

# **Coral Bay Draft Coastal Management Plan**



**Department of Conservation and Environment  
Perth, Western Australia.  
Bulletin 174. July 1984.**

**CORAL BAY : DRAFT**

**COASTAL MANAGEMENT PLAN**

A study promoted by the  
Coastal Management Co-ordinating Committee  
and the  
Department of Conservation and Environment  
in co-operation with the  
Shire of Carnarvon

Department of Conservation and Environment  
Bulletin No 174  
July 1984

**ISBN 0 7244 6731 9**

**ISSB 0 0156-2983**

## CONTENTS

	Page No
ACKNOWLEDGEMENTS	(iv)
PREFACE	(v)
COASTAL MANAGEMENT CO-ORDINATING COMMITTEE	(vi)
CONCLUSIONS AND RECOMMENDATIONS	(vii)
INTRODUCTION	1
REGIONAL CONSIDERATIONS	4
NATURAL ENVIRONMENT	5
Climate	5
Coastal Processes	5
Tides and Currents	6
Geology	6
Geomorphology	8
Land Capability	8
Analysis of the Landforms	9
Hydrology	12
Vegetation	12
Fauna	13
Marine Ecology	13
Landscape Appraisal	16
Conclusions	16
HUMAN ENVIRONMENT	18
Land Use and Tenure	18
Development	18
Planning and Administration	20
Tourism	21
Recreation	23
Fishing, Boat Launching and Swimming	23
Shell Collecting	23
Off Road Vehicles (O.R.V.)	24
Movement and Access	24
Conclusion	24

	<b>Page No</b>
EXISTING FORESHORE MANAGEMENT AT CORAL BAY	26
OPPORTUNITIES AND CONSTRAINTS	29
GOAL AND OBJECTIVES	30
EVALUATION OF THE DEVELOPMENT POTENTIAL AT THE CORAL BAY TOWNSITE	31
EVALUATION OF THE ENVIRONMENTAL CAPABILITY TO WITHSTAND FURTHER DEVELOPMENT	32
STRATEGIES FOR SPECIFIC MANAGEMENT AREAS	33
. Townsite	33
. District	33
IMPLEMENTATION	37
REFERENCES	38
APPENDIX	39
<b>LIST OF FIGURES</b>	
1 Location of Coral Bay showing the National and Regional Context	3
2 Landforms of the Coral Bay District	7
3 Analysis of the Landforms in the Coral Bay Townsite	10
4 Existing Development at Coral Bay	19
5 Existing Foreshore Management at Coral Bay	28
6 Coastal Management Proposals in the Coral Bay Townsite	34
7 Management Proposals in the Coral Bay Locality	36
<b>LIST OF TABLES</b>	
1 The Potential Development Hazard Ratings for the Landforms at Coral Bay	9
2 Summary of Recreation Useage Expressed in Units of People, Vehicles, Tents and Caravans for the Coastline in the Proposed Ningaloo Marine Park on 4 August 1982	22
3 Numbers of Visitors Residing at Exmouth and Coral Bay on 4 August 1982	22

## LIST OF PHOTOGRAPHS

1	Aerial photograph of the Coral Bay settlement	2
2	The eroded beach at the north of Coral Bay showing exposed fossil coral	2
3	<u>Acropora</u> sp (Staghorn Coral)	14
4	<u>Platygyra</u> sp (Brain Coral)	14
5	<u>Alcyonacean</u> Coral	15
6	<u>Goniastria</u> sp (Honeycomb Coral)	15
7	Eroded Holocene dunes to the south of the Coral Bay settlement	17
8	Eroded beach and dune to the south of Coral Bay settlement showing exposed fossil coral	17
9	Existing foreshore management work at Coral Bay	27
10	Shire signboard and existing foreshore management work at Coral Bay	27

## ACKNOWLEDGEMENTS

Mr. R. O'Brien prepared this report for the Coastal Management Co-ordinating Committee. The section on Vegetation was prepared by Mr. C. Chalmers and Ms. G. Craig.

Valuable advice was provided by the following people:

Mr. M. Allen	-	Town Planning Department
Dr. W. Andrew	-	Marine Department
Mr. P. Armstrong	-	Marine Department
Mr. P. Brooks	-	Shire of Carnarvon
Mr. C. Chalmers	-	DCE
Mr. S. Chape	-	DCE
Mr. B. Cloughton	-	Shire of Carnarvon
Mr. P. Gleed	-	Town Planning Department
Dr. B. Hamilton	-	DCE
Dr. P. Hesp	-	Department of Agriculture
Mr. C. Hutchinson	-	Department of Lands and Surveys
Mr. R. May	-	National Parks Authority
Dr. M. Paul	-	Marine Department
Mr. J. Riches	-	Department of Agriculture
Mr. P. Skitmore	-	DCE
Dr. K. Tinley	-	DCE
Dr. P. Woods	-	DCE

The figures were prepared by Mr. T. Berman and the cover was designed by Ms. P. Moran.

The photographs were taken by Mr. R. May and Mr. R. O'Brien.

## **PREFACE**

Coral Bay is one of the few places on the Ningaloo Reef where the general public is able to gain access to the coast. Existing proposals by the Ningaloo Marine Park Working Group are presently being considered by the Environmental Protection Authority. The proposals include the establishment of a marine and terrestrial park under the control of a new management authority. If the proposals are adopted substantial changes will take place at Coral Bay. The author of this report supports the Ningaloo Marine Park recommendations and considers the status of this report to be secondary to the Ningaloo Marine Park Report.

This report focuses on the Coral Bay townsite and surrounding locality. It addresses specific land use and coastal management issues at Coral Bay.

If the proposal to establish the Marine Park is accepted by State Government, and if a management authority is established, much of the information in this report will be useful to the new authority.

If the State Government does not accept the Ningaloo Marine Park recommendations or if there is extended delay, the present plan should be adopted by the Shire of Carnarvon and the various State Departments for the interim management of Coral Bay.

This draft plan is available for comment until 31 October 1984. Once a decision has been made on the Ningaloo Reef Marine Park the plan will either be modified or finalised after consideration has been given to comments received.

## **THE COASTAL MANAGEMENT CO-ORDINATING COMMITTEE**

In 1977 the Environmental Protection Authority published its Guidelines for an Environmental Protection Policy on the Coastal Zone of Western Australia. The guidelines were intended to lead to the preparation and implementation of a Statutory Environmental Protection Policy. The potentially far reaching consequences of the proposals contained in the guidelines aroused considerable interest and concern. In 1978, following a period of submissions and debate, the situation was referred by the E.P.A. to the Conservation and Environmental Council for review.

The Council recommended the formation of an interim Steering Committee. The Coastal Planning Steering Committee, together with a specially appointed Coastal Adviser, carried out a comprehensive review of coastal planning and management in Western Australia. The study adopted broad terms of reference and thoroughly examined all aspects related to the coast and led to the formation in September 1982 of the Coastal Management Co-ordinating Committee.

The Committee is comprised of :

- Director of the Department of Conservation and Environment
- Head of the Harbours and Rivers Branch, Public Works Department
- Commissioner of Soil Conservation, Department of Agriculture
- Head of Country Planning, Town Planning Department
- Regional Surveyor, Department of Lands and Surveys
- Manager, Shipping and Navigation, Department of Marine and Harbours

The terms of reference of the Committee are as follows:

- 1 To overview the preparation and implementation of coastal management plans at both regional and local levels.
- 2 To co-ordinate departmental activities on the coast through exchange of information and views, and to review expenditure programmes and priorities.
- 3 To advise Government on coastal management policies, legislation and administrative arrangements.

One of the first resolutions of the Coastal Management Co-ordinating Committee was to prepare a coastal management plan for Coral Bay.

## CONCLUSIONS AND RECOMMENDATIONS

### CONCLUSIONS

- 1 Coral Bay contains a spectacular and unique natural resource which should be protected.
- 2 Visitors are attracted to Coral Bay in increasing numbers, during school holidays, for the purpose of fishing, boating, swimming, viewing the coral and enjoying the aesthetic value of the Ningaloo Reef.
- 3 Coral Bay has become overcrowded at peak use periods and environmental degradation is occurring.
- 4 The narrow eroding beaches at Coral Bay do not facilitate large numbers of beach users.
- 5 No overall planning has been adopted at Coral Bay.
- 6 Coral Bay is remote and there is little finance available for management.
- 7 There is a limited area of land suitable for development at Coral Bay but even this does not have a high development capability rating.
- 8 Any further increase in the number of users will result in irreversible environmental damage.

### RECOMMENDATIONS

#### Marine :

- 1 No engineering structures or works of any description such as groynes or breakwaters should be built in the coral lagoon. Also, no navigation channels or boating passages should be cut through the coral.
- 2 The potential of Coral Bay for boating and recreation has reached its capacity, therefore development should be restricted to the existing improvements in order to prevent irreversible environmental damage.
- 3 The areas set aside for boating and swimming should be clearly separated and signposted.

#### Coral Bay Townsite:

- 4 No further subdivision, leasing or building development should be permitted at Coral Bay, except for the existing commitments on Lot 46, otherwise irreversible damage will occur to the coral and the unstable eroding sand dunes.
- 5 If further developments are approved at Coral Bay and greater numbers of users enter the area substantial financial inputs will be required to manage the environment, namely the building of an alternative boat launching facility away from the coral lagoon, the provision of land based recreational facilities and the management of the unstable sand dune areas.
- 6 If further developments are approved at Copral Bay the onus for providing finance to manage the environment should be on the developer and not the Local Authority or the State Government.

- 7 The possibility of imposing a levy on the hotel and caravan park users should be investigated as a possible source of capital to manage Coral Bay.
- 8 Long term planning control may not be achieved by using Interim Development Orders. Zoning under the provisions of a Town Planning Scheme may be more effective. Such a scheme could be separate for the Maud's Landing townsite (Coral Bay and Maud's Landing) or could form part of the Carnarvon Town Planning Scheme.
- 9 The existing C Class coastal reserve (No 37500) should be extended to the north of the townsite boundary and should be vested in the Shire of Carnarvon for recreation and foreshore preservation.
- 10 A road should be constructed to provide access to the proposed parking area to the north of the townsite boundary. Pedestrian access should be provided from the parking area to the beach at the northern end of Coral Bay and to the dune blowout.
- 11 The old road, through the existing foreshore reserve No 37500, which was closed off at the time the beach management project was implemented, should be reopened as a pedestrian path and surfaced with limestone.
- 12 The western portion of Lot 45 to the north of Lots 49 and 31 should be subject to similar management treatment as the rest of the reserve.
- 13 The dune area to the south of Lots 49 and 31 should be proclaimed a C Class coastal reserve and vested in the Shire of Carnarvon for the purpose of recreation and foreshore management. The reserve should be fenced and pathways should be covered with limestone to prevent destabilization of the sand.
- 14 French Street should be extended to the south to provide access to the beach areas south of the townsite.
- 15 Increase the area for boat launching and mooring to 65 metres east and 100 metres west of the existing jetty. At the same time ensure that boats do not encroach on the swimming area.
- 16 Appropriate signs should be erected (a) to inform the public of the intention of the reserves i.e. dune restoration, and (b) to guide them to the pathways.

District :

- 17 Proclaim a C Class reserve from the Coral Bay townsite south to the Cardabia Station boundary to be vested in the Shire of Carnarvon for the purpose of recreation and foreshore management.
- 18 Upgrade the coastal track south of the townsite to the blowout and provide parking facilities at appropriate places to gain access to the beaches.
- 19 Proclaim a C Class reserve north of the Coral Bay townsite to the northern edge of the Maud's Landing townsite to be vested in the Shire of Carnarvon for the purpose of recreation and foreshore management.
- 20 Do not permit any development in the Maud's Landing townsite owing to its almost total lack of development capability.
- 21 Make the necessary arrangements to have a Shire ranger stationed at Coral Bay. Ideally the ranger should be permanent but failing that a temporary ranger should be stationed at Coral Bay during peak use periods.

Regional :

- 22 A study of the Ningaloo Coast should be undertaken with the purpose of identifying at least two additional sites similar to Coral Bay which could be developed as small holiday resorts.

## INTRODUCTION

The Coastal Management Co-ordinating Committee expressed concern in May 1983 about the development taking place at Coral Bay, and about a range of management issues. The Coastal Planning and Management Adviser investigated the situation at Coral Bay and reported to the Committee at its meeting in September 1983. The outcome of the report was a resolution by the Committee to prepare a coastal management plan for Coral Bay which would provide guidelines for the ongoing development of the settlement and solve the existing management problems.

