives and the result could be closer if allowance were to be made for the additional water supply and sewerage costs associated with the Camping alternative. The "Camping" and "Status Quo" alternatives result in equal direct and indirect employment in Far North Queensland. The "No Resort" and "Expand Resort" are inferior to the other alternatives in terms of this criterion.

The remarks contained under the heading Financial and Other Considerations do not appear to bring forward any significant differences between the alternatives except in respect to flows of monies within the community as a whole. As discussed earlier such flows though important from a funding perspective do not change society's welfare since they entail only transfers from one group to another.

The most obvious financial flows occur as a result of the assumptions, explicitly or implicitly, made in the definition of alternatives relative to the continuation of closure of the commercial attractions on the island. Owners of attractions should be indifferent as to which alternative is chosen provided a fair market price is paid when any business is closed. No comments can be made on what would be regarded as a reasonable acquisition payment for any business because it would entail, at least indirectly, the presentation of data made available to the Consultants on a confidential basis. For the same reason the report does not include data on or analysis of the cost structures of any of the businesses.

In all except the "Expand Resort" alternative there are transfer payments other than those involving owners of commercial attractions. Through government a transfer takes place from the general public to island visitors. The extent of the flow is shown under the heading Additional Resource Costs in the tables since this item represents costs associated with Green Island not recovered from users.

When examining the results of the evaluation it should be appreciated that the alternatives were chosen not so much as actual cases or likely candidate schemes but more as alternatives useful for establishing a proper framework for decision-making. The alternatives were selected to give an indication of the effects of certain major shifts in the pattern of use. Looked at in this way the most important point to be made concerns the significance of the values. Neither the economic effects or economic impacts of any of the alternatives appears significant with respect to anticipated values of corresponding regional or state measures. The obvious implication of the result is that the choice of any use plan within the range considered will not be material from the viewpoint of economic considerations.

Other less important observations can also be made. It appears that the resort should be left unchanged. Neither closing nor expanding the resort yields an improvement in society's welfare when viewed along with the consequential economic effects on other potential visitors to the island. Another less certain result appears to be that, unless the environment of the National Park would be substantially altered, some appropriate activities additional to those at present could be permitted without any noticeable effect on society as a whole. Discriminating users of the park may suffer a substantial loss if such moves were made but users of this type are thought to represent a low proportion of the total population. The form which the additional activities could take is not necessarily restricted to camping. It seems likely that a similar conclusion would apply to the erection of a facility within the park which was used for purposes in harmony with the general theme and values associated with national parks. Clearly this conclusion would break down if an overly large structure was envisaged.

7.5 Planning for the Future

Despite oft repeated statements emphasising the major tourist potential of the Great Barrier Reef, there is as yet little evidence to support this view. In fact, reef oriented tourism has apparently declined in recent years. The drop in appeal may well be due to the public becoming dissatisfied with the available reef opportunities. The marine environment makes it difficult for the general public to have contact with the reef except through artificial and frequently sterile techniques. For as long as contact with the reef is reliant on existing techniques the role and importance of Green Island as a tourist/recreational resourse appears unlikely to become significant.

The potential of the reef, if it exists, is likely to be realised only if some way can be found to involve the tourist with the reef more directly. That the majority of visitors to Green Island have expressed an interest in more information concerning the reef can be seen as some support for the view that the public is seeking an opportunity for more than a casual reef experience. The Queensland Fisheries Service has made a start on giving the public a better exposure to the reef by, for example, conducting guided reef walks. However the programme is limited and constraints on funding restrict development.

Experience overseas points to increased interest in the natural environment when properly "interpreted". While no factual evidence exists in Australia on the effects of interpretation at marine parks, it is generally accepted that there is a demand for and a merit in providing a full interpretative programme related to the Reef as a whole.

It is appropriate to query what part Green Island should play in such a programme. Conditions have changed since the idea of establishing a major interpretative centre on Green Island was first proposed in 1971 by Pannel, Kerr, Foster and Co. on their Great Barrier Reef Visitor Plan. More up-to-date information is also available on anticipated developments. For these reasons a re-examination of the overall interpretative programme for the Reef as a whole appears warranted.

