Draft Coastal Management Plan
Town of Geraldton

Department of Conservation and Environment
Perth, Western Australia

Draft Coastal Management Plan

Town of Geraldton

M G Kerr

Department of Conservation and Environment
Perth, Western Australia

November 1984

Bulletin No. 185

Acknowledgements

Information, advice and criticism have been contributed by various people and groups during the preparation of this dratt plan and their assistance is gratefully acknowledged:

Tony Turner and councillors from the Town of Geraldton. Officers from various government authorities including the Tourism Commission, the Western Australian Museum, Harbours and Rivers Branch of the PWD, Town Planning Department, the Aboriginal Lands Trust and Westrail.

The Geraldton Port Authority, Geraldton Cultural Trust, the Geraldton Historical Society, St George's Catamaran Club.

Colin Chalmers, Peter Woods and Peter Skitmore from the Department of Conservation and Environment for valuable advice. June Hutchison and Ilona D'Souza for proof reading, Tony Berman and Brian Stewart who prepared the report for publication, and Lesley Bennett for word processing.

ISBN 0 7244 6819 6
ISSN 0156-2983

Contents

Page

Tables

Photographs

Preface

The coast is an area within which many land uses interact. Management problems along the coast arise from its inherent fragility and sensitivity, from use pressures, and from ill-advised development and simple mistreatment.

Development and a whole range of human activities can be accommodated within Western Australia's coastal zone but an increased awareness of the special characteristics of the coast is required to do so successfully.

In 1982 the Western Australian Government established a Coastal Co-ordinating Committee comprising representatives from a number of State Authorities to:

- advise government about coastal management policies, legislation and administrative arrangements;
- co-ordinate departmental activities on the coast through the exchange of information and views, and review expenditure programmes and priorities;
- overview the preparation and implementation of coastal management plans at regional and local levels for various locations on the coast of Western Australia.

  This is the ninth draft plan prepared under this programme.

  The preparation of a coastal management plan is guided by general coastal planning policies to ensure that:

  - use of coastal areas is limited to activities requiring coastal locations
  - natural systems and cultural assets are protected
  - ground water and seawater quality is protected
  - a wide range of recreational uses are provided for
  - sites of concern to Aboriginal people are protected
  - tourism is catered for and encouraged
  - appropriate industrial and commercial activities are provided for
  - a public education programme relating to coastal areas is developed.

Introduction

Background

In June 1983 the Department of Lands and Surveys received a request from the Town of Geraldton to have the foreshore areas within the town vested in Council. That request was accepted on the basis that Council accept responsibility for management as prescribed by the Department of Conservation and Environment (DCE).

Council agreed to this and on 27 February 1984 the Department of Lands and Surveys asked the DCE to prepare a Coastal Management Plan for the coastal area within the jurisdiction of the Town of Geraldton. In April 1984 the DCE commenced to gather information to prepare a Coastal Management Plan for Geraldton, in consultation with the Town Council and various government bodies and groups with interests in Geraldton's coastal zone.

Purpose and Aims of the Plan

In the past, decisions concerning the use and management of coastal land around Geraldton have occurred on an ad hoc basis. The purpose of management planning is to achieve a systematic and co-ordinated approach to management and development while recognising natural processes and resource characteristics as well as human needs. The aims of this draft plan are to:

- facilitate orderly and long-term development, conservation and management of the coastal zone
- identify areas suitable for particular uses that require a coastal location
- identify areas which should be protected and make recommendations about their management
- identify problem areas and recommend management strategies
- identify relevant authorities and people that should participate in the planning process and outline authorities which may provide a management input into the area
- illustrate relationships between coastal management areas and nearby land uses to define possible conflicts and suggest compatible activities
- identify possible sources of financial assistance.

It is hoped that this document will also provide a useful resource for people who are interested in gaining an understanding of the functions and interrelationships of the natural and human factors which affect this coastal area and thus also obtain an insight into the management problems of this section of coast and the reasoning behind the management recommendations.

The allocation of compatible uses to appropriate resources is critical to successful coastal zone management. Failure to plan on this basis may result in degradation of resources, significant increases in management costs, or loss of the resource and any improvements.

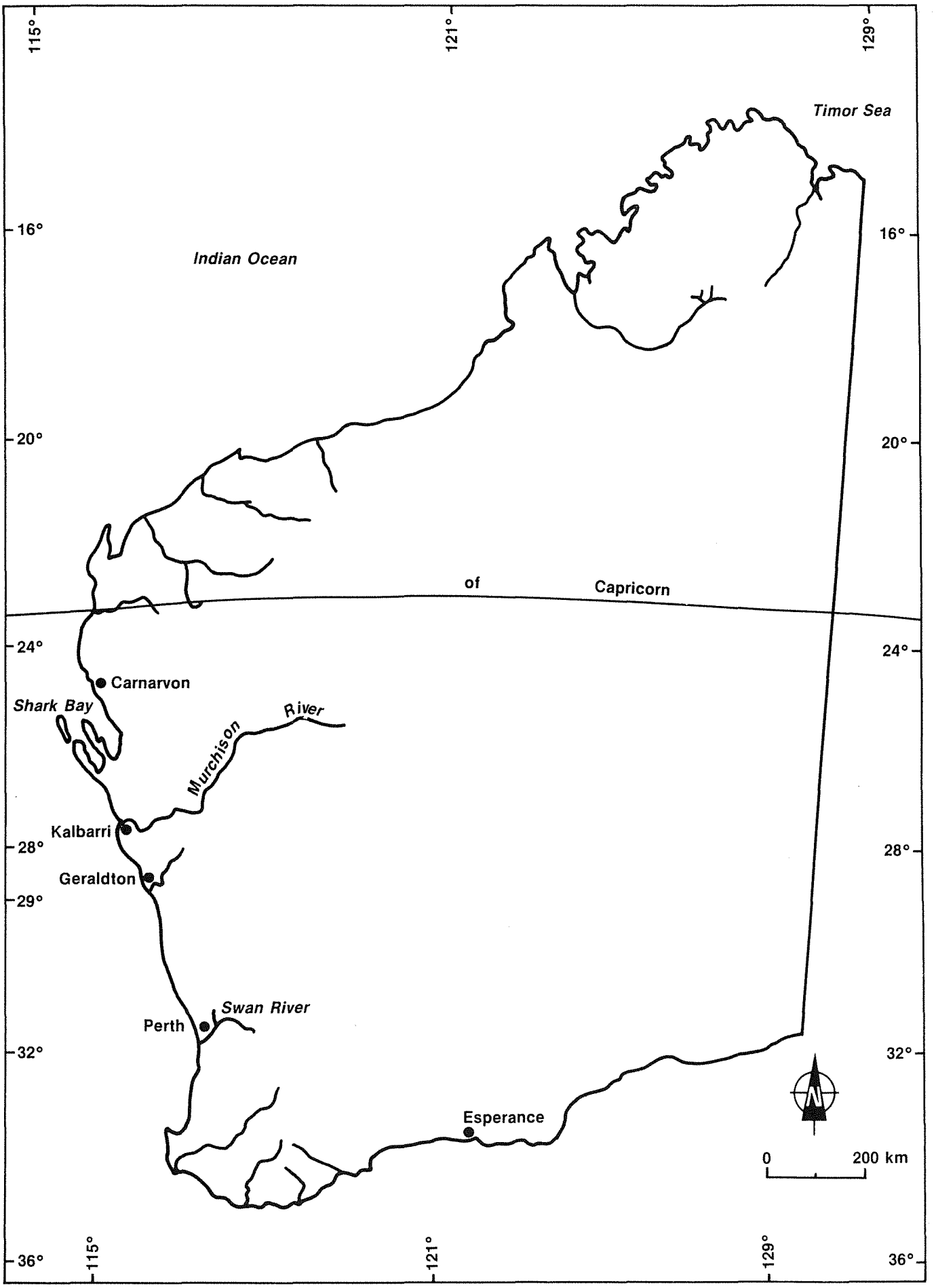
Many recommendations are described in this plan and their implementation will be time consuming, expensive and in some instances require amendment to the Town Planning Scheme. However, these disadvantages will be offset by the more efficient use of land, the reduction in costs associated with continued maintenance of degrading resources, resolution of differences between conflicting land uses and retention of the amenity which attracts visitors to Geraldton.