### Coral Bay Townsite

Coral Bay, formerly known as Bill's Bay, is the southern portion of the Maud's Landing townsite. The settlement is 250 kilometres north of the town of Carnarvon and is 160 kilometers south of Exmouth (Figure 1). The bay derives its name from the coral which grows in the lagoon formed between the Ningaloo Reef and the coastline. The coral formations are easily accessible to the beach for skindivers, and visitors are able to view the coral by means of a glass bottom boat.

### The Purpose of the Plan

Coral Bay has unique recreational resources which continue to attract more and more tourists and holiday makers. It is anticipated that the existing problems will become aggravated unless steps are taken to resolve some of the conflicts. These problems and conflicts will be addressed in the report.

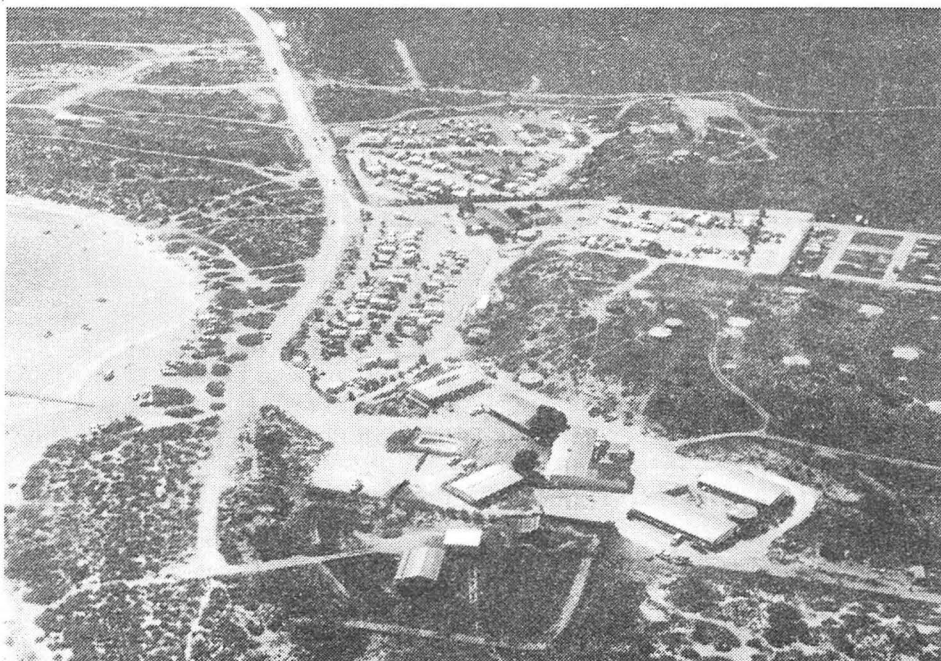
At present the future of Coral Bay is uncertain. The Ningaloo Marine Park Report recommended that the privately owned land be resumed and leased under the control of a management authority. If the Ningaloo Marine Park Report is not accepted, it is possible that the Shire of Carnarvon, in collaboration with the Department of Lands and Surveys, will proceed with a Town Planning Scheme for the townsite.

What is certain is that unless something is done, the resources of the area will be degraded. It is for this reason that this coastal management plan is being prepared. The plan will provide basic guidelines for the future development and management of Coral Bay.

### Study Area

This report considers Coral Bay at three different scales:

- 1 The Regional considerations of the entire Ningaloo Reef.
- 2 The District, surrounding the Coral Bay townsite, which is affected by the activities in the area.
- 3 The Coral Bay townsite.



**1** Aerial photograph of the Coral Bay settlement



**2** The eroded beach at the north of Coral Bay showing  
exposed fossil coral

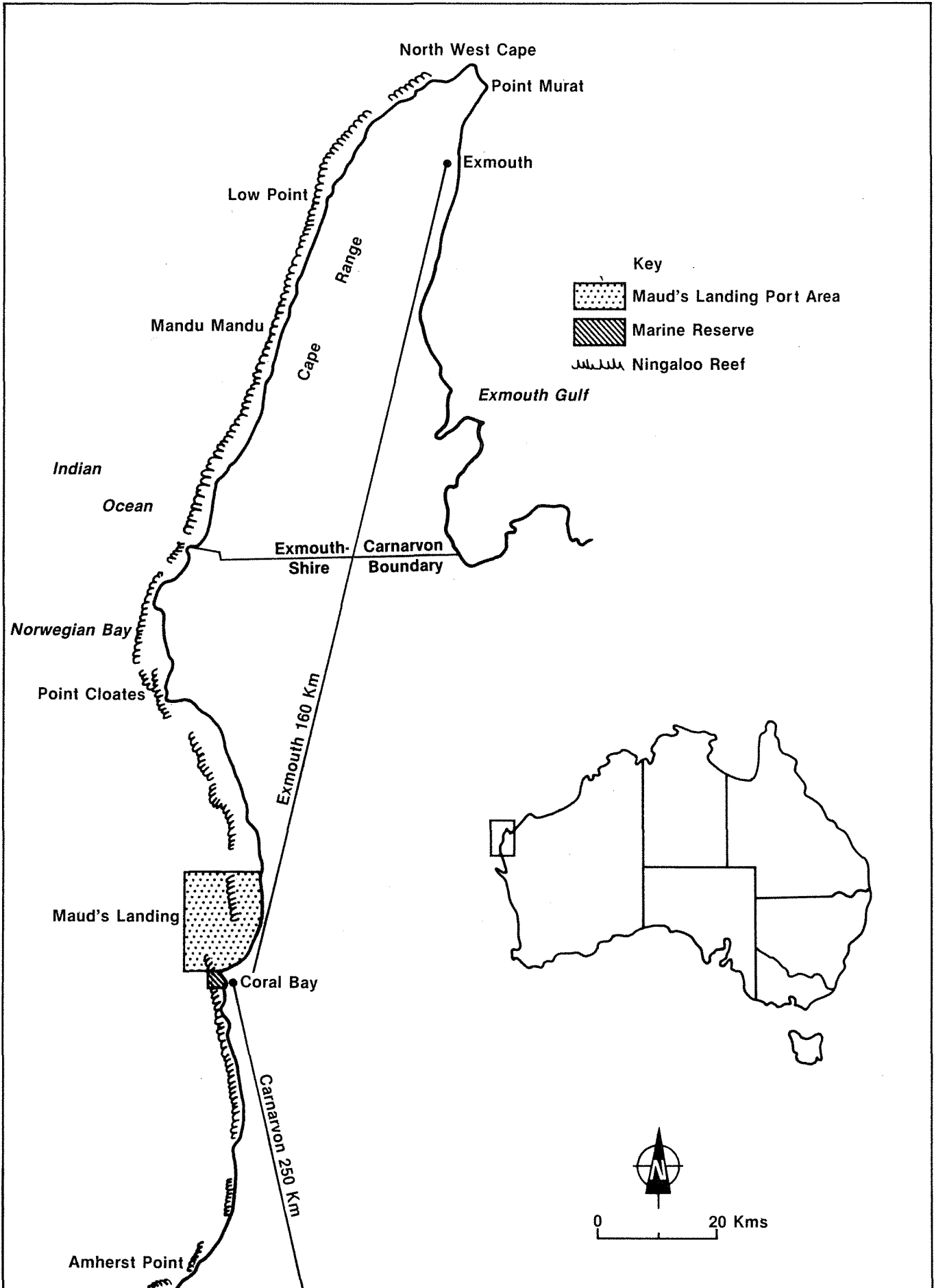


Figure 1 Location of Coral Bay showing the National and Regional Context

## REGIONAL CONSIDERATIONS

An investigation of Coral Bay and an analysis of its problems would be incomplete without consideration of its regional setting (Figure 1).

The main attraction to the region is the Ningaloo Coral Reef which occurs for over 260 kilometres of coastline from Point Murat, in the Gulf of Exmouth, around North West Cape, and then south along the coast to Amherst Point. The fauna associated with the coral is diverse and spectacular and is comparable with any good coral habitat elsewhere.

The demand for outdoor recreation between Carnarvon and Exmouth has increased sharply over the past decade and this is having a significant impact on the environment. Owing to the aridity of the climate it is highly susceptible to environmental damage.

Much of the coast along the reef is undeveloped and there are few places for boat launching and few facilities for holiday makers. The town of Exmouth provides a good range of facilities, namely charter boats for game fishing, vehicle hire and support services. The Cape Range National Park provides low key camping facilities from Tantabiddi Well south to beyond Yardie Creek.

South of the National Park is Lyndon Location 97 which is an RAAF Weapons Testing Range. The remainder of the Ningaloo Reef is bordered by three stations; Ningaloo, Cardabia and Warroora. At present the owner of Warroora prohibits access through his property but the owners of Ningaloo and Cardabia permit access and in some places permit camping along their coast.

Coral Bay is therefore the only access point along the Ningaloo Reef with facilities such as a shop, fuel outlet, a hotel and two caravan parks. As a result, Coral Bay is the focus for holiday makers and suffers from overcrowding at certain times of year.

In order to reduce the overconcentration of holiday makers at Coral Bay, thought will have to be given to opening up additional resort settlements along the Ningaloo Reef. This aspect requires urgent attention, but should await the outcome of the Ningaloo Reef Marine Park deliberations. It is therefore beyond the scope of the present study.

## NATURAL ENVIRONMENT

Coral Bay is situated in a remote part of Western Australia 1200 kilometres north of Perth. The natural environment has not been studied in any detail, so much of the data used in this section has been gathered from studies which have been done in the general area of Coral Bay.

### Climate

Coral Bay is situated in a dry climatic region which is characterised by evaporation exceeding precipitation on the average throughout the year. There is no water surplus and no permanent streams originate in this climatic zone. The average annual rainfall is between 200 and 300 mm per annum and the evaporation between 1700 and 3000 mm per annum. The majority of the rain falls during the months of February and March and is associated with cyclonic disturbances. The winter rainfall is more regular but less intensive. The significance of the higher evaporation is that restoration of damaged vegetation is slow.

The mean maximum temperature in the Coral Bay region is 26.7°C with the highest monthly average of 30°C recorded in February. The temperature is approximately 5°C higher than Perth in winter which makes the area attractive to holiday makers.

The prevailing wind at Coral Bay is from the south, and at certain times of the year it is extremely unpleasant. The significance of the wind at Coral Bay is that most of the area is unprotected except for a small area north of the Holocene dunes where the caravan and camping places have located. These dunes also provide the safest and most sheltered boat launching and swimming place along this stretch of coast.

### Coastal Processes

The coast at Coral Bay which is aligned north-south is subject to a westerly swell that originates in the Roaring 40's and south-east trade wind belt of the Indian Ocean. In winter the swell is low to moderate and in summer it is low. The Ningaloo Reef absorbs the main force of the ocean energy and the waves which reach the shoreline are refracted and relatively subdued. Temporary rough seas and heavy swells associated with cyclones affect the coast and are responsible for certain coastal features.

The force of the ocean energy expended on the reef results in fragmented coral debris being washed towards the shoreline. The supply of this material is fairly restricted and much of it has been slowly lost into the parabolic dunes and beach ridges that form the coast. Gaps in the reef and the consequent higher wave energy which penetrates to the coast, result in varied beach and dune formations. For example, the reef directly west of the Coral Bay settlement reduces most of the wave energy and has produced a remarkably sheltered lagoon which has resulted in a unique coral habitat. The coastline in Coral Bay is therefore sheltered and variations in shoreline movements are relatively slight. Further north, opposite Maud's Landing, there is a large break in the reef and the coast is far more exposed to ocean swell. The greater wave energy has washed more sediment ashore and the coastline is consequently accreting.

The main coastal processes which operate along the Coral Bay coast are therefore:

- 1 The absorption of swellwave energy by the Ningaloo Reef resulting in a continuing breakdown of the reef.
- 2 Onshore transport of small volumes of coral debris to the coast.
- 3 The wind induced northerly littoral drift during summer.
- 4 The continuing removal of a large percentage of littoral sediment by wind action from the beach at the two blowouts.
- 5 The movement of larger volumes of sediment onshore to the north of Point Maud by refracted swell.