Accessibility from the mainland has been seen as a point in favour of Green Island. But locations further south have obvious competitive advantage with respect to major population centres. And, as argued earlier, there is reason to expect that advances in over-water transport will tend to reduce the significance of the sea component of travel in any comparison of alternative locations.

The case for consideration of other locations is further strengthened by the fact that a major interpretative centre on Green Island would be likely to have certain featurs in competition with existing commercial attractions. To some extent there could be a simple objection to this on the grounds that it would be preferable to provide any new services at other locations even less well served than is Green Island. Another concern of establishing the centre at Green Island could be the effect on the financial viability of present operations. All of the existing attractions could be affected adversely to some degree. While improved services may have an influence on total patronage, existing attractions could be expected to suffer in two ways. The newer service would be more attractive offering a higher quality experience. As well the length of stay on the island would act as a constraint reducing the possibility of participation in both the new and the old attractions. It might be suggested that this constraint could be overcome by visitors coming for an additional day. Yet this could be contradicted by evidence which suggests visitors obtain possibly negative benefit from the boat trip. They are therefore unlikely to come to the island a second time during a visit to Cairns to see the remaining lesser enjoyable attractions. As discussed previously more modern ferries may partly offset this inhibiting factor but there will remain the fact that the scenery is uninteresting and the journey consequently somewhat tedious. The not infrequent occurrence of rough seas is another factor reducing the potential enjoyment of the crossing.

Accepting that development of a major interpretative centre would adversely affect the viability of existing operations there may be pressure for compensation or acquisition. Any such payment would involve some component for goodwill, a financial cost that might not be incurred if the programme were centred away from Green Island.

Even if Green Island remains a favoured site it seems desirable to plan the interpretative programme for Green Island after consideration of proposals for interpretation elsewhere on the Reef. Obviously there is a need for a formalised statement outlining a broad framework for the Reef. Once the interpretative theme for the island is set the scale, type and location of facilities can be decided. With respect to the location and depending on the nature of the facilities envisaged, consideration could be given to the possible use of public lands thereby avoiding the financial costs of acquiring private leases.

Remaining questions such as these are outside the scope of this study and though not amenable to economic anaylsis at this time they appear likely to have a bearing on the economic value of Green Island as a tourist/ recreation resource in the future.

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APPENDICES

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APPENDIX A Accommodation Survey Questionnaire

Economic Associates (Aust.) Pty. Ltd.

131 Leichhardt Street, Brisbane. Telephone: (072) 21 6833 Telex: AA41529

P.O. Box 288, North Brisbane, Australia 4000.

Manager: R.J. O'Hara, B.E., B.Econ., M.I.E.Aust. Your Ref.: Our Ref.:

Dear Visitor,

We are undertaking an important research project on behalf of an Australian Government body. The research relates to tourism in North Queensland and elsewhere in Australia. The results of the study will be used to plan how best to meet travellers' needs.

As part of this study we are surveying tourists who come to Cairns. Your co-operation in completing the attached questionnaire would be much appreciated.

If you are a member of a "family group", that is whether directly related or travelling as a unit, please answer the questions on behalf of all persons travelling with you. One questionnaire only is to be completed in this case. Please note that each individual or "family group" which is part of a larger organised tour party is asked to complete a separate questionnaire.

We wish to stress that all information provided by you will be treated as strictly confidential.

Please answer all questions as each is of importance. We emphasise that a failure to complete the questionnaire will limit the usefulness of the study.

Please read the instruction on the questionnaire carefully and complete the questionnaire before you depart tomorrow morning. Where possible an interviewer will return to collect the questionnaire from you. If this has not occurred please leave with the Receptionist/Office as you go out.

Thank you in advance for your participation.

Yours faithfully, ECONOMIC ASSOCIATES (AUST.) PTY. LTD.,

R.J. O'Hara, Manager

United States: Economic Associates Inc. 1150 Connecticut Av. Washington D.C. 20036