Agencies which are potential sources of funds are more likely to provide financial assistance for works that are part of a long term plan. Preparation and acceptance of this draft management plan is a first step in this direction.

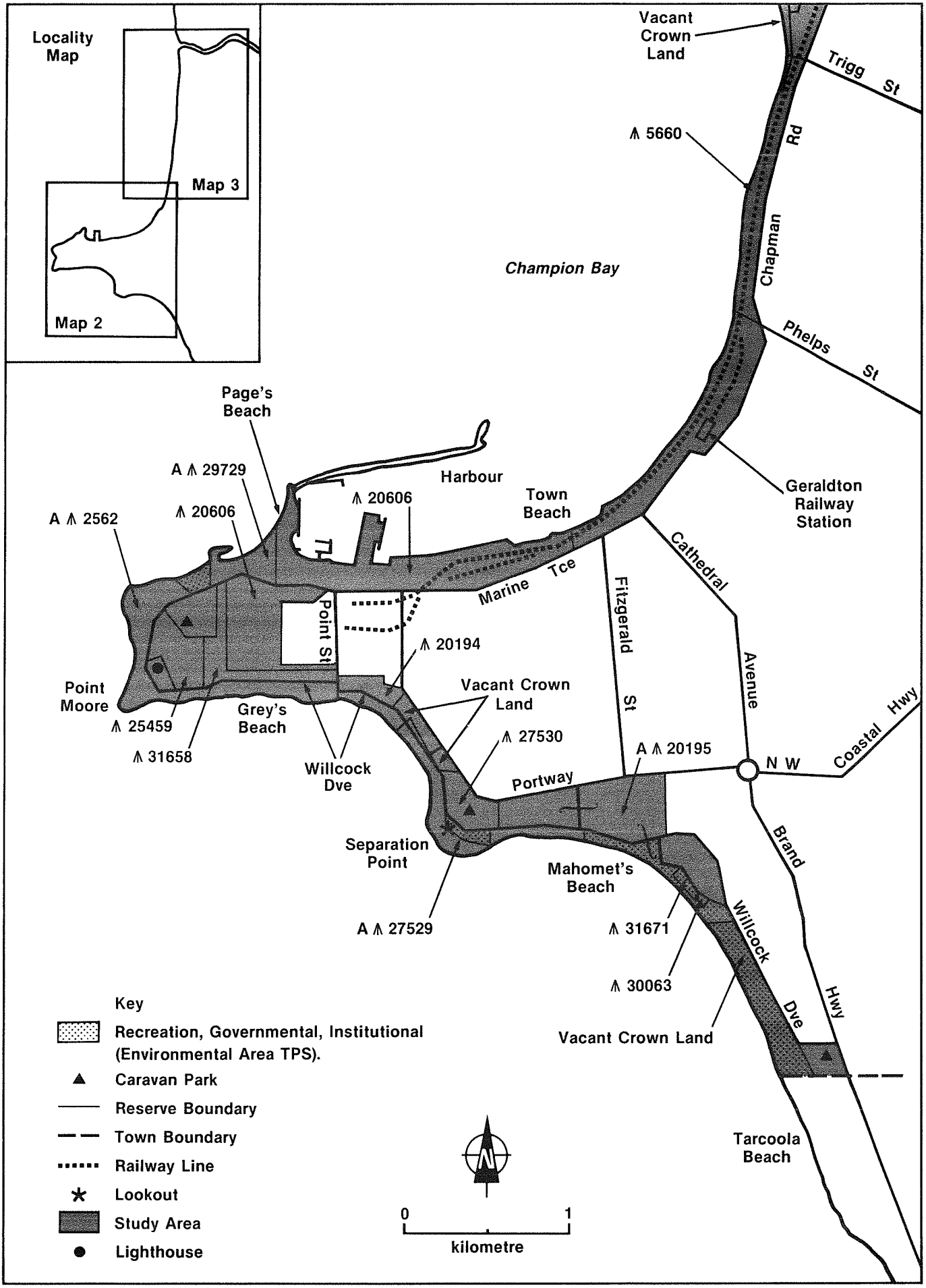
The Study Area

The Town of Geraldton is located at latitude 28° 46'S and longitude 114° 36'E, approximately 400 km north of Perth (See Map 1).