Because the Ningaloo Coast is remote the record of aerial photography is not as complete as more highly populated coastal regions. Aerial photo comparisons between 1940 and 1983 indicate, however, that there has been a certain amount of erosion of sediments in Coral Bay itself. The evidence is not adequate to use as a base for any long term projections.

#### Tides and Currents

The tidal range at Coral Bay is approximately 1.5m which is relatively slight and has little influence on the coast. At low tide many of the coral heads are exposed and boating is hazardous.

The ocean currents in the lagoon are strongly influenced by the wind regime. In summer the prevailing southerly winds cause a northerly current which tends to produce a moderate littoral drift in that direction. In winter the wind regime plays a lesser role and there is little reversal of the summer process in the bay.

#### Geology

The continental shelf is narrow in the vicinity of the Ningaloo Reef. The sea floor rises sharply to the outer barrier reef which consists of corals and limestone. At Coral Bay the reef is situated from 1 to 2 kilometres from the shore. The lagoon, which has formed between the barrier reef and the shore, is shallow and is inhabited by living coral. The shoreline consists of intertidal flats bordered typically by narrow beaches and limestone platforms. The shoreline is backed by Holocene parabolic sand dunes (6000 years B.P.) aligned in a north-south direction parallel to the prevailing wind. Pleistocene sand deposits (1-2 million years B.P.) and limestone ridges, which are associated with raised beaches and former shorelines, lie further inland.

The distribution of sediments around Coral Bay is shown in Figure 2. Two generations of Quaternary sediments are found in this vicinity. The older, or Pleistocene unit, comprises pink coloured beach, dune and supra-tidal flat deposits. Cemented beach sediments consisting of fossil corals, outcrop as a low tide reef both south and north of Coral Bay. Leached dune sediments are found along most of the coast and extend further inland than their younger Holocene counterparts.

The younger, or Holocene unit, comprises sublittoral, beach, dune, coral, and tidal flat deposits that front and overlie or partially cover pre-existing sediments and coastal landforms. Beach and dune sands are typically white.

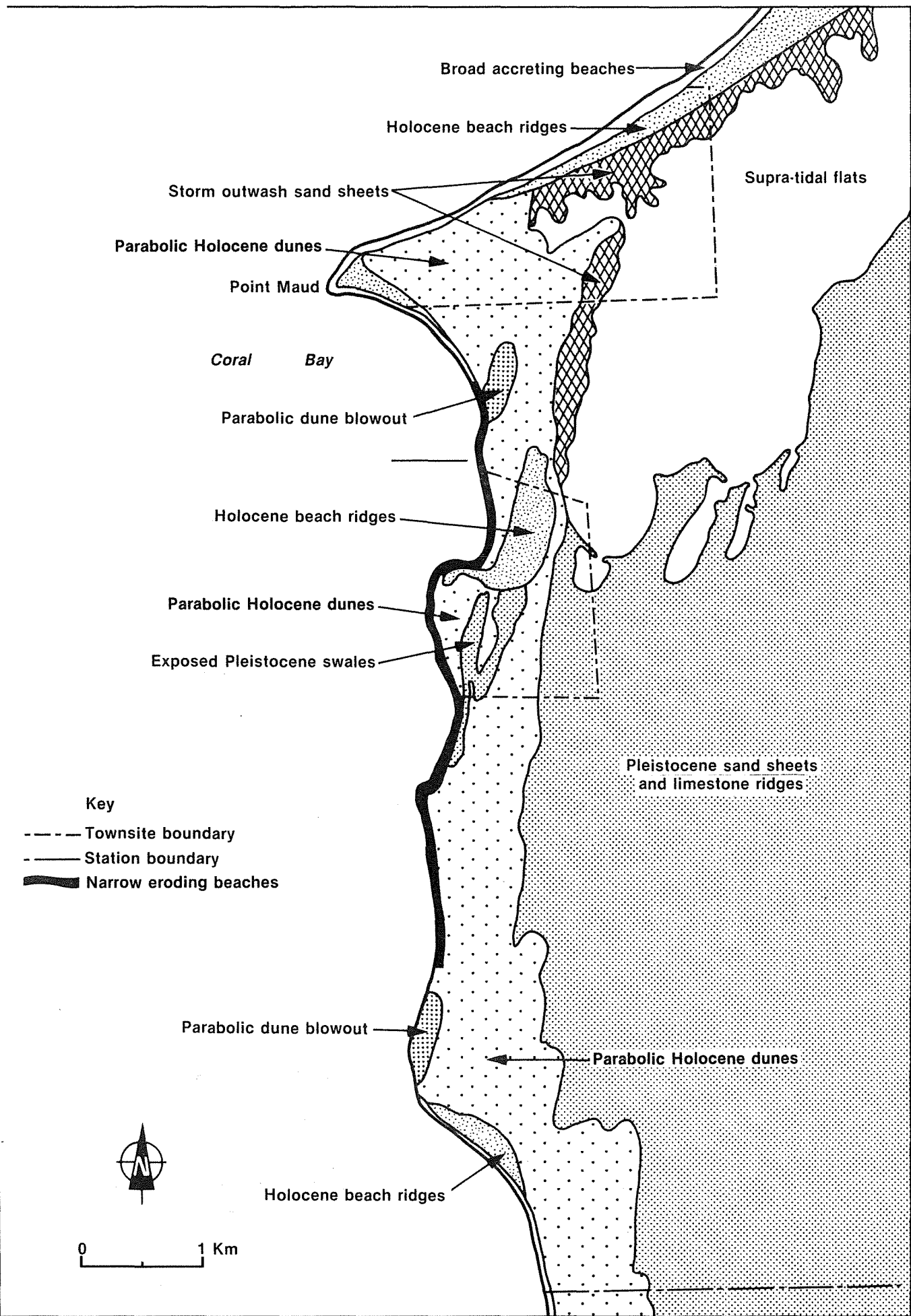


Figure 2 Landforms of the Coral Bay District

A veneer of sublittoral sediment exists on the seabed off Coral Bay. Holocene beach sediments occur along much of the coast and comprise: coarse cemented coral beachrock, coarse lime sand and unconsolidated quartz sand with a small percentage of shell material.

The geological history of the area has the following characteristics. During the Pleistocene (1-2 million years ago) a raised sea stripped and reworked the coast into beach and dune deposits and the coral reef developed. Low areas were drowned and tidal flat sediments deposited. During the last ice age, about 30,000 years ago, sea level dropped to minus 100 m and these coastal sediments were coloured light reddish brown by the addition of dust from inland. Around 6000 years ago the sea rose again to its present level, sweeping loose material from the drowned shelf and reef into beach ridges and later into dunes. Reworking of Pleistocene and older sediments continued resulting in retreat of cliffed coasts where sediment supply was low, or deposition of dunes and beach ridges where sediment supply was greater. With stable sea level and diminishing supplies of sand from offshore, growth of beaches and dunes has generally ceased and coastal erosion is now evident.

### Geomorphology

The landforms at Coral Bay are predominantly Holocene sand dunes which are relatively unstable (Figure 2). The area to the north of Robinson Street and to the east of the Holocene dune belt comprise north-south trending beach ridges which indicate that the area has not been affected by the subsequent parabolic dune activity. Similar ridges may be seen at the southern edge of Point Maud and along the coast to the north of Maud's Landing indicating growth of the coast over recent years. The older Pleistocene basement material is exposed in a few swales to the south of the caravan parks. These areas are unlikely to suffer wind erosion. The supra-tidal flat area to the east of the townsite is periodically flooded by seasonal rainfall. To the east of the supra-tidal flat area there is evidence of an ancient marine cliff shoreline, and it is possible that this area may have been a coral lagoon in the Pleistocene. These supra-tidal flats are occasionally flooded by sea water during storm conditions.

### Land Capability

An analysis of the landforms in the Coral Bay area was done from recent aerial photographs (Figure 2). Four major landforms exist:

- 1 Holocene parabolic dunes
- 2 Holocene beach ridges
- 3 Pleistocene sand sheets and dune ridges
- 4 Supra-tidal mudflats

The Holocene dunes are mainly unconsolidated except for the binding vegetation cover. They are therefore fragile and are susceptible to erosion if the vegetation is disturbed. The Holocene beach ridge area is older than the parabolic dunes and is more sheltered and is marginally more stable. The sand is, however, mainly unconsolidated and could be mobilized if vegetation is disturbed. The Pleistocene sand dune ridges are stable and can withstand development. The supra-tidal mudflats are regularly inundated by either seasonal rainfall or cyclonic storm surge and are totally unsuitable for development.

**Table 1**

The potential development hazard ratings for the landforms at Coral Bay.

Map Unit (Figure 2)	Hazard Rating	Limitations to Development	Development Considerations
Parabolic Holocene Dunes, Blowouts and Outwash Sheets	Very high	Prone to wind erosion	No permanent development recommended. Physical limitations severe.
Holocene beach ridges	Moderate	Prone to wind erosion	Moderate limitations which may be overcome.
Supra-tidal flats	High	Saline soil Prone to flooding	Totally unsuitable.
Pleistocene sand sheets and dune ridges	Moderate	Prone to wind erosion	Moderate limitations.

#### Analysis Of The Landforms In The Coral Bay Townsite

The landforms in the Coral Bay townsite have been analysed in greater detail (Figure 3).

Unit 1 consists of supra-tidal flats and is totally unsuitable for development, as the area is periodically flooded.

Unit 2 consists of a flat Pleistocene dune. This area is stable, but does not have the advantage of close proximity to the ocean and is not likely to be attractive for development.

Unit 3 is a stable area of Pleistocene sediments. This area does have development capability but suffers from a poor position, as does Unit 2.

Unit 4 consists of a raised Holocene dune ridge which could easily be made unstable by any form of development.

Unit 5 is an area of Holocene beach ridges. This area includes the entire Lot 46, most of Lot 47, most of Lot 42, and the northern edges of Lot 49 and 31. This area is moderately stable, on condition that adequate measures are taken to guard against wind erosion.

Unit 6 is a plateau area in a Holocene dune area and has only limited development capability.

Unit 7 consists of two dune swales which have a base of Pleistocene sediment. These areas are probably the most stable in the townsite.

Unit 8 is a narrow Holocene dune ridge which could become unstable if developed or altered.