NTH. QLD TOURISM SURVEY

Directions. In the following question the Cairns Region refers to the coastal and adjacent inland regions north of Townsville.
In most cases question can be answered by placing a \checkmark in the appropriate square.
\star
 What is the main purpose of your visit to this area? Holiday/recreation Business (no further questions 4. Other (specify)) to be answered)
2. Where is your usual place of residence? If Australia which <i>town/city</i> If overseas which <i>country</i>
3. Including yourself, how many people are travelling as part of your "family" group? Adults Children
4. When this <i>trip is completed</i> how many nights will you have spent in each of these areas?
Cairns RegionOther areas of QueenslandOther areas of Australia
Total* no. of nights away from home
5. How many nights have you spent in the Cairns Region so far?
 6. What type of accommodation are you using mostly on this trip? 1. Hotel or motel 2. Caravan Park 3. Rented flat/house 4. Private home 5. Other
7. What was your main means of transport to Cairns? 1. Plane 2. Rail 3. Bus 4. Car 5. Other
8. Before starting this trip were there any <i>specific attractions</i> (things to do, places to see) which prompted you to come to the Cairns Region? List them in order of importance, most important first.
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
9. Was any such attraction so important that if it were not available you would not have visited here? Which attraction?
۲
 10. On this trip have you visited Green Island? 1. Yes (Go to Quest. 11) 2. No but intend to visit (Go to Quest. 16) 3. No and will not be visiting
If (3) what is the major reason?
1. Involuterest 4. Previous visit unenjoyable 2. Insufficient time 5. Other (specify) 3. Don't know about it (Go to Quest. 16) 5. Other (specify)

11.	(a) Indicate by \checkmark in column (a) which of the following activities/attractions you took part in/visited.
	(a)(b)(c)(d) (Quest. 14)Underwater Observatory\$Castaway Theatre\$Marineland MelanesiaGlass bottom boat tripRestaurant or Coral Cay BarNational ParkSnorkelling
	 (b) If time allowed on the island had to be shortened by 1 hour would you have 1 not visited Green Island? 2 visited, but left out some activities/attractions? Which ones? Indicate by in column (b) above.
	 (c) If time allowed on the island had been reduced by 3 hours would you have 1 not visited Green Island? 2 visited, but left out some activities/attractions? Which ones? Indicate by in column (c) above.
12.	If the time taken for the total visit to Green Island had to be reduced would you prefer 1. less time on the island? 2. less time on the boat to and from?
13.	 (a) When you visited Green Island was it 1. □ overcrowded 2. □ crowded 3. □ slightly crowded 4. □ not at all crowded
	(b) What day of the week was your visit?
14.	(a) What would be the maximum price per adult you would have been willing to pay for your whole visit to Green Island? \$
	(b) How much at most would you have been willing to pay to visit each of the attractions on the Island's Indicate by completing column (d) of table at Question 11.
15.	 If you had been unable to get to Green Island what alternative would you have chosen? 1. Shorten holiday by a day 2. Substitute some other activity/visit in Cairns Region 3. Substitute some othe activity/visit elsewhere in Qld 4. Other (specify
16.	Prior to this trip had you visited Green Island before? 1. Yes 2. No
17.	 (a) What is your best estimate of the total cost of the complete holiday/trip for your "family" \$ (Overseas visitors exclude travel outside Australia)
	(b) Please provide your best estimate of expenses incurred in the past 24 hours for each of the following items
	Accommodation \$ Sightseeing/entertainment \$ Food and drink \$ Incidental items (souvenirs, papers etc.) \$

18. Show the major occupation of each adult in your "family" group on this holiday by indicating the numbers who belong to each of the following categories.

Student	 Home Duties	 Technical	
Retired	 Professional/Managerial	 Tradesman	
		Other	

Thank you.

APPENDIX B Ferry Survey Questionnaire

Economic Associates (Aust.) Pty. Ltd.

131 Leichhardt Street, Brisbane Telephone: (07) 221 6833 Telex: AA41529

P.O.Box 288, North Brisbane, Australia 4000.

Dear Visitor,

As part of an important research study for an Australian Government body, we are seeking your comments in relation to your visit to Green Island. This survey, together with information from other sources, will be used to plan how best to meet visitors' needs.

Your co-operation in completing the questionnaire below would be much appreciated.

Please hand the questionnaire to the interviewer as you leave the boat.

Yours faithfully, ECONOMIC ASSOCIATES (AUST.) PTY. LTD.

R.J. O'Hara, Manager.