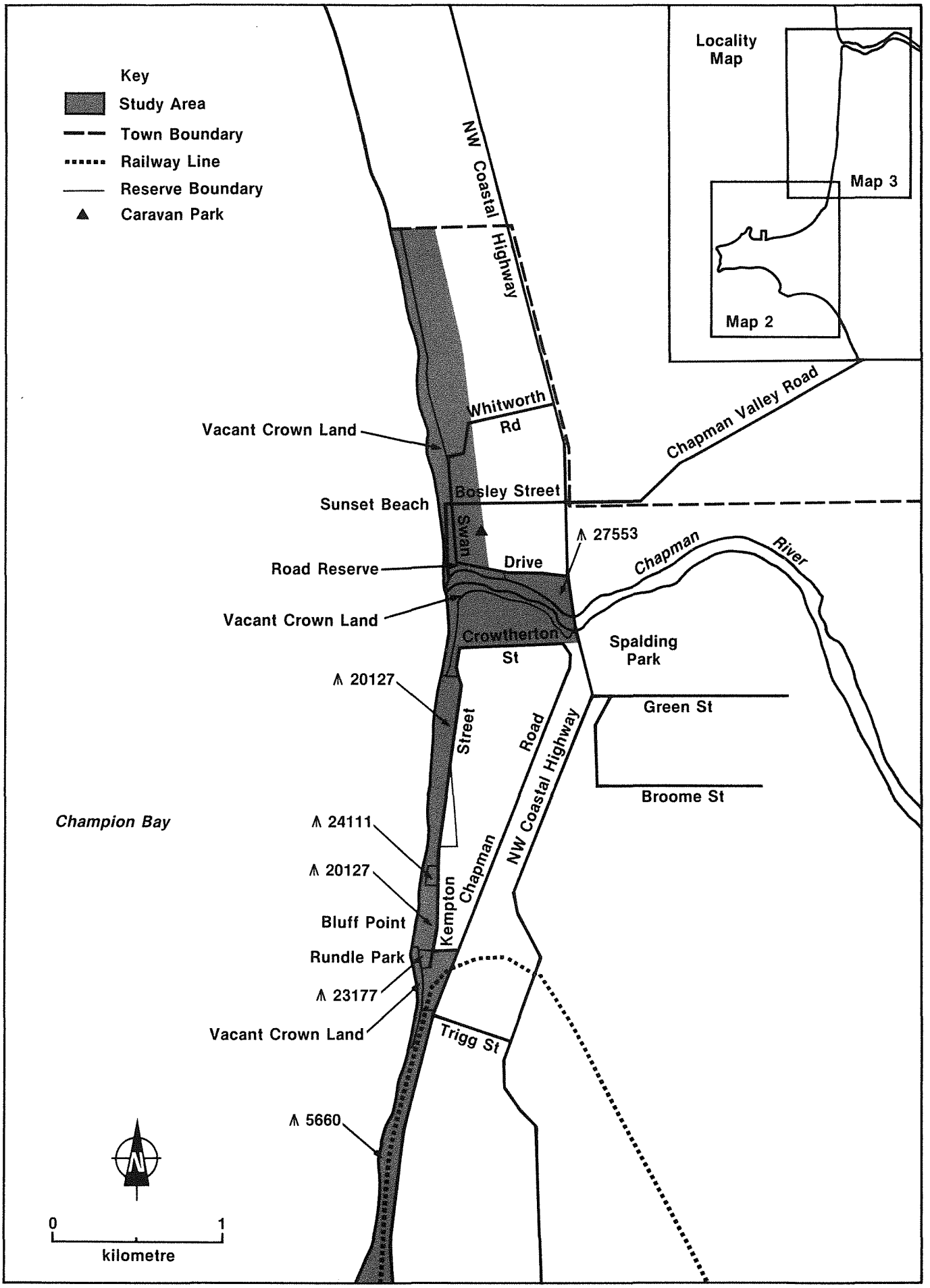
For the purposes of this Coastal Management Plan, the area under consideration encompasses the beaches within the Geraldton Town boundary, adjacent offshore waters, the Chapman River and adjacent river reserve to the bridge, and land away from the foreshore in instances where activities on such land may directly or indirectly affect future use and management of the coast (See Maps 2 and 3).



Map 1 Geraldton — Location



Map 2 Study Area and Crown Reserves



Map 3 Study Area and Crown Reserves

Natural Environment

Geology

Geraldton lies within the Coastal Belt as described by Playford et al. (1970). Within this belt a band of Pleistocene (6,000 to 1-2 million years before present) coastal limestone, up to 8 km wide forms a prominent ridge along the mainland coast. The limestone also forms a series of offshore ridges running parallel to the coast which occur as reef chains adjacent to the coast. The Pleistocene limestone which forms a local basement to the Geraldton coastal zone was deposited as a series of coastal sand dunes.

Holocene sediments front and overlie the Pleistocene. Deposition of these sediments commenced around 6000 years ago with the formation of dunes, beach ridge plains and submarine banks.

Most of the study area contains unconsolidated or weakly consolidated Holocene sediments. These are sensitive to natural processes and human interference which may lead to instability and therefore management problems.

Geomorphology

The skeleton of the Geraldton coastal zone comprises three coast-parallel limestone ridges. The landward ridge will be referred to as the western ridge. The other ridges which have been drowned and partially degraded, form coast-parallel chains of reefs offshore.

The reef running to the south of Separation Point will be referred to as the inner reef. The reef running through the Point Moore area will be referred to as the outer reef. The drowned depression between the inner reef and western ridge will be referred to as the nearshore depression. The inner reef is present only to the south of Separation Point. Note that the western ridge runs along the shore and then offshore north of the railway marshalling yards (See Figs 1 & 2).

A limestone shelf extends offshore (to at least the outer reef in the Geraldton area) for 24 km between Greenough River and Buller River.

Superimposed on this limestone basement are a number of landforms associated with the younger sandy sediments (See Figs 1 & 2). These are:

- Submarine Banks
- Marine Basins
- Beach Ridges/Beach Ridge Plains
- Transgressive Dunes
- Beaches