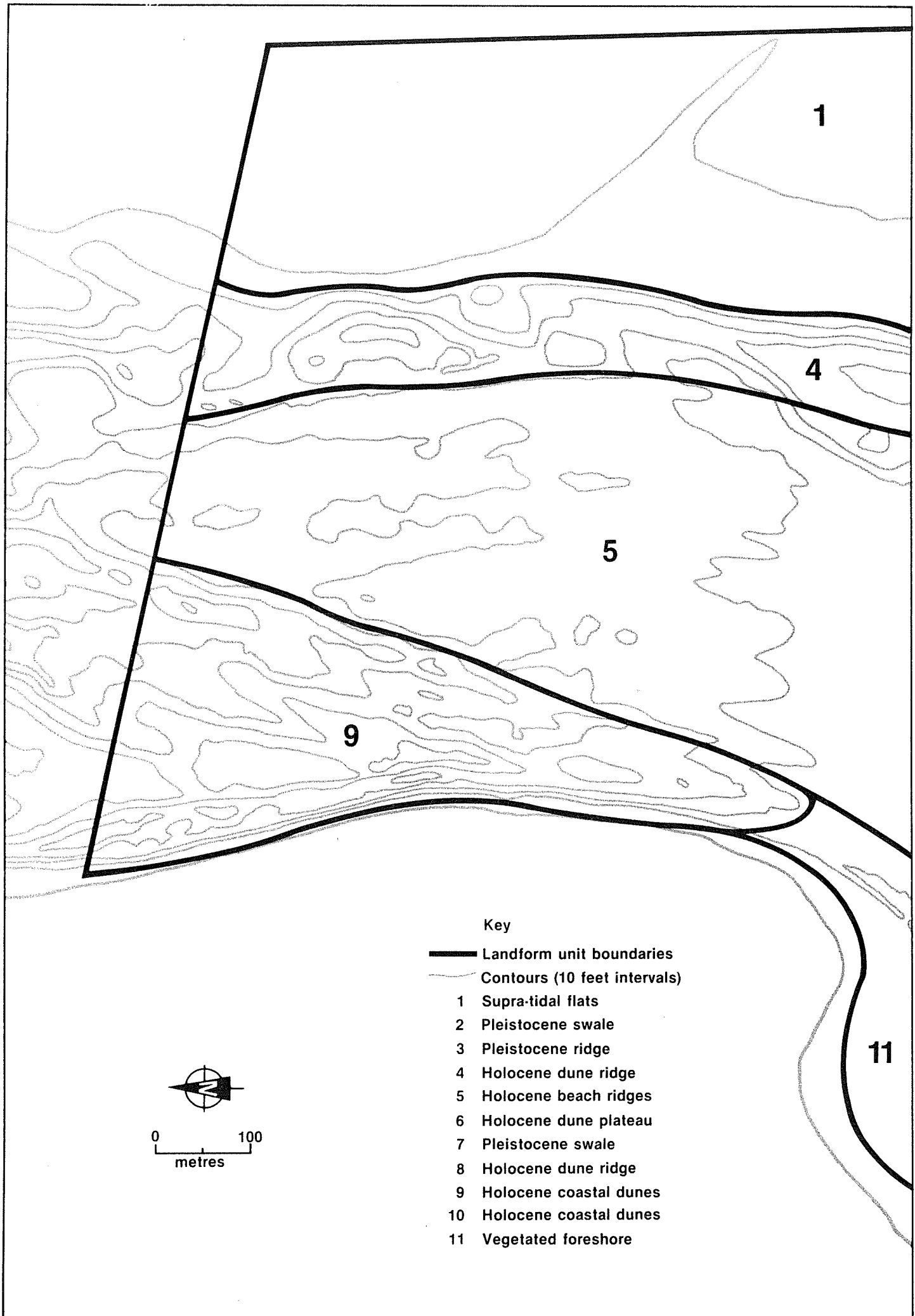
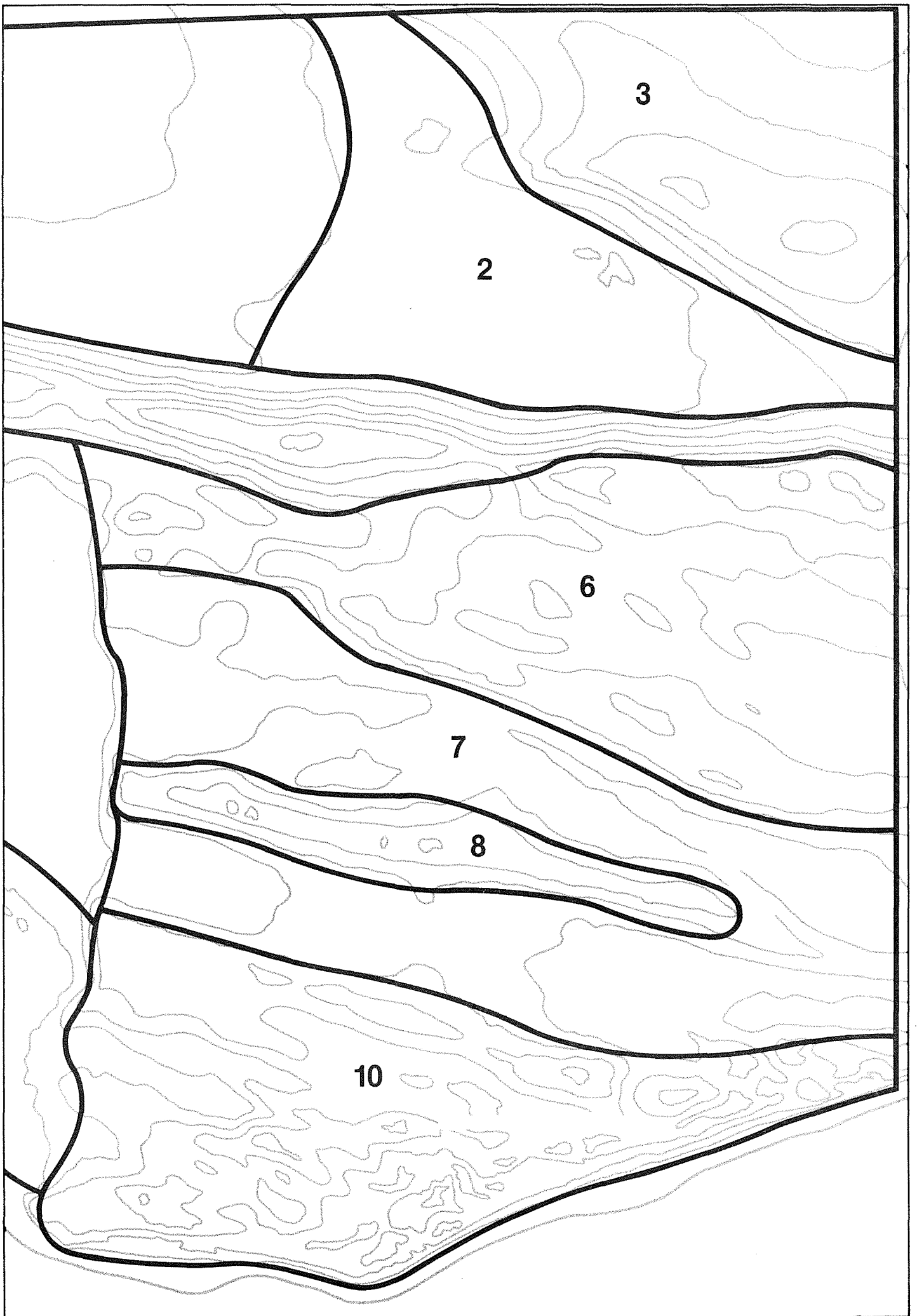


Figure 3 Analysis of the landforms in the Coral Bay Townsite



Unit 9 is a coastal dune area which appears to be eroding from the very steep frontal dune. The area is extremely fragile and should be protected from uncontrolled use and all forms of development.

Unit 10 is the most fragile area in the townsite. Although the sand supply is marginally greater along the beach, the user pressure is higher than the dune area to the north. This area should also be protected from uncontrolled use and from all forms of development.

Unit 11 consists of the Coral Bay foreshore area. This area is periodically flooded during storms. The use of this area is controlled by a beach management project. The area is unsuitable for all forms of development and most of it is a coastal reserve.

#### Hydrology

No detailed hydrological study has been undertaken at Coral Bay. The lack of a permanent potable water supply at Coral Bay has limited development for several years. In 1980 a permanent supply of 1960 kilolitres per day was established with acceptable salinity levels. A second bore has recently obtained heated water from an artesian source.

#### Vegetation

The natural vegetation of the Coral Bay area comprises several major plant associations which correspond with the landforms described. All associations are coastal zone communities which are easily disturbed and difficult to rehabilitate. In addition, most are characterised by significant areas of bare sand or saline mudflats.

##### Storm Outwash

This series of low parallel dunes supports a relatively dense association of large shrubs and herbs. Spinifex longifolius (Sand Spinifex) dominates the foredune while that species and Olearia axillaris, Scaevola crassifolia and Atriplex isatidea are the most common plants growing on the secondary dune system. Further inland these species occur but are dominated by Acacia coriacea (Desert Oak).

##### The Supra-tidal Flat

The supra-tidal flat has extensive areas of bare salt affected mudflat but on slightly elevated areas populations of Holosarcia indica, Holosarcia halocnemoides and Limonium salicorniaceum exist. Dense mats of Sporobolus virginicus (Salt-water Couch) exist on low lying areas around the flats and indicate high soil salt levels.

##### Sand Sheets and Ridges

This sand dune system is slightly inland from the beach and enjoys some protection from the sea breeze. Large areas of bare sand exist between plants forming the association which include large shrubs (to 2 metres) including Acacia coriacea, Exocarpus sp Salsola kali. The understorey comprises unidentified Myrtaceous shrubs and grasses.

## Swales

The vegetation of the swales is dominated by a sward of Cenchrus ciliaris (Buffel grass) with occasional shrubs and herbs including Acacia sp Rhagodia obovata and unidentified grasses. The most common plant on the dune ridges between the swales is also an unidentified grass species.

## Parabolic Dunes

The most common plant in this association is Spinifex longifolius although large areas of bare sand occur. Where shelter is provided between dune ridges a variety of other plants exist. These include Scaevola crassifolia, Olearia axillaris, Eremophila sp Atriplex isatidea and Rhagodia obovata. On limestone outcrops Ficus sp occurs.

## Fauna

There have been few biological studies done in the region. Red Kangaroos Megaleia rufa have recently been seen in the study area. The local station owners have prohibited shooting in the area as a means of protecting the fauna. The bird assemblages of the North West Cape have been studied and a total of 144 species have been recorded. Many of these species are, however, associated with the mangrove areas to the north of Coral Bay.

## Marine Ecology

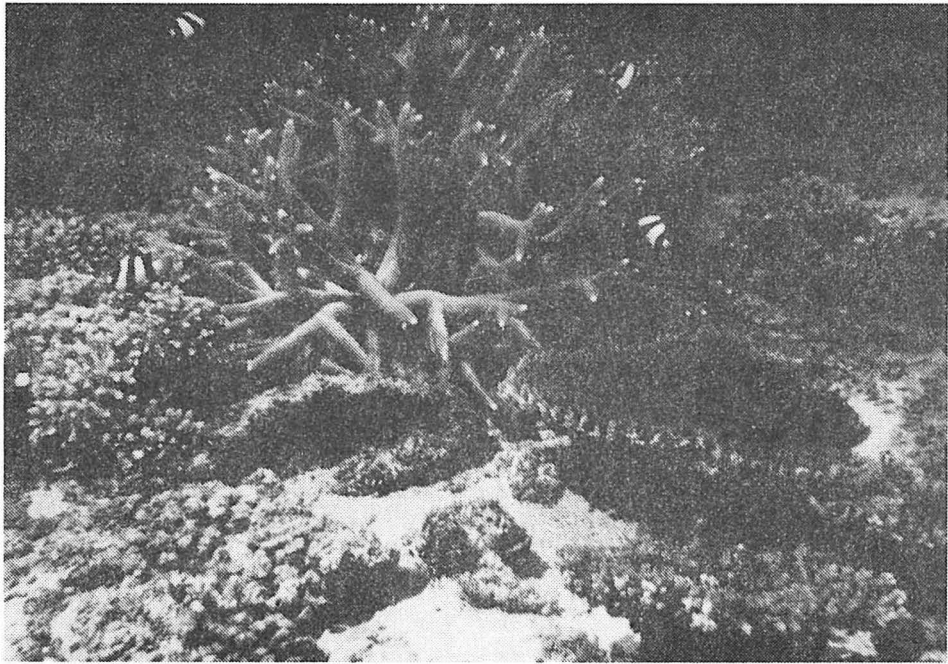
Marine biologists of the Western Australian Museum have done a preliminary survey of the fauna of the Ningaloo Reef and its lagoons. Five transects were made in the Coral Bay vicinity and preliminary inventories of the fauna were made. No detailed information has been published. The coral in Coral Bay is protected by means of a marine reserve (Figure 1).

The fauna of the Ningaloo Reef is extremely diverse (with 340 species of fish recorded [Wells, 1978]). Surveys have recorded over 80 species of coral belonging to 34 genera. In addition, almost 500 species of molluscs have been recorded along the reef. The molluscs range in size from microscopic snails to giant clams Tridacna squamosa.

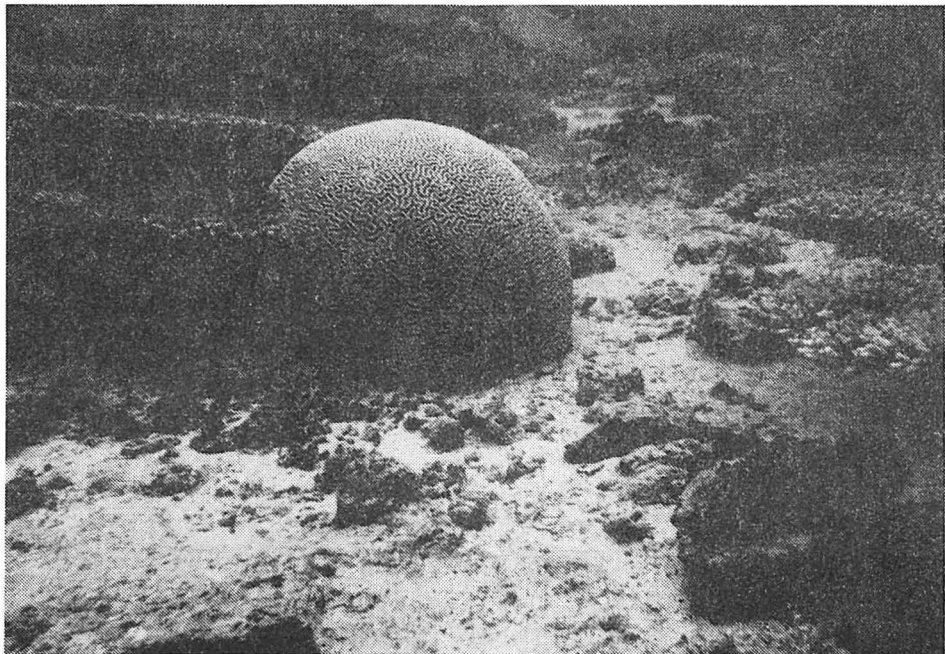
The Ningaloo Reef is not homogenous in form and consists of several distinct habitats. The reef varies in width from a few hundred metres to a few kilometres and tends to form specific lagoons. The lagoons are generally 5 to 10 metres in depth and have sandy bases.