			GREEN ISLAND SURVEY	
Di	irections:	(a) (b)	Only one questionnaire is to be completed for each family group. In most cases questions can be answered by placing a \checkmark in the appropriate position.	
1.	Where is	s you	ir usual place of Residence?	
	If Austra	ılia,	which town/city State	
	If oversea	as, v	which country	
2.	Including your "far	g yo nily	urself, how many people are travelling as part of "group?	
	Adults		Children	•••
3.	Before yo (things to List then	ou vi o do, n in	isited Green Island on this trip were there any specific <i>attractions</i> , places to see) which prompted you to come to the Island? order of importance, most important first.	
	1			•••
	3			•••
4.	Consider opportun life (fish,	ring nity 1 , etc.	your whole visit to the Island, would you have liked an to see and hear <i>more</i> about the coral reefs and marine .)?	
	No Yes Don't car	re		
5.	Indicate	whi	ch of the following attractions you visited.	
			YesNoUnderwater ObservatoryCastaway TheatreMarineland MelanesiaGlass bottom boat trip	

Dining and bar facilities

6. How would you rate each of the attractions visited and facilities used?

		Very Good	Satisfactory	Needs Improvement
	Underwater Observatory Castaway Theatre Marineland Melanesia Glass bottom boat trip Dining and bar facilities Boat trip to the Island			
7.	Considering your whole trip to the Island, what add attractions, services, etc., do you think should be pr	litional facilities ovided?	,	
	Comments:			
		•••••••••••••••••••••••••••••••••••••••	••••••	•••••••••••••••••••••••••••••••••••••••
8.	Because of increasing patronage there are pressure amenities (toilets, showers). To cope with this probl alternatives would be to limit visitor numbers or ch use of the amenities.	es on existing pub lem two of the pos harge a small am	olic ssible ount for	
	(i) Would you be prepared to pay for the use of the	toilets?	🗌 No	
	 (ii) What would you do about showering? Wouldn't use the shower Would use a free saltwater sho Would pay for a fresh water sho 	wer ower		

APPENDIX C Transactions Data

TABLE C.1 Far North Qld.: Employment^(a) Generated by Green Island Sales^(b)

	SECTOR	DIRECT & INDIRECT	INDUCED	TOTAL
1	Animal Industries	.5	1.0	1.5
2	Other Agriculture	1.5	6.0	8.0
3	Forestry, fishing		.5	1.0
4	Coal, crude petroleum mining			
5	Other mining			· ······
6	Food manufacturing	1.0	3.0	4.5
7	Wood and paper manufacturing	.5	1.5	2.0
8	Machinery, appliances	3.5	.5	4.0
9	Metals, Metal Products	.5		.5
10	Non-metallic minerals		territoria i	· · · · · ·
11	Other manufacturing			.5
12	Electricity, etc.	.5	.5	.5
13	Building Construction	3.0	1.0	3.5
14	Trade	25.0	10.0	36.0
15	Transport, communication	4.0	3.0	7.0
16	Finance	4.0	2.0	6.5
17	Public Administration		.5	.5
18	Community Services		1.5	1.5
19	Entertainment	1.0	5.0	7.0
20	Green Island Tourism	83.0		83.0
	All Sectors	127.0	37.0	164.0

(a) Full-time equivalents rounded to nearest 0.5 persons.

(b) Predicted total value for full year 1979.
(c) N.B. Rows and columns may not sum to totals because of rounding.

TABLE C.2 Far North Qld.: Income^(a) Generated by Green Island Sales^(b) (\$,000)

	SECTOR	DIRECT & INDIRECT	INDUCED	TOTAL
1	Animal Industries	1.0	2.0	2.0
2	Other Agriculture	5.0	23.0	27.0
3	Forestry, fishing		1.0	2.0
4	Coal, crude petroleum mining			
5	Other mining			
6	Food manufacturing	10.0	30.0	40.0
7	Wood and paper manufacturing	3.0	14.0	17.0
8	Machinery, appliances	28.0	6.0	34.0
9	Metals, Metal Products	5.0	2.0	6.0
10	Non-metallic minerals	1.0	2.0	3.0
11	Other manufacturing	3.0	2.0	4.0
12	Electricity, etc.	5.0	6.0	11.0
13	Building Construction	20.0	7.0	27.0
14	Trade	119.0	57.0	176.0
15	Transport, communication	28.0	25.0	53.0
16	Finance	52.0	35.0	87.0
17	Public Administration		2.0	2.0
18	Community Services		10.0	10.0
19	Entertainment	3.0	18.0	21.0
20	Green Island Tourism	640.0		640.0
	All Sectors	922.0	231.0	1153.0

(a) Wages, salaries and supplements only.(b),(c) See Table C.1.