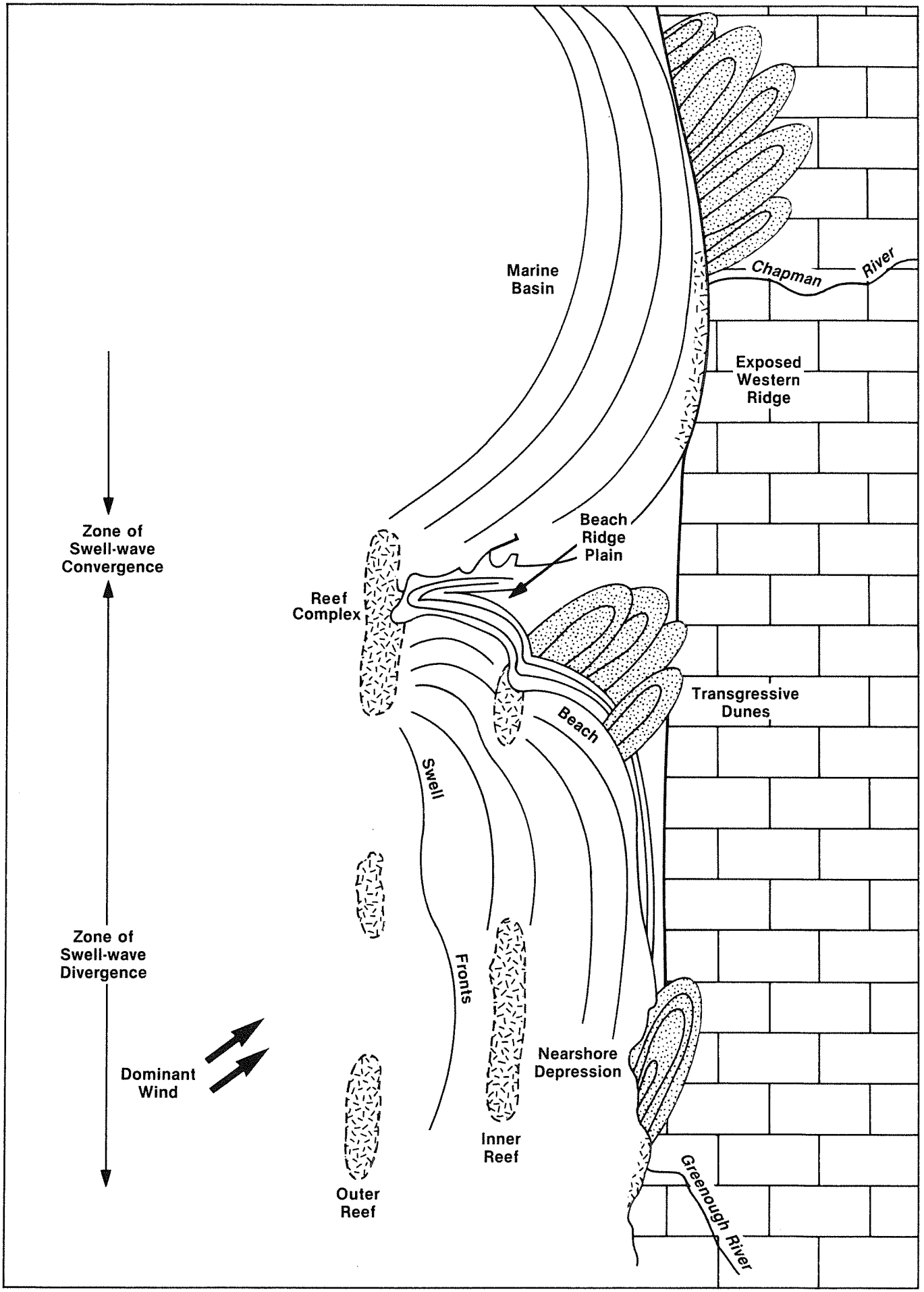


Figure 1 Relationship Between Pleistocene/Holocene Features and Swell-Wave Patterns at Geraldton.

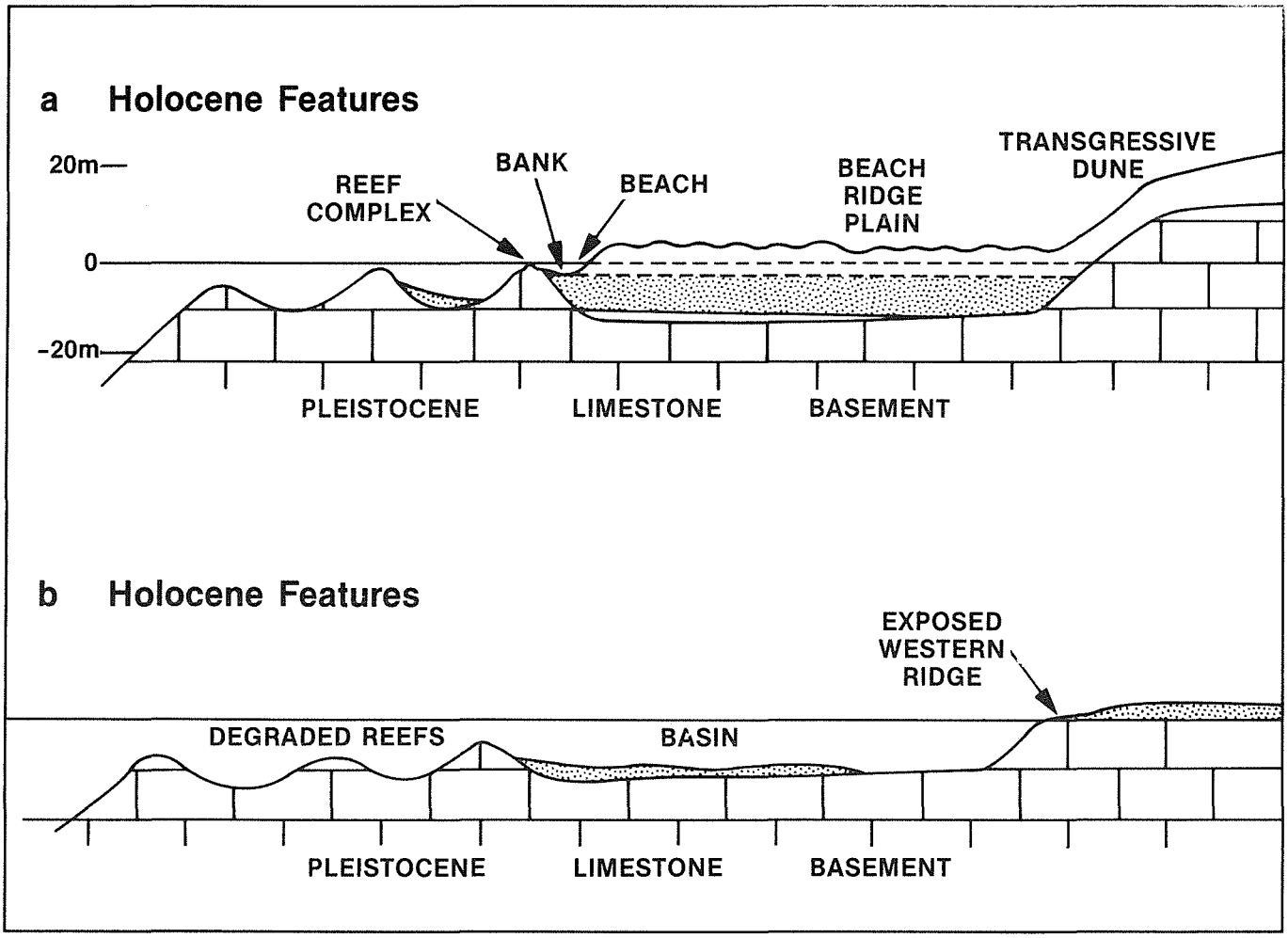


Figure 2 Cross Sections of Holocene Features and Pleistocene Limestone Basement. (Woods 1984)

Submarine Banks

Submarine Banks are shore-normal, elongate mounds of sand, stabilized by sea grass and topped by a linear zone of bare mobile sand. Banks are best developed in zones of swell wave interference behind island and reef complexes, and mark the zone maximum onshore sediment transport.

Where a bank meets the shore it may grade into a beach and a transgressive dune field, though it may be partially covered by a beach ridge plain.

Marine Basins

Development of submarine banks and beach ridge plains has led to partition of the nearshore depression into a series of sheltered seagrass-covered basins.

Beach Ridges/Beach Ridge Plains

Beach ridges are low, shore-parallel dunes that form behind the beach or are the result of abandoned shoreline positions. A beach ridge plain is a triangular, sandy projection of the shore

overlying a submarine bank and comprising a large number of beach ridges. Beach ridge plains extend beyond the general trend of the coast (See Fig. 4). In most cases the plains are being eroded on the southern flank (e.g. Grey's Beach).

Transgressive Dunes

These dunes are U-shaped and parallel to the dominant wind direction. The majority of dunes are stabilized by vegetation, though a large bare transgressive dune occurs to the north of Sunset Beach and just to the north of the Greenough River.

Beaches

Sandy beaches extend along much of the Geraldton coastline, except where harbour and railway developments have occurred. Beaches on the southern flanks of beach ridge plains are often narrow in summer while beaches to the north are wide and sheltered.

Summary

During the last 6000 years a submarine bank, and subsequently a beach ridge plain, have grown out to the outer reef where Point Moore is located (See Fig. 2).