Massive heads of the coral Porites rise up from the lagoon bed to just below the water surface. An outstanding example of one of these exists in the Coral Bay lagoon. The single growth is approximately 10 metres in height and 10 metres wide.

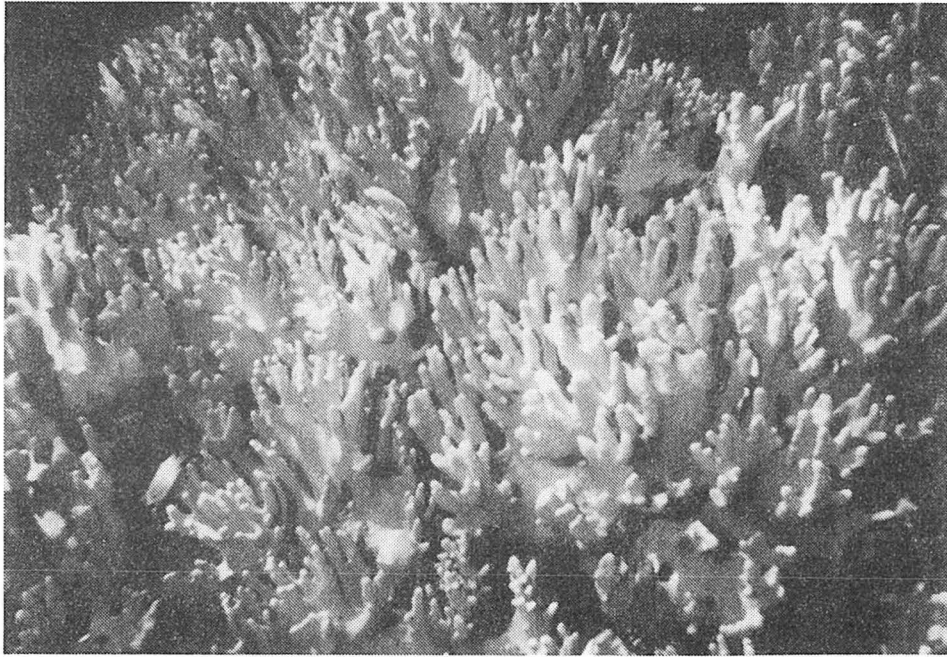
Apart from the heads the majority of the coral grows adjacent to the reef. There is generally little coral growth in the lagoons. Coral Bay is therefore exceptional, having a wide range of species. The centre of actively growing coral is the reef crest, which lies just below the low tide level. The constant wave action brings a steady supply of oxygen and nutrients to the crest. The crest of the Ningaloo Reef tract is dominated by the corals Acropora and Platygyra although numerous other species are found.



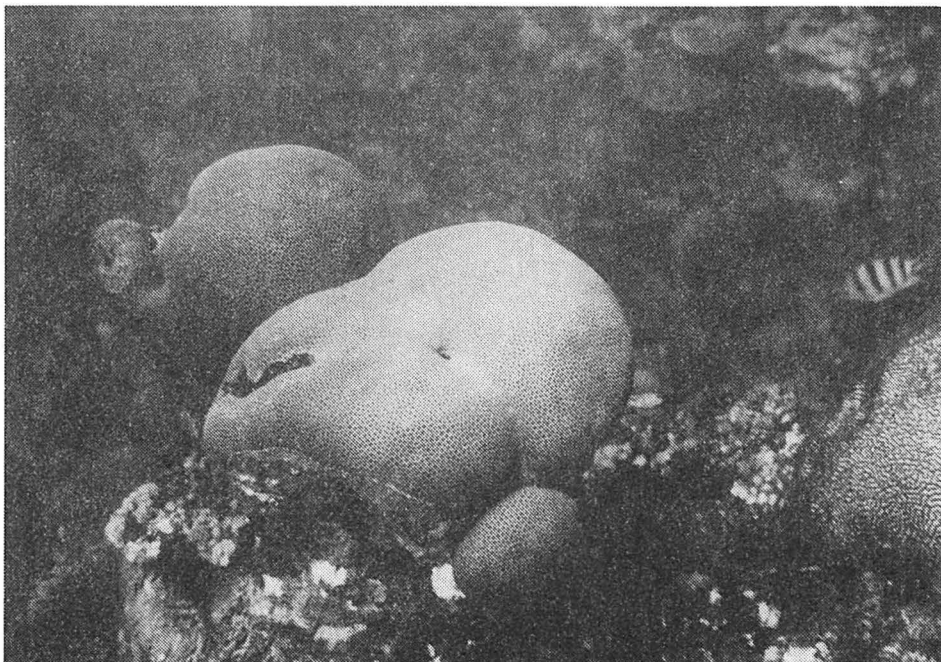
3 Acropora sp (Staghorn Coral)



4 Platygyra sp (Brain Coral)



5 Alcyonacean Coral



6 Goniastria sp (Honeycomb Coral)

The following are general observations on the Coral Bay area. The richest and most diverse coral fauna is found between Point Maud and the first false passage south of Coral Bay. Coral Bay itself contains some of the finest areas of coral. These may be at risk from the passage of boats and particularly from anchor damage, since most of the corals are of the fragile corymbose and foliose species.

Of particular interest in the Coral Bay area are some perfectly formed colonies of Merulina ampliata; turreted colonies of Echinopora lamellosa, which is one of the most abundant species in Coral Bay; very large colonies of Alveopora spp, off Point Maud; very large Porites colonies; and an exceptionally large hemi-spherical colony of Hydrophora rigida in the lagoon south of Coral Bay (Marsh, 1978).

### Landscape Appraisal

Accepting that an individual's appreciation of a scenic view is generally subjective and that a person's concept of intrinsic quality of a landscape is a function of personal values and experience, a few general comments will be made on the landscape at Coral Bay.

Coral Bay is situated in an arid area. As a result the vegetation is sparse and the overall effect is of a harsh environment. The coastal dunes in the immediate vicinity of Coral Bay are covered by a thin vegetation cover and do not provide anything that is spectacular or particularly emotive. The beaches are clean and white but are narrow and are mostly submerged during high tides. One landscape aspect which is particularly satisfying is the colour of the sea in the lagoon. The shallow, clear water provides an iridescent blue colour which most people find appealing, especially as it is such a contrast to the harsh arid landscape. Where views provide vistas beyond the lagoon to the white line of the breakers and the deep blue of the ocean beyond, the picture is completed.

The real 'landscape' value is therefore more of a 'seascape' and the provision of views which provide for this aspect will probably be the quality which is most likely to satisfy tourists and holiday makers. The quality of the built environment will either enhance or detract from the natural environment. It is therefore essential to develop the area with aesthetic sensitivity.

### Conclusion

The analysis of the natural environment at Coral Bay raises a series of conflicts for the planner and manager.

The arid climate is appealing to the visitor owing to the higher than average temperatures but this same climate reduces the vegetation's ability to sustain unlimited numbers of people.

The Ningaloo Reef at Coral Bay reduces the majority of the ocean wave energy, creating a calm lagoon and ideal coral habitat. Little sediment reaches the beaches which are consequently narrow and submerged at high tide. This reduces the potential of the Coral Bay area to accommodate large numbers of holiday makers.

The terrestrial environment is predominated by fragile parabolic dunes. This factor limits the development potential in the area to which people are attracted to enjoy the unique coral and remarkable seascape. This limitation can be reduced or eliminated depending on the extent of finance available to manage the environment.



7 Eroded Holocene dunes to the south of the Coral Bay settlement



8 Eroded beach and dunes to the south of the Coral Bay settlement showing exposed fossil coral

## HUMAN ENVIRONMENT

The first recorded activity in the region was the landing of the schooner Maud in 1884. In 1896 a townsite Reserve (No. 3699) was gazetted to protect the site of the jetty and a Government goods shed, and to provide for a possible settlement. In 1908 the Public Works Department found deeper water further north and the area was reserved as a possible future townsite. Both Coral Bay and Maud's Landing are registered as a single townsite under the name of Maud's Landing, but here, for the sake of clarity, they will be referred to as Maud's Landing townsite and Coral Bay townsite (Figure 4).

### Land Use and Tenure

Maud's Landing townsite is undeveloped. All that remains of previous activity is a few remaining wooden posts from the jetty. A layout of eight lots exists on the Surveyor General's working sheets but the land has not been sold, vested or leased. The coast off Maud's Landing is a registered port area (Figure 1).

The Coral Bay townsite consists of nine lots. The first is a Coastal Reserve (No. 37500) also identified as Lot 45, which is reserved for boat launching and foreshore protection and is vested in the Shire of Carnarvon. Three lots are held in fee-simple (42, 43 and 49), three are leased (31, 46 and 47), a portion is Vacant Crown Land (VCL) and the remainder of the townsite is VCL leased to the Cardabia Station. There are two roads, Robinson Street and French Street.

The existing land use is as follows:

Lot 31	Fishing shack
Lot 42	Caravan park
Lot 43	Dwelling house
Lot 45	Reserve used for boat launching and partly fenced for dune rehabilitation.
Lot 46	Chalet park, partly developed
Lot 47	Caravan park
Lot 49	Hotel, caravan park, shop and service station

The area of Vacant Crown Land is unfenced and undeveloped. Apart from Lot 45 a 40 metre wide strip of Vacant Crown Land exists along the entire coast.

### Development

In 1966, Mr. K. Ryan applied for some land in the vicinity for a fish processing works and for some additional areas for tourist developments. Planning consultants at the time recommended that the Maud's Landing townsite be retained for light industry and that tourist developments should be sited at Coral Bay. Townsite design and planning was done at the time but no formal scheme was adopted.

In March 1968 Mr. Ryan was offered a 21 year lease over Maud's Landing Lots 30 and 32, which were later amalgamated into Lot 49, for Holiday Centre Development. A caravan park, service station and a 67 bed hotel were subsequently built. In 1973 the hotel was sold to Mr. N. Monck. By 1981 nine cabana units, six motel units and six chalets were added to the property and the caravan park contained 64 bays. A Crown Grant was issued for Lot 49 in January 1981.