In Tables C.3 and C.4 columns and rows headed 1 to 19 correspond in order to the GRIT sectors numbered 1 $\,$ to 11(b) as defined. Column and row 20 corresponds with the Green Island sector as defined in Section 5 of the report.

Other symbols are defined as follows

HH	Household sector
OVA	Other value added
OFD	Other final demand
Μ	Imports
Х	Exports

Values in the tables are expressed in 1973-74 prices consistent with the original GRIT table.

TABLE C.3Modified Far North Queensland Transaction Table
(\$,000) (1973/74 Prices)

SECTOR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	н-н	O.F.D.E	XPORTS	TOTAL
1						14156				1											89		6161	20407
2	1436	9620				55995	1	—	—	— '	1					_			7		11384		12646	91090
3		_			407	64	3127	1	1	3	2	11	2		76	_		3	_	_	47	38	9	3791
4											—		_		_					—				—
5		8	4		1034	44	—	2	143	395	24		514	2	6	1		3	3				55991	58174
6	818	450	50		1	2037	6	2	1	1	125	1	2	60	4	1	10	152	73	50	47147		91878	142869
7	1	761	41		57	126	2234	192	18	10	11	1	3487	141	81	1	197	136		1	6282	9511		23289
8	71	248	138		1390	82	215	111	27	36	34	362	327	52	1342	7	251	19	3	40	1670	2528		8953
9	2	25	6	_	486	41	71	371	130	46	44	27	927	30	10	1	52	20	2	8	767	1161		4227
10					165	18	10	1	6	23		1	2157	1	27		1	1		1	1081	1637		5130
11	430	1634	18		18	3	4	1	1		3		3	14	3		1	7	1	6	577	878		3602
12	238	1327	22		1638	948	498	114	116	91	70	270	200	419	237	1079	241	689	726	4	906	1510	5861	17204
13	314	1137	15		288	412	407	39	29	87	49	660		646	1578	936	1660	735	5	28	1456	38684		49165
14	1125	4645	456		6563	3369	926	537	140	266	152	253	4096	3596	1636	1519	134	832	265	139	17453	1190		49292
15	358	2466	62		2265	4840	884	224	217	519	88	672	1430	1370	528	296	150	131	29	31	7420	1172	3513	28665
16	6	68			1608	1004	343	57	30	41	24	30	80	2676	196	1078	276	43	194	60	12890	5237	2819	28760
17						35						1		8	1					_	659	14042		14738
18	50	1			22	87									47	23	181	6			2520	17921		20858
19	2				20	261				2		7	5	120	57	12	1	3	22	4	7876	_	880	9272
20							_	_	_	_	-	_									103		929	1032
н-н	1147	10317	785		8237	15072	7075	3143	1017	1154	795	4363	14668	18947	10079	11122	9210	13158	3572	348				134209
O.V.A.	12255	48498	1547		12599	15793	3703	1160	885	970	603	9182	6125	15252	7659	10825	221	2911	2962	144				153294
IMPORTS	2154	9885	647	_	21376	28482	3785	2998	1469	1485	1577	1363	15142	5966	5098	1859	2152	2009	1410	168	80130	—		189155
TOTAL	20407	91090	3791		58174	142869	23289	8953	4230	5130	3602	17204	49165	49292	28665	28760	14738	20858	9274	1032	200457	95509	180687	

TABLE C.4Modified Queensland Transaction Table
(\$,000) (1973/74 Prices)