Mahomet's Flats was originally a large transgressive dune field which has since been stabilized for residential development. Transgressive dunes occur to the north of Sunset Beach and to the north of Separatione Point, as evidenced by the high hind dunes and hilly topography of the town west of the western limestone ridge.

Climate and Oceanography

Rainfall

Geraldton's climate follows a Mediterranean weather pattern with cool, wet winters and warm, dry summers. Average annual rainfall is 477 mm, with 406 mm (85%) falling in the months May to October. On average Geraldton receives rain on only 88 days per year.

Temperature

Temperature in the summer is generally high, ranging from an average 18.2C minimum to 31.2C maximum. The winter range is on average 9.7C to 19.9C.

Effective Rainfall

The seasonal distribution of rainfall and fluctuation in temperature for Geraldton are shown in Figure 3. The period when the monthly rainfall is too small to be effective occurs in those

months when the rainfall curve is below the temperature curve. The "effective rainfall" is that required to start and maintain vegetation growth. In Geraldton there are on average almost eight months of the year when rainfall is not effective. The implication for coastal vegetation is that recovery after damage is likely to be slow.

Winds

Summer winds are generally from the east in the morning and from the south-southwest in the afternoon. Tropical cyclones can affect the coast during summer bringing strong winds from any direction. In winter, winds are from the northwest through south.

The dominant wind which blows at 20-30 kph is from the southwest during summer. The strength of this wind is evidenced by the wind-distorted nature of vegetation in the Geraldton area.

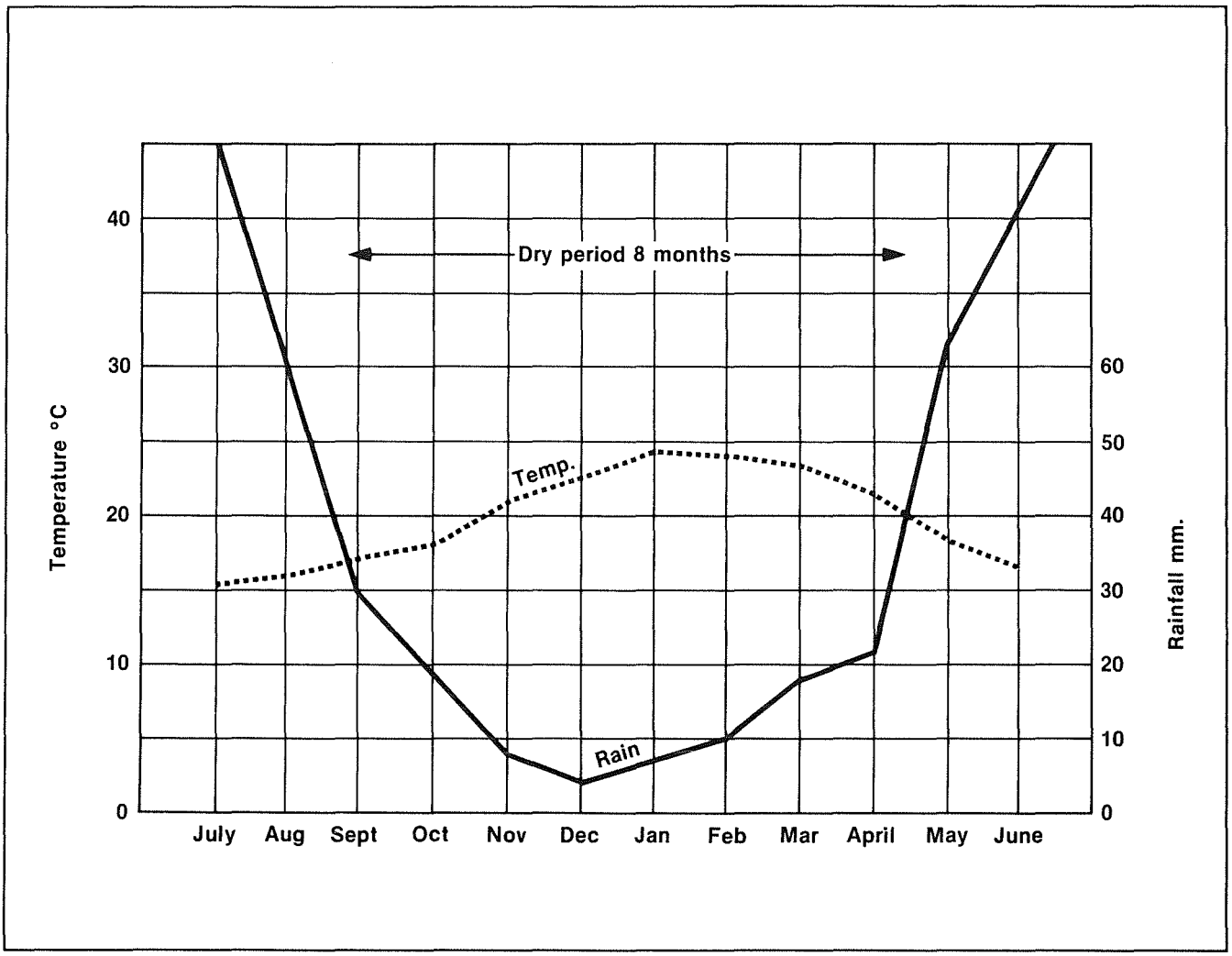


Figure 3 **Seasonal rainfall and temperature diagram for Geraldton. (Beard, 1976)**