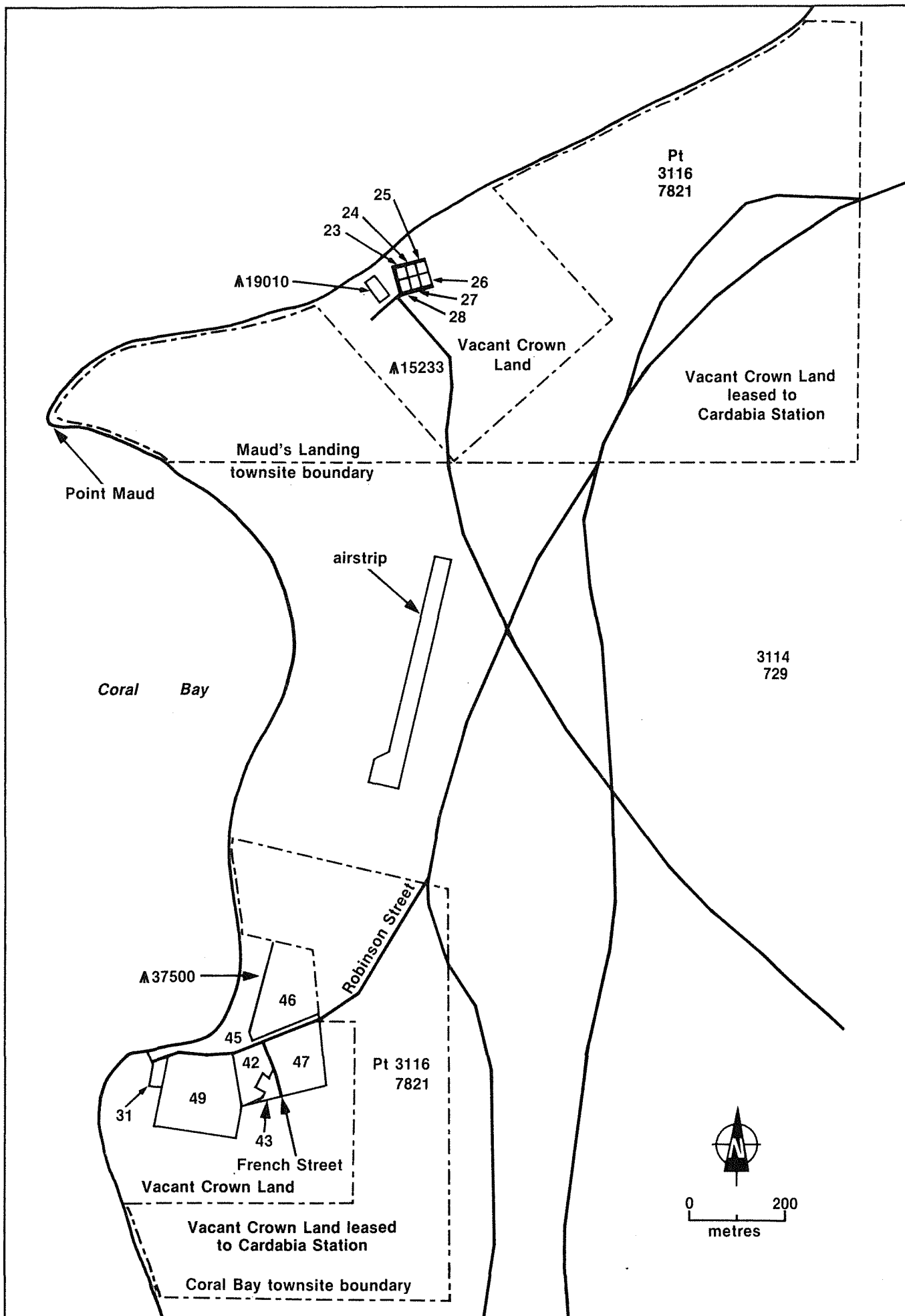


Figure 4 Existing Development at Coral Bay

The original township layout concept allowed for a number of single residential lots. The Shire of Carnarvon opposed the release of these lots owing to the absence of a town water supply. Investigations by the Public Works Department revealed that good supplies of brackish water would be available at great depth.

Lot 43 which contained a dwelling house was leased to Dr. W. Brogan in 1973. In 1978 he also obtained a lease over Lot 42 for Holiday Accommodation and Caravan Park. Brogan developed the land rapidly and was granted Lot 42 in 1980 and Lot 43 in 1981.

In 1979 Dr. Brogan applied for land to develop a chalet park, transit caravan park, trailer park, van and boat storage, country club with recreational facilities, shop and restaurant and serviced accommodation. Recognising that water supply would be a problem he sank a bore which established a permanent supply with a flow which exceeded expectations (1960 kl per day) and had acceptable salinity levels.

In accordance with what Dr. Brogan had undertaken the Department of Lands and Surveys released Lots 46 and 47 for 'Chalet Park' and 'Caravan Park' respectively. Subsequently, Coral Bay Amalgamated Holdings Pty Ltd entered into sub-leasing agreements with 19 different parties. For the purpose of this subdivision Dr Brogan has laid out an unofficial subdivision of 26 lots. Lands and Surveys does not recognise this subdivision as other than a device employed by the lessee of Lot 46 to facilitate the sub-leasing of chalet sites.

#### Planning and Administration

The Shire of Carnarvon is the responsible planning authority in Coral Bay. The Shire has controlled the planning at Coral Bay through an Interim Development Order (IDO). In addition, the Shire administers various Acts, such as the Local Government Act, the Health Act, and Shire by-laws.

As much of the land in the townsite is V.C.L., the Department of Lands and Surveys is responsible for the administration within the townsite of various provisions of the Lands Act.

The split of responsibility between the two organizations has led to certain misunderstandings in the past, but there have been joint meetings in recent times to define objectives and plan the future development at Coral Bay.

A meeting was held in August 1983 at Coral Bay to resolve development issues related to Dr Brogan's chalet development and caravan park. It was attended by officers of the Department of Lands and Surveys, Shire of Carnarvon, Department of Conservation and Environment and Dr Brogan. Amongst other things it was decided that a Town Planning Scheme should be developed for the townsite.

Shortly after the meeting it was announced that an \$8m hotel, villa, restaurant and conference centre complex is proposed for Lot 49. If this development were to be permitted, the pressures on the Coral Bay area would be further increased. The Shire of Carnarvon rejected the development proposal in terms of its Interim Development Order. The Minister rejected an appeal against the Shire's resolution, one of the reasons being that this study was in the process of preparation.

In November 1983 the Ningaloo Marine Park report was released. The report proposed the creation of a Marine and Terrestrial National Park, stretching from Exmouth to Amherst Point, a distance of 260 kilometres. The report contains detailed recommendations for the future of Coral Bay. If these recommendations are accepted by the State Government, they would have far reaching implications. Recommendation 24 of that report relates directly to Coral Bay and is attached as Appendix 1.

An important aspect of administration is the presence of a Shire ranger to ensure that by-laws and management arrangements are enforced. At present the Shire of Carnarvon ranger visits Coral Bay on a weekly basis. This arrangement is understandable when one considers the length of coast which the Shire has to manage. The Shire made an approach to the State Government for financial assistance to employ another ranger, and this possibility still exists. A ranger is most necessary during peak use times and possibly an arrangement to station a ranger at Coral Bay during school holidays may relieve some problems.

## Tourism

Tourism deals with group oriented utilization of commercial facilities and provides the principal economic basis for development at Coral Bay. From traffic counts and recent data it is apparent that there has been a rapid increase in vehicular movements and use of recreational opportunities along the Carnarvon and Exmouth Shire coasts. It has been estimated that 23,000 people visited the west coast and the Cape Range National Park in 1981-82.

Peak average daily traffic movements occur in the May and August school holidays, with above average movements between the months of May and September. Data from the Main Roads Department between 1977 and 1981 indicate an average annual daily traffic volume of 43.3 vehicles for Coral Bay and 7.3 for the Warroora road. Assuming that traffic returns by the same road, it is estimated that 16,000 people used the Coral Bay road in 1981-82.

An aerial survey of the coast on 4 August 1982 (school holidays) provided data on the recreational use of the coastline (Table 2).

**Table 2**

Summary of recreation useage expressed in units of people, vehicles, tents and caravans for the coastline in the proposed Ningaloo Marine Park on 4 August 1982.

Location	People*	Vehicles	Tents	Caravans
Warroora Station	188	57	39	26
Cardabia Station	106	32	37	7
Ningaloo Station	211	64	46	14
Location 97	26	8	4	1
National Park	224	68	32	21
Shire of Exmouth	46	14	3	3
Location 44	132	40	1	1
TOTAL	933	283	162	73

\*Estimate based on 3.3 people per vehicle – data derived from a questionnaire survey of coastal visitors over the same period. Source : Ningaloo Marine Park Report.

**Table 3**

Numers of visitors residing at Exmouth and Coral Bay on 4 August 1982.

Location	People*
Coral Bay	780
Exmouth	2530
TOTAL	3310

\*Estimates provided by accommodation managers assisting with the questionnaire survey referred to above, based on number of people residing in motels and caravan parks on 4 August 1982.  
Source : Ningaloo Marine Park Report

Coral Bay has a limited range of tourist facilities, namely glass bottom boat tours, fishing charter and boat hire. During school holidays facilities are inadequate.

At one time it was estimated that during peak periods between 90 and 260 illegal campers used the coast surrounding Coral Bay. As a result dunes have been degraded as vehicles have made new tracks to gain access to selected places on the coast.

## Recreation

Recreation focuses on the activities which tourists pursue, namely fishing, diving, swimming, sailing and beachcombing. Coral Bay has a fairly limited range of facilities, fishing charter and glass bottom boat trips to view coral are popular.

### Fishing, Boat Launching and Swimming

One of the main attractions at Coral Bay is the good quality deep sea fishing available beyond the Ningaloo Reef. Coral Bay is one of the only good boat launching places along the coast. Coral Bay is also a sheltered swimming area and user conflicts have resulted. The Shire of Carnarvon together with the Department of Marine and Harbours and other State Departments, prepared a plan to separate boats and bathers.

The Department of Marine and Harbours has jurisdiction over the area in terms of the Navigable Waters Regulations of the Western Australian Marine Act. The Department generally works closely with the local authority in administering boating areas. In the case of Coral Bay, boat launching and mooring is restricted to an area 35 metres on either side of the jetty. The Department of Marine and Harbours considered that provision to be inadequate and recommended to the Shire that 100 metres to the west and 65 metres to the east of the existing jetty would be a more realistic provision.

In practice, the boats use much of the inshore bay area and intrude into the swimmers area. An additional problem is that fishermen fillet their fish in the bay and throw the offal overboard. The result is that the bay is severely polluted at peak periods. The Shire has requested fishermen to dispose of offal at the Coral Bay dump but this request has generally been disregarded. Fish are sometimes discarded in the rubbish bins, and this creates an additional nuisance with the foul odour of the rotting fish.

Concern has been expressed about the damage to the coral by the anchors of boats and this aspect needs to be further investigated.

The provision of an alternative boat launching facility in close proximity to Coral Bay would seem to be an obvious solution to several of the nearshore management problems. Two possible sites were identified, one at the original Maud's Landing site and the other a few kilometres south of the settlement. These sites were discussed in detail with the Harbours and Rivers Branch of the Public Works Department.

What emerged is that both sites would require expensive engineering works, in the vicinity of \$300,000. The Public Works Department usually requires that the Shire contribute 50% of the total cost. It is unlikely that a Shire like Carnarvon with a small tax base will be able to expend considerable funds on a remote area such as Coral Bay. As a general rule ramps and breakwaters are never constructed in such remote areas.

### Shell Collecting

The management of the living marine resources is entirely the responsibility of the State Department of Fisheries and Wildlife. The Coral Bay area is protected by an existing Marine Reserve, 60 chains by 120 chains in extent (Figure 1). Fishing by rod and handline is permitted in the reserve but most of the fishing is done beyond the reef. The collection of coral and benthic-dwelling animals or plants is prohibited in the reserve but still takes place.

## Off Road Vehicles (O.R.V.)

The use of O.R.V. in the Coral Bay area is not restricted in any way. Vehicles are commonly used to gain access to remote beaches. Research has shown that the inter-tidal zone is ecologically productive and that controls should be established. It has been found that vehicle use distrupts the invertebrate beach fauna and impairs the activities of numerous animals, for example ghost crabs, which recycle marine debris.

Although several tracks exist in the dune areas to the north and south of Coral Bay, there does not appear to be severe vegetation damage. Use is made of two large dune blowouts, to the south and north of Coral Bay. These could possibly be used as O.R.V. areas in an informal manner.

## Movement and Access

Access to Coral Bay is by means of a 14 kilometres unsurfaced road from the sealed Learmonth-Minilya Road. North of Coral Bay there is a station road which is unsurfaced and in poor condition. The lessee of Cardabia station permits access to the north under certain conditions. To the south the lessee of Warroora station generally does not permit access across his property.

There are two existing streets in the Coral Bay township; Robinson Street and French Street which was intended to provide access to Lot 43. Robinson Street was originally built to the fishing shack on Lot 31. Robinson Street is the main access for vehicles towing boats to gain access to the boat launching area at Coral Bay. At peak use time the road and beach areas become congested with parked vehicles and trailers.

Tracks to the south of the Coral Bay settlement provide access to a few coastal areas, depending on the ability of particular vehicles to negotiate the sand.

Pedestrian movement through the fragile dunes south of the hotel is presently uncontrolled and degradation of the dunes is evident in certain places.

## Conclusion

Although a century has passed since the area was first opened up, it is only recently that development pressures have really been experienced.

The Shire of Carnarvon, as the planning authority, has controlled the development at Coral Bay by means of an Interim Development Order. The Department of Lands and Surveys has also been closely involved owing to the large proportion of Vacant Crown Land in the area and the need to administer various provision of the Land Act.