SECTOR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	н-н	O.F.D.E	XPORTS	TOTAL
1		_				309819		_	_	12	2264		3		1						10111		183322	505532
2	41501	61381				292989	82				368						9		148		136894		88873	622245
3		1		9356	1966	884	17152	25	21	55	302	120	23	1	1533			26	1	_	3746		_	35267
4				—	80	1821	553	106	3289	2575	2465	13763	491	1604	2023		61	427	538	_			207461	237257
5	1	48	63	7636	9089	198	62	156	3836	11566	959	4	11394	41	173	21	1	33	65				336269	379615
6	26770	8949	446	13	24	53012	944	121	702	75	12096	26	266	1614	131	53	403	4628	1914	80	623102		418510	1153879
7	231	18936	236	1632	2593	5205	50638	7164	1916	2629	6851	41	79779	19096	4986	157	13341	5580	714	3	90742	17313	49919	379702
8	4385	4252	1322	5233	21185	1679	3777	18028	4689	2418	5976	5987	31290	4664	48200	554	16904	928	2505	50	78588	24571	175093	462281
9	157	515	135	4522	9113	16677	7353	65721	43596	3294	17306	1984	101261	2620	3250	54	4759	1515	705	8	4477	25177	101633	415840
10	4	4	2	6203	14563	2927	1004	967	2561	14251	1230	55	101351	28	1077	7	72	189	258	1		15568	15394	177716
11	29243	35734	2296	1560	19149	5040	8200	10545	5522	2865	33074	1155	20453	9109	17930	2304	7387	4807	4243	6	51948	7151	78858	358579
12	6152	9584	157	13678	12086	9650	5981	6822	10951	5270	7649	6411	4793	9634	5790	32798	6235	15382	14833	4	87448	25670		296981
13	7461	7885	217	5082	2458	5107	5394	2436	2767	3648	4771	13643		15024	46366	28008	44375	1489	766	28	24136	857360		1091821
14	21512	26388	3311	9291	38686	41461	21256	27207	15285	8900	22366	4674	99505	41522	34593	43209	3606	18304	9661	139	625541	_	_	1116417
15	10485	19871	799	9466	19802	55745	14958	15590	24064	18041	9637	13708	40517	38181	14232	9542	5725	3481	1500	60	180514	174734	41403	722055
16	16	221	660		1158	18765	8300	7527	5243	3946	2017	5888	829	2750	105563 5745	59842	11708	775	8443	77	324634	—	200210	854301
17				11		159			1	1		9		2	14			_			8381	410464		419042
18	1422	23	2	168	154	395				—					704	913	4330	119	_		119622	270889		398741
19	25	3	1		154	1185	9	15	1	38	1	124	103	2360	810	348	74	59	671	4	170365		38793	215143
20						_				_					_						413		619	1032
Н-Н	28669	68866	8648	25216	60175	170220	109120	134074	81400	43456	72988	75982	325614	427912	256711	32367	249265	247053	79481	348				2788845
0.V.A.	303288	331894	13387	113709	92037	108397	59390	67016	65036	40754	59814	154541	136821	348767	193972	324300	5371	58698	66147	144			_	2542683
IMPORTS	24005	27251	4245	23323	99536	63018	66302	101045	76257	15851	92577	3925	136209	88674	83743	28543	45410	21847	22548	80	908881	_	_	1933268
TOTAL	505532	622245	35267	237257	419615	1153888	379702	462281	345840	177716	358582	296981	1091823	1116416	722051	854300	419036	398740	215141	1032	3449543	1828897	2916357	-

19-SECTOR GRIT SECTOR CLASSIFICATIONS

SECTOR NATIONAL SECTORS INCLUDED 01 01 Sheen

1.	Animal industries	$\begin{array}{c} 01.01 \\ 01.03 \\ 01.04 \end{array}$	Sheep Meat cattle Milk, cattle and pigs
2A.	Other agriculture	$\begin{array}{c} 01.02\\ 01.05\end{array}$	Cereal grains Poultry
		$\begin{array}{c} 01.06\\02.00\end{array}$	Other farming Services to agriculture
2B.	Forestry, fishing	$\begin{array}{c} 03.00\\ 04.00\end{array}$	Forestry and logging Fishing, trapping and hunting
3A.	Coal and crude petroleum mining	12.00	Coal and crude petroleum mining
3B.	Other mining	11.01	Iron
		11.02	Other metallic minerals
		14.00 16.00	Non-metallic n.e.c. Services to mining
4A.	Food manufacturing	21.01	Meat products
		21.02	Milk products
		21.03	Fruit and vegetable products
		21.04 21.05	Flour mill and acroal food products
		21.05 21.06	Bread cakes and biscuits
		$\frac{100}{21.07}$	Confectionery and cocoa products
		21.08	Food products n.e.c. (including fish and sugar)
		21.09	Soft drinks, cordials and syrups
		21.10	Beer and malt
		$\begin{array}{c} 21.11\\ 22.01 \end{array}$	Alcohol beverages n.e.c. Tobacco products
٨R	Wood and paper manufacturing	95.01	Commill muchusta
чD.	wood and paper manufacturing	25.02	Plyboard, veneers and manufactured boards
		25.03	Joinery and wood products n.e.c.
		25.04	Furniture, mattresses, brooms and brushes
		26.01	Pulp, paper and paper-board
		26.02	Fibreboard and paper containers
		26.03	Newspapers and books
		26.05	Commercial and job printing and printing trade services
4C.	Machinery, appliances	33.01	Photographic, scientific equipment, etc.
	equipment	33.02	Television sets, radios, communication and electronic equipment n.e.c.
		33.03	Household appliances n.e.c.
		33.04	Electrical machinery and equipment n.e.c.
		33.05 33.06	Agricultural machinery and equipment Construction, earthmoving and materials
		29.07	nandling machinery and equipment
		32.01	Motor vehicles and parts and transport
			equipinenti II.e.e.