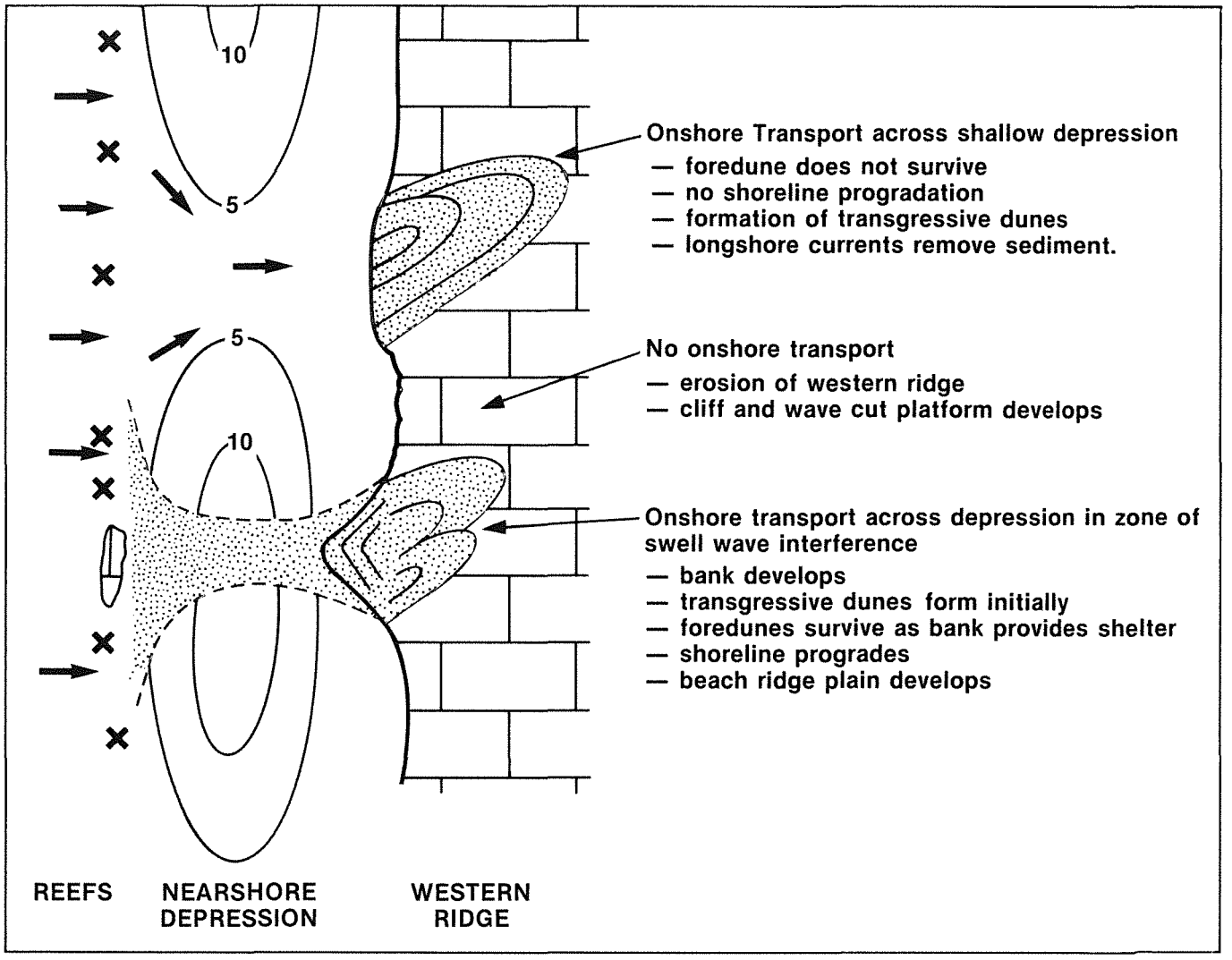


Figure 4 Swell-Induced Onshore Transport (Woods 1984)

It is considered that winds above 10 kph will cause significant sand movement (Wood and Grieve 1978). The Bureau of Meteorology wind records show the severity of the wind climate in the Geraldton area. July is the least windy month; however, on 75% of days in the month the wind exceeds 10 kph. Winds exceed 20 kph on 30% of days. December is the windiest month when on 99% of days winds exceed 10 kph while 80% exceed 20 kph and 45% exceed 30 kph.

Waves

The Geraldton coast is subject to a swell that is generally from the southwest. The swell direction is altered, as it approaches the coast, by offshore features including reefs and by extensions of the shoreline such as groynes and breakwaters. The shape of the sandy beaches around Geraldton is maintained parallel to the refracted swell patterns. The swell wave energy is largely diminished as it passes through the reef chain.

Superimposed on the swells are locally generated wind waves which arise from a variety of directions.

Currents

Longshore currents are generated in the surf zone by wind waves arriving at an angle to the shore (See Fig. 5a). As the sandy beaches are maintained by swell waves it is common that strong local winds generate a longshore current capable of transporting sediment in the surf zone.

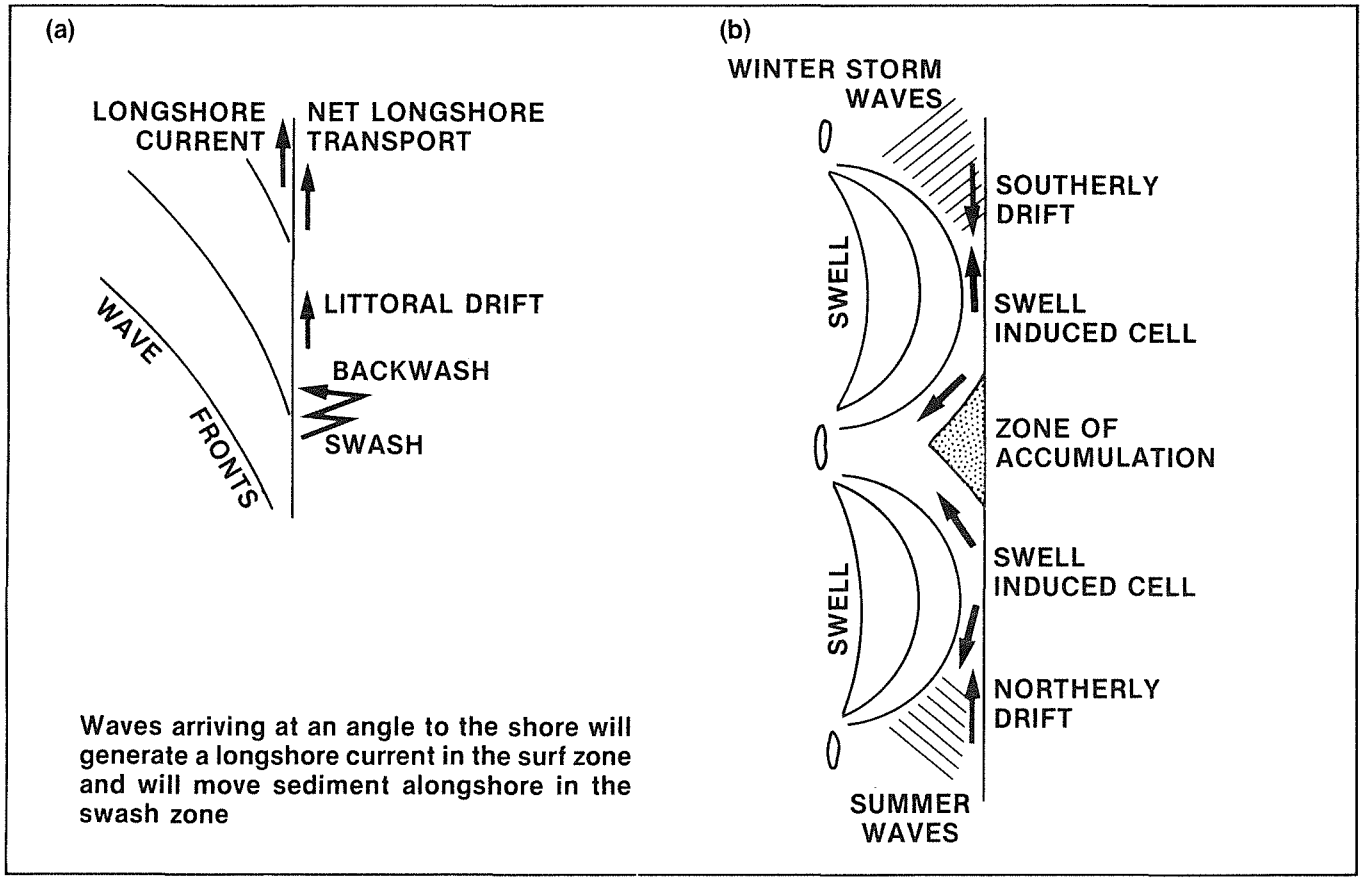


Figure 5 Swell-and Wave-Induced Longshore Transport (Woods 1984)