The most recent development pressure is the proposal to build an \$8m hotel, villa unit complex on Lot 49 which is in an sensitive position with regard to dune stability and land capability.

The future of the area, and for that matter, the entire region could change significantly if the report of the Ningaloo Marine Park Working Group is approved.

The problem of the conflict between boats and swimmers on the beach could most simply be resolved by the construction of a new boat launching facility away from Coral Bay, but investigations indicate that it is unlikely that adequate funding could be found. It is therefore considered that an adequate boat launching area should be set aside and that controls be enforced.

## EXISTING FORESHORE MANAGEMENT AT CORAL BAY

Coral Bay has become more popular as a holiday resort in recent years. The increased use led to soil erosion and the destruction of vegetation. By 1981 it was necessary to implement a foreshore management programme (Figure 5).

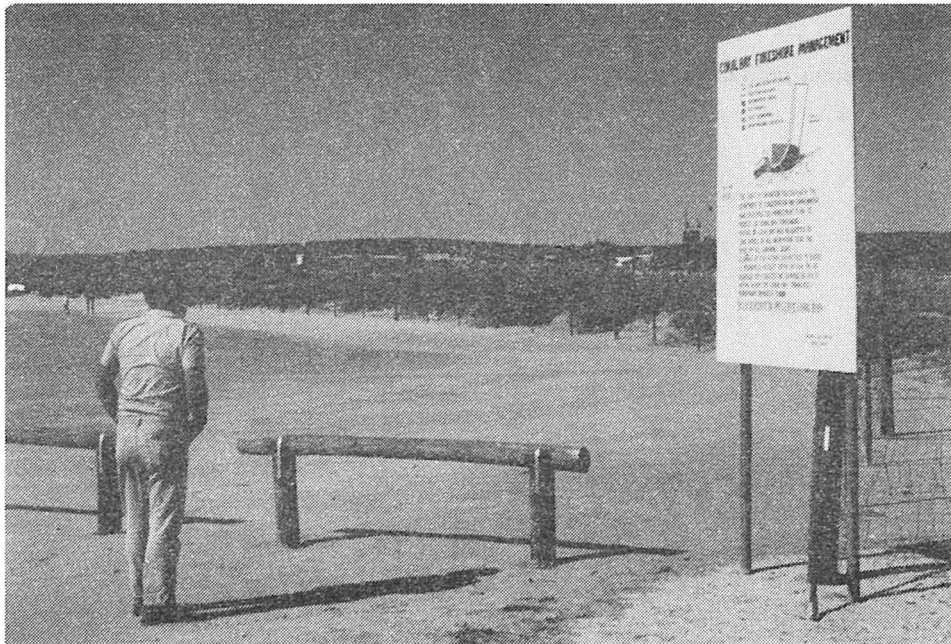
The Shire of Carnarvon, in collaboration with various State Departments, prepared and implemented a plan which achieved the following objectives :

- 1 To provide a large car park for beach users
- 2 To provide three limestone covered pathways to the beach
- 3 To fence the pathways and the degraded vegetation areas in order to restore them
- 4 To separate vehicles from the bathing beach
- 5 To erect signs to inform the public of the purpose of the management programme
- 6 To fence off dunes to the north of the Coral Bay settlement to prevent degradation

The management programme has been effective in re-establishing vegetation in the foreshore area.



9 Existing foreshore management work at Coral Bay



10 Shire signboard and existing foreshore management work at Coral Bay

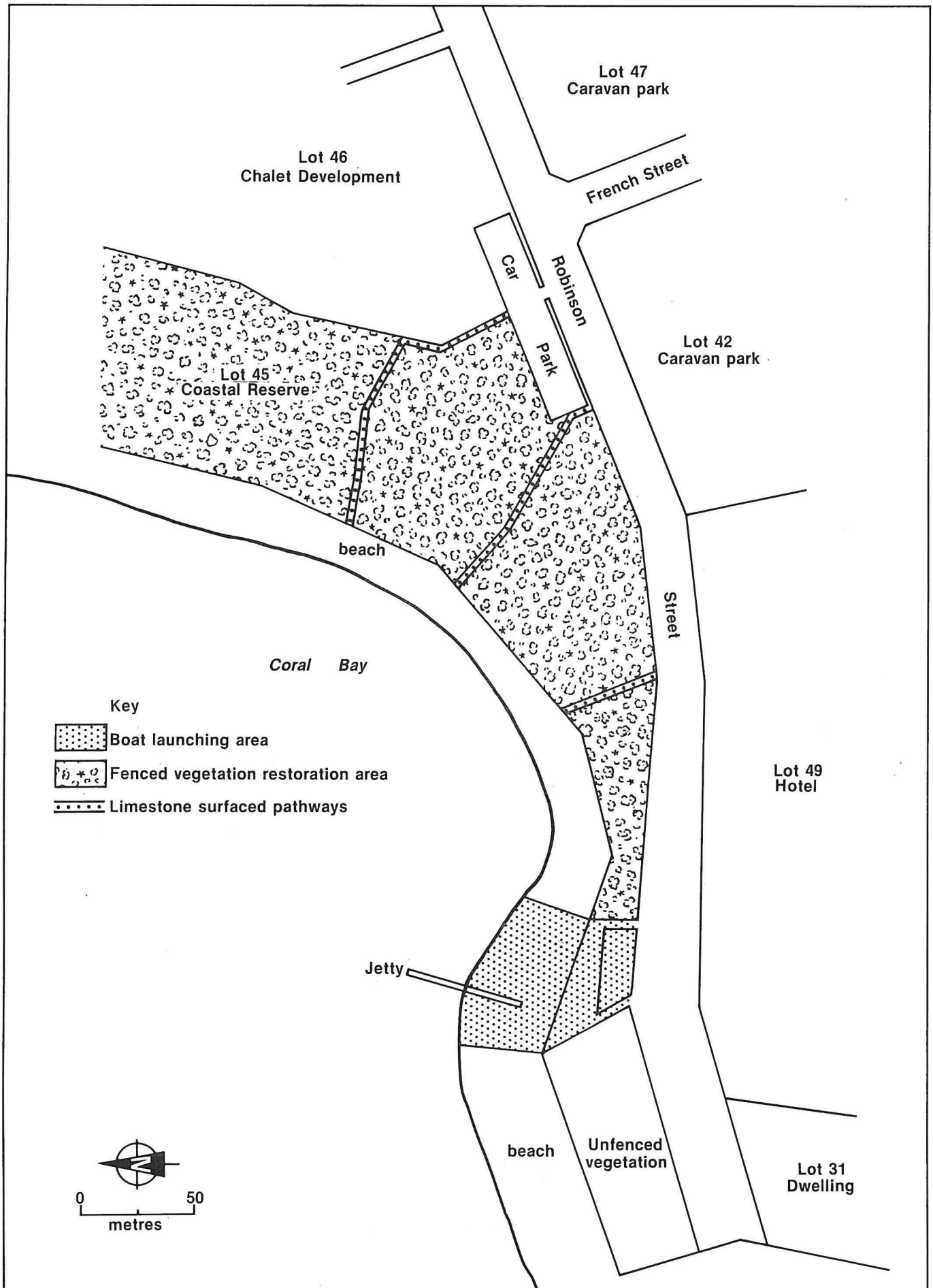


Figure 5 Existing Foreshore Management at Coral Bay

## **OPPORTUNITIES AND CONSTRAINTS**

Coral Bay has a number of resources which by nature are fragile and unable to withstand unlimited use.

The resources or opportunities are :

- 1 A spectacular and unique coral lagoon
- 2 An ideal winter climate and temperature regime which attracts heavy use during holiday periods
- 3 A rich marine ecosystem which provides abundant fish
- 4 A seascape along the Ningaloo Reef of high aesthetic value
- 5 A safe boat launching and mooring site
- 6 A safe swimming beach

The constraints are :

- 1 The remoteness of the area
- 2 The prevailing wind is strong and unpleasant in summer
- 3 The arid climate is not conducive to rapid vegetation restoration
- 4 Narrow eroded beaches which are completely submerged during high tides
- 5 The lack of finance for developing such areas
- 6 Limited water supply, namely only two boreholes
- 7 The extent of navigable water in the coral lagoon is restricted

Specific management issues are :

- 1 The existing development is not comprehensively planned
- 2 Overcrowding during peak periods
- 3 Congestion on Robinson Street
- 4 Conflict between swimmers and boaters
- 5 The filleting and cleaning of fish in the bay
- 6 The degradation of dunes, caused by pedestrian trampling

## **GOAL AND OBJECTIVES**

The goal of coastal planning and management at Coral Bay is to achieve a balance between the protection of the environmental quality and provision for the social and economic needs of the users.

### **Objectives :**

- 1 To assess the physical capability of the land to support development
- 2 To assess recreational capability
- 3 To guide development on the basis of the above assessment
- 4 To guide development in such a way as to preserve the visual resources of a sensitive environment
- 5 To guide management of the coast at Coral Bay so that environmental degradation is prevented
- 6 To provide access to the coast in such a way as to permit its use as a resource yet minimise erosion and damage
- 7 To conserve the unique coral resource for its inherent quality and for scientific study

## EVALUATION OF THE DEVELOPMENT POTENTIAL AT THE CORAL BAY TOWNSITE

From the analysis of the landforms in the Coral Bay townsite it is clear that certain areas should not be developed under any circumstances. These are Units 1, 4, 6, 8, 9, and 10 (Figure 3).

Units 2 and 3 are capable of withstanding development but, owing to their relatively remote position, there is not likely to be much demand for development on this land in the near future.

Unit 5 has a moderate development suitability and the majority of the existing development is located in this area. Of this area the only undeveloped land lies to the north-east of Lot 46. The area has limited expansion potential, and if development does take place in the future at Coral Bay, this is where it should be located.

Unit 7 is the most stable area in the Coral Bay townsite. It is, however, unsuitable for permanent structures because it consists of two narrow dune swales. These swales could be used as camping or caravan areas but a tree planting programme would probably be needed to provide protection from the prevailing wind. Both areas are at present highly exposed to the wind. If these areas are developed for camping it would be essential to implement a management programme to Unit 10 which lies between Unit 7 and the sea.

Unit 10 is the most fragile area in the townsite and has the hotel and a large proportion of Lot 49 in it. The hotel is located in a hollow on the leeward side of the dune area and is in a relatively stable area. The recent development proposal for Lot 49, in which a large hotel was to be located on top of the dune to the east of the existing hotel, is, however, not likely to gain support on environmental grounds.

## EVALUATION OF THE ENVIRONMENTAL CAPABILITY TO WITHSTAND FURTHER DEVELOPMENT

Several factors at Coral Bay indicate that the environment is extremely fragile and that severe irreversible damage could be done unless development and the consequent increase in the number of users is controlled. The coral habitat, the eroding beaches and the fragile coastal dunes can not tolerate more development without substantial financial inputs.

It is therefore, considered that the Shire of Carnarvon as the planning authority and the Department of Lands and Surveys as the land agency should ensure that no further subdivision leasing or built development is permitted at Coral Bay.

It is conceivable, however, that development could be permitted to a limited extent in the future if large scale financial inputs are made into the area to ensure the environmental damage is prevented. Such inputs may include the building of an alternative boat launching facility away from Coral Bay (\$300,000 to \$500,000) land based recreational facilities to take the pressure away from the beaches and an extensive dune management programme.

If further developments are approved at Coral Bay the onus for providing finance to manage the environment should be on the developer and not on the Local Authority or the State Government.

Long term planning control may not be achieved by using Interim Development Orders. Zoning under the provisions of a Town Planning Scheme may be more effective. Such a scheme could be separate for the Maud's Landing townsite (Coral Bay and Maud's Landing) or could form part of the Carnarvon Town Planning Scheme.

The above should not preclude the completion of the existing development on Lot 46, but should preclude new development proposals on any other lots which are outside of the existing uses.

## STRATEGIES FOR SPECIFIC MANAGEMENT AREAS

The following management strategies are proposed for specific coastal areas.