		$\begin{array}{c} 32.02\\ 32.03\end{array}$	Ship and boat building and repair Locomotives, rolling stock and repair
4D.	Metals, metal products	$29.01 \\ 29.02 \\ 31.01 \\ 31.02 \\ 31.03$	Basic iron and steel Non-ferrous metal basic products Fabricated structural metal products Metal containers, sheet metal products Cutlery and hand tools, metal coating and finishing and metal products n.e.c.
4E.	Non-metallic mineral	$\begin{array}{c} 28.01 \\ 28.02 \end{array}$	Glass and glass products Clay products
	F	28.03	Cement
		28.04	Ready-mixed concrete
		28.05	Concrete products
		28.06	Gypsum, plaster and other non-metallic mineral products
4F.	Other manufacturing	27.01	Chemical fertilisers
		21.02	(plastic materials, synthetic resins, industrial gases, synthetic rubber, other basic chemicals)
		27.03	Paints, varnishes and lacquers
		27.04	Pharmaceutical and veterinary products, agricultural chemicals
		27.05	Soap and other detergents
		27.06	Cosmetic and toilet preparations
		27.07	Chemical products n.e.c. (incl. ammunition, explosives and fireworks)
		27.08	Petroleum and coal products
		23.01	Prepared fibres (cotton ginning, wool scouring, top-making)
		23.02 23.03	Man-made fibres, yarns and fabrics Cotton, silk and flax yarns, fabrics and household textiles
		23.04	Wool and worsted yarns and fabrics
		23.05	Textile finishing
		23.06	Textile floor covering, felt and felt products
		20.07	(incl canvas rone etc)
		24.01	Knitting mills
		24.02	Clothing
		24.03	Footwear
		34.01	Leather tanning, leather and leather substitute products n.e.c.
		34.02	Rubber products
		$34.03 \\ 34.04$	Plastic and related products Signs, advertising displays, writing
		34.05	Ophthalmic articles, jewellery, silverware and other manufacturing
5	Flootnicity and and	96 01	Flootnigity gon systian and distribution
э.	Electricity, gas and water	30.01 36 09	Gas production and distribution
		27.01	Water, sewerage and drainage
6.	Building and construction	41.01	Resdential buildings
		41.02	Other buildings and construction
7.	Trade	46.01	Wholesale trade
		48.01	Retail trade
		48.02	Motor vehicle repairs
		48.03	Other repairs

8.	Transport and Communication	$\begin{array}{c} 51.01 \\ 52.01 \end{array}$	Road transport Railway transport, other transport and storage
		53.01	Water transport
		54.01	Air transport
		55.01	Communication
9.	Finance	61.01	Banking
		61.02	Finance and life insurance
		61.03	Other insurance
		61.04	Investment, real estate and leasing
		61.05	Technical and other business service
		61.06	Ownership of dwellings
10.	Public administration and	71.01	Public administration
	defence	72.01	Defence
11A.	Community services	81.01	Health
	·	82.01	Education, libraries, etc.
		83.01	Welfare services, religious and community organisations
11B.	Entertainment, etc.	91.01	Entertainment and recreational services
		92.01	Restaurants, hotels and clubs
		93.01	Personal services





GREAT BARRIER REEF MARINE PARK AUTHORITY

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