Coastal Processes

A number of coastal processes are operating at Geraldton:

- swell-induced erosion of outer reefs; onshore transport of erosion products to the coast and longshore transport of sand in the surf zone
- wave-induced longshore transport of suspended sediment in the surf zone
- inland aeolian (wind-driven) transport of fine sand

Swell-Induced Transport

The prevailing swell from the southwest that is diffracted and reflected as it passes through the reef chain has been, and is responsible for:

- breakdown of the reefs
- onshore transport of erosion products
- longshore transport of sand in the surf zone

Onshore Transport

During the last 6000 years the inner and outer offshore ridges have absorbed a significant percentage of the swell wave energy reaching the coast at Geraldton. Under this influence the ridges have broken down to form a perforate series of reef chains with erosion products swept ashore. Sediment is either transported onshore accumulating to form beaches and dunes, or is deposited in zones of swell-wave interference behind reef structures to form submarine banks across nearshore depressions to the mainland shore and subsequently to develop as beach ridge plains (See Fig. 4).

Longshore Transport

Diffraction of swells as they pass through the reef chains leads to complex patterns of divergence and convergence with the result that swells arrive at the shore from a variety of directions. Consequently swell-induced longshore transport direction varies locally along the coast with sediment transported away from zones of divergence. Thus material arriving from offshore tends to be retained along stretches of coast subject to converging or interfering swells, while sediment on other sectors is subject to removal in longshore currents. This local redistribution of sediment has led to the formation of sandy shores that are basically parallel to the incoming diffracted swell patterns (See Figs 1 & 5b).

Wave-Induced Transport

Superimposed on the swell-induced transport regime is longshore transport generated by local wind waves. This transport system is significant in moving sediment along the Geraldton coast in contrast to swell waves which cause only local redistribution. Under the influence of the seasonal wind regimes, the direction and intensity of longshore currents change. During summer, littoral currents drive sediment to the north, whereas in winter, sediment is moved southwards.

The major effects of wave-induced currents are minor realignment of swell-controlled sandy beaches through erosion of south facing shores during summer and transport of sediment to the north, and erosion of north facing shores during winter, with transport of sediment south. Due to the net dominance of the northward transport system a small amount of material is continually moved to the north. This phenomenon has been responsible for the assymetric growth of beach ridge plains and erosion on their southern flanks.

Wind-Induced Transport

Sediment that arrives at the shore is subject to inland transport by onshore winds unless trapped by vegetation behind the beach to form a foredune.

Inland transport on the Geraldton coast has led to the formation of transgressive dunes which are generally oriented south west/north east. This suggests that wind transport is mainly the result of summer south westerlies.

Beach Sand Cycles

During winter, high energy northwest to west storm waves erode sandy beaches and dunes, transporting sand offshore and southwards to form an offshore bar (Fig. 6b). During summer, the sand on the bar is transported onshore to re-form the beach and dune system (Fig. 6c). Provided that enough sand is available on the beach and dunes to accommodate winter erosion, the beach will re-form each summer with the shoreline in the same place. If, however, sand is being lost inland from the beach or if longshore input is affected (e.g. by a groyne), greater erosion of the dunes will be necessary to supply the amount of sand required for the bar. In the following summer the beach will re-form but the shoreline will have retreated (Fig. 6b*-d*). With continued loss of sand from the active system, retreat of the shoreline may result in exposure of underlying rocks or action may have to be taken to prevent erosion of coastal development. The role of vegetation which traps and binds sediment in the dune system, where it is held ready for release during storms, is vital in maintaining a balance in the seasonal beach sand cycle.

Role of Vegetation

Along much of the Geraldton coastline, a zone of hardy plants adapted to sand inundation and salt spray traps sand behind the beach. If this vegetation zone is maintained, sand will be retained in the system. If the vegetation is destroyed, sand will be lost inland, upsetting the sand budget in favour of erosion.

Long-Term Changes

Long-term changes in shoreline position are complex and not always fully understood. However, the important point to appreciate is that long-term changes do occur and that on sandy coasts, changes in shoreline position (i.e. hundreds of metres) can take place within the nominal planning scale of 100 years. Similarly, the rate of erosion may be markedly greater for a number of years than the average over time.

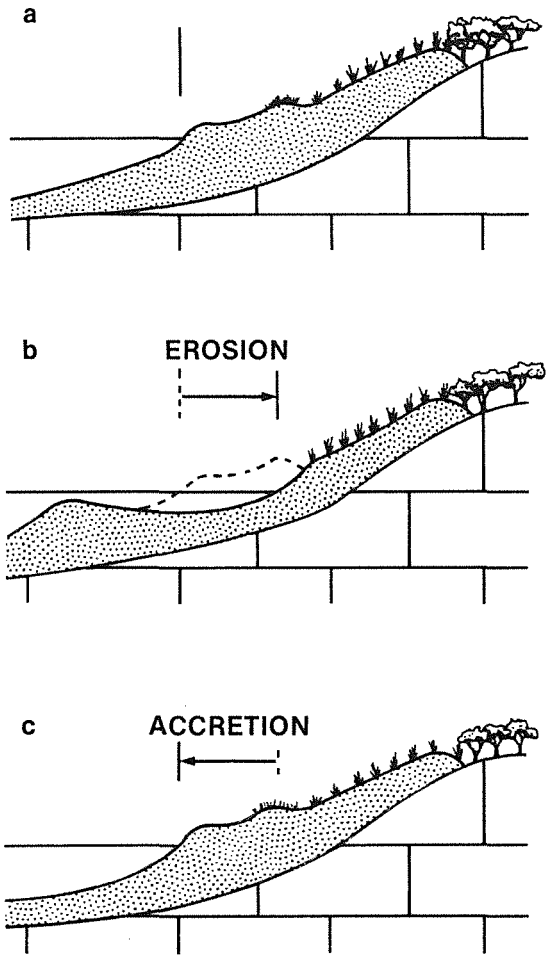
It is clear that significant erosion along Geraldton's coastline is taking place at Grey's Beach and Sunset Beach. There is nothing to suggest that this will not continue.

Summary

The following outline summarizes the action of coastal processes on the Geraldton coast (Refer to Maps 2 and 3 for locations).

Under the current regime south of Mahomet's Beach, sand is transported northward in littoral currents along the sandy coast. As a result, this coast has been eroding slowly since the first survey of the area. At Mahomet's Beach where the coast curves to the west, sand is deposited over a limited area near the Geraldton surf club. As a result sand has at times accumulated and overwhelmed the vegetation to blow inland. This will probably continue in the future.

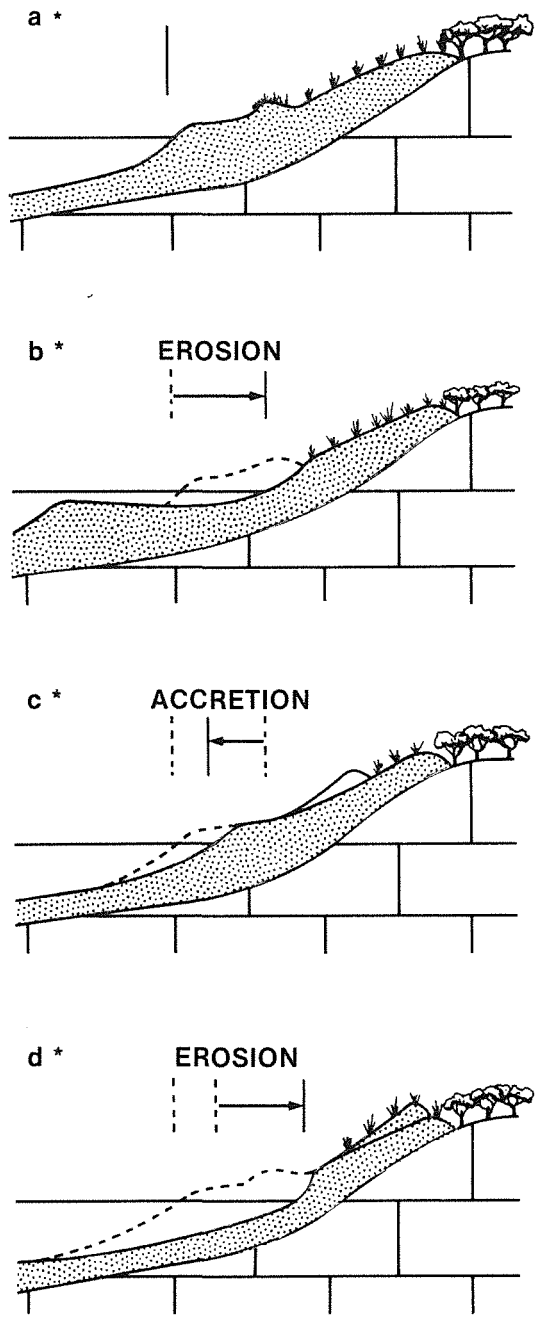
Balanced Sand Cycle



Normal beach sand cycle where sand is trapped at the back of the beach in a foredune. During storms, sand is transported offshore to form a bar (b). During the subsequent calm period (or season) sand is returned to the beach (c). With sand trapped in the foredune the shoreline regains its former position.

i.e. Erosion equals Accretion.

Unbalanced Sand Cycle

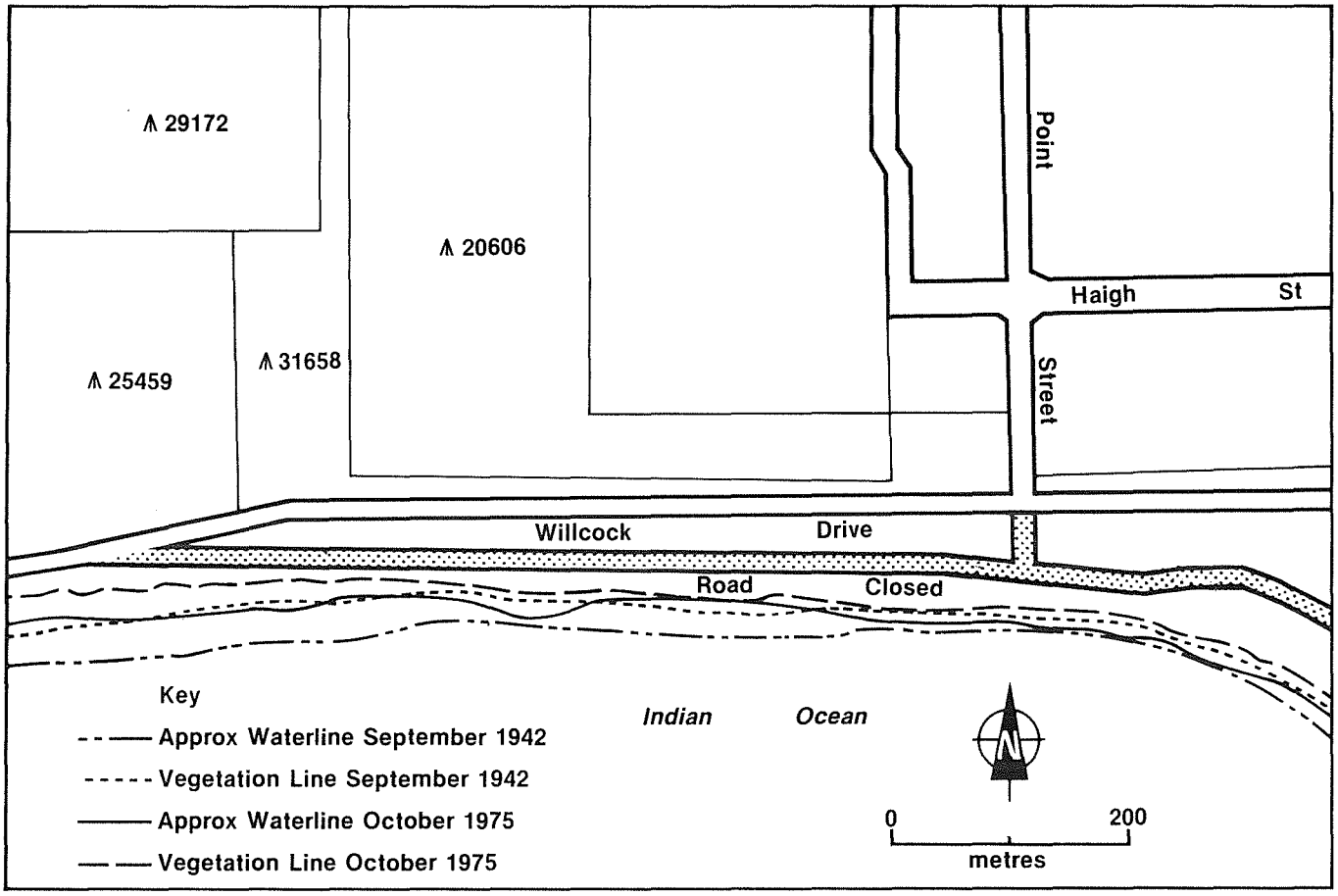


Unbalanced sand cycle where sand is not trapped in the foredune following a storm allowing sand to be lost from the active beach zone. (c)*. As a result the shore will not regain its former position. During the next storm the dune will be attacked leading to formation of a dune cliff (d)*.

i.e. Erosion greater than Accretion.

Figure 6 Beach Sand Cycles. (Woods, 1984)

At Grey's Bay, beach and dune erosion is occurring, resulting in a shoreline recession, in places, at over 1.5 m per year (See Map 4). The cause of this is complex. It appears that there is no sediment replacing material from the beach and dune, which is washed to the northwest and deposited around Point Moore. As is common on south facing beaches of beach ridge plains, erosion is evident due to: (a) a lack of sediment transported from offshore and (b) lack of sediment transported in longshore currents.



Map 4 Shoreline Movement — Grey's Beach