### Townsite (Figure 6)

- 1 Extend the existing foreshore management programme in Reserve 37500, Lot 45, to the end of Robinson Street to ensure that adequate access is provided to the boat launching area and that land is set aside for trailer parking.
- 2 The proposed Reserve in the dune area to the south of the hotel should be fenced to prevent uncontrolled pedestrian access. Pathways should be constructed and surfaced with limestone to provide access across the dunes to the beach. A lookout should be built at the top of the high dune to the west of Lot 31 to provide good views over the bay and should be fenced and provided with an access path. Signs should be placed in the appropriate places to direct people to the paths. Degraded areas of exposed sand should be covered with brush to help regenerate dune vegetation growth. A board and chain access over steep dunes may be required.
- 3 In the dune area to the north of the settlement vehicular access should be provided to a parking area in the dune depression immediately to the north of the townsite boundary. The car park in the dune depression should be surfaced in limestone and should be fenced. The road will need to be covered in limestone. The sand track which starts near the present car park on Robinson Street and follows the dune swale to the north should be opened for pedestrians. It should be surfaced with limestone and should be appropriately signposted to keep people off the frontal dune.
- 4 A pedestrian path should be provided to the north-west of the car park to provide access to the beach across a low spot in the frontal dune. The path may need a board and chain pathway in steep places.

### District (Figure 7)

- 5 The coastal road in the proposed reserve to the south of the Coral Bay townsite should be upgraded and surfaced with limestone. This road will provide access to the southern coast. Surfaced car parks should be provided at certain places along this road.
- 6 The proposed reserve to the north of the Coral Bay townsite which includes most of the Maud's Landing townsite, should maintain the existing road to the beach, but should restrict general O.R.V. activity in the dune area.

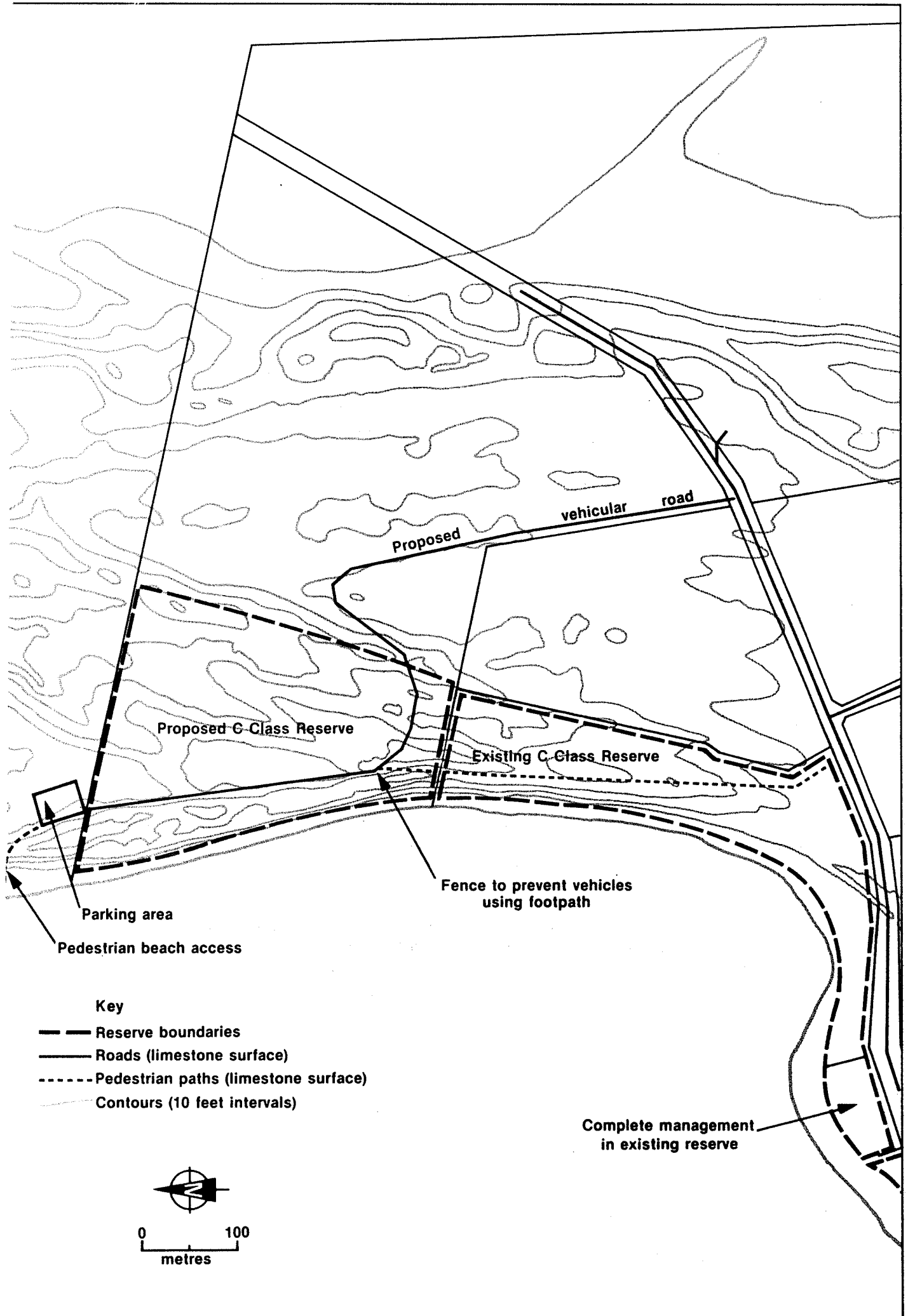


Figure 6 Coastal Management Proposals in the Coral Bay Townsite



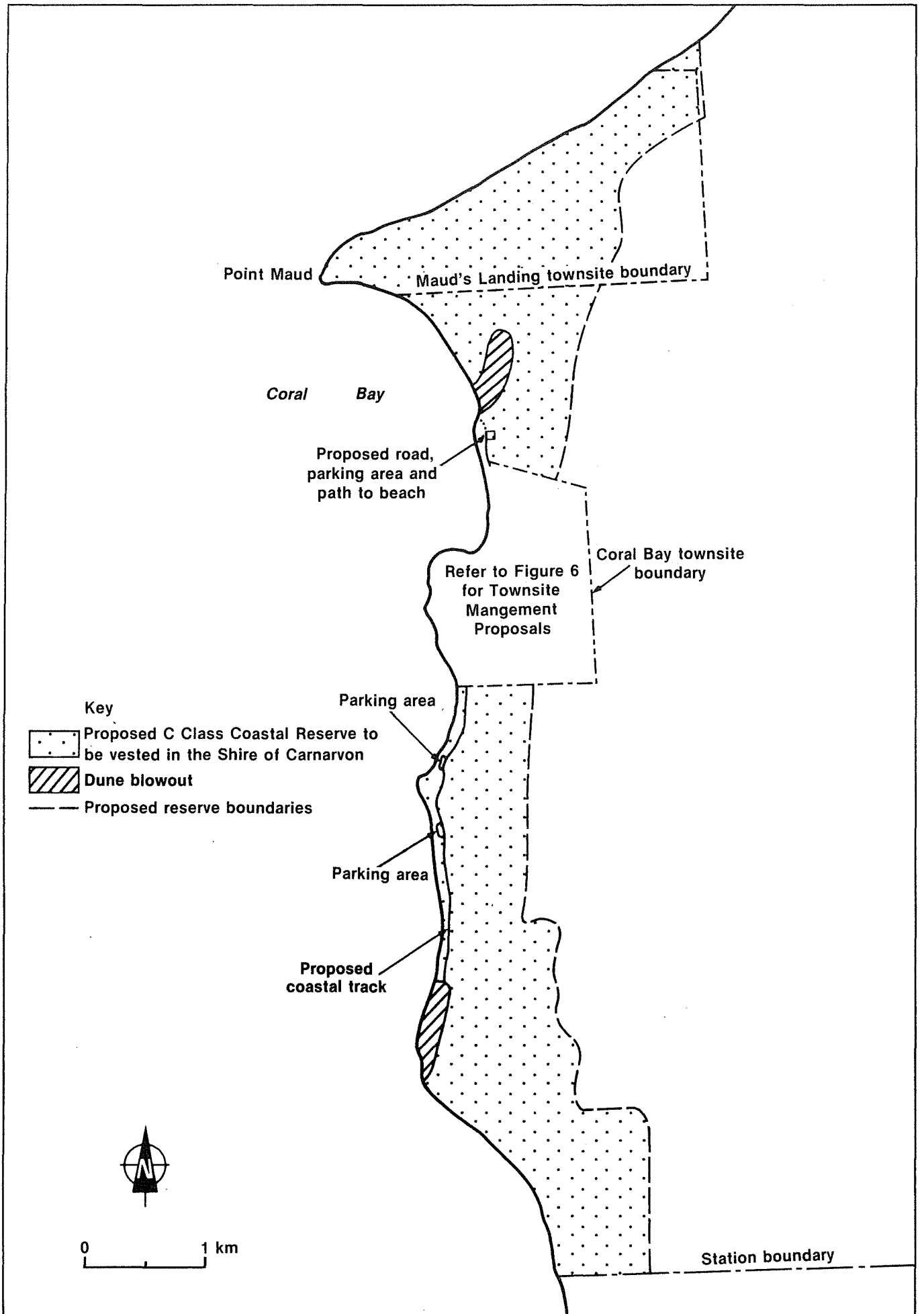


Figure 7 Mangement Proposals in the Coral Bay Locality

## **IMPLEMENTATION**

The Coral Bay coastal management plan was prepared for the Coastal Management Coordinating Committee as a source document for the Shire of Carnarvon and the Department of Lands and Surveys to provide guidelines for the on-going planning and management of the area.

The present draft should therefore be presented to the Shire of Carnarvon for comment as well as to the Department of Lands and Surveys through the Coastal Management Coordinating Committee.

It is proposed that the Shire of Carnarvon and the Department of Lands and Surveys comment and, if necessary, amend the present draft and accept the concept while awaiting the outcome of the Ningaloo Marine Park Proposals.

If the Ningaloo Marine Park is approved this plan should be forwarded to the proposed management authority for information and amendment as required.

If the Ningaloo Marine Park is not established, this coastal management plan should be adopted once comments and amendments have been made.

### **Funding**

Some of the proposals do not require funding and these can be implemented at an administrative level. Many of the recommended land management programmes do, however, require funding and this raises further problems. The Shire of Carnarvon is ultimately responsible for this aspect but the Shire does not have unlimited financial resources to spend on a remote part of the Shire like Coral Bay.

The Shire should attempt to obtain funding from outside sources and in practice it has been found that, once a comprehensive plan exists, funding is easier to obtain. Other possible sources of finance are the State Tourist Commission, the Department of Youth Sport and Recreation (Community Sport and Recreation Facilities Fund), Main Roads Department (Tourist Road Grants), DCE (Beach Management Grants), the Department of Agriculture (Soil Conservation Grants) and private developers.

Acceptance of a coastal management plan by the Shire is the first step in obtaining support from other agencies and ultimately its implementation.

## REFERENCES

Department of Lands and Surveys : Coral Bay A Lands Department Perspective. Unpublished and undated.

Department of Tourism, 1979 : Lower North Regional Tourism Survey

Environmental Protection Authority, 1975 : Conservation Reserves for Western Australia, Systems 4, 8, 9, 10, 11 and 12

Marsh, L.M. : Field Notes on the Coral Bay Area, Unpublished and undated.

National Parks Authority, 1983 : Ningaloo Marine Park Report and Recommendations by the Marine Park Working Group

Weaver Oil and Gas Corporation Australia, 1980 : Biology of the Ningaloo Reef Around Low Point, North West Cape, A Consultants Report

Wells, F.E., 1978 : Coral Reefs of the North West Cape, Fishing Industry News Service, Vol II - No. 1

## **APPENDIX 1**

### **RECOMMENDATION 24 OF THE NINGALOO MARINE PARK REPORT**

#### **Recommendation 24 :**

- (a) The townsite areas at Maud's Landing and Coral Bay be revoked, together with the existing vacant tenure, and vested in the management agency as a Class 'A' Reserve for the purpose of a National Park**
- (b) The facilities at Coral Bay be limited to the current development pending site analysis of the area**
- (c) Subdivision at the northern part of Coral Bay be immediately stopped pending further investigation into the suitability of the area for development**
- (d) The existing 3 ha of freehold land at Coral Bay be purchased by the State and leased**
- (e) The management agency provide continued opportunities for development of accommodation and recreation facilities under leasehold conditions**
- (f) The Carnarvon Shire council be provided by the mangement agency with the opportunity, where appropriate, for development of facilities and involvement in management of the proposed Marine Park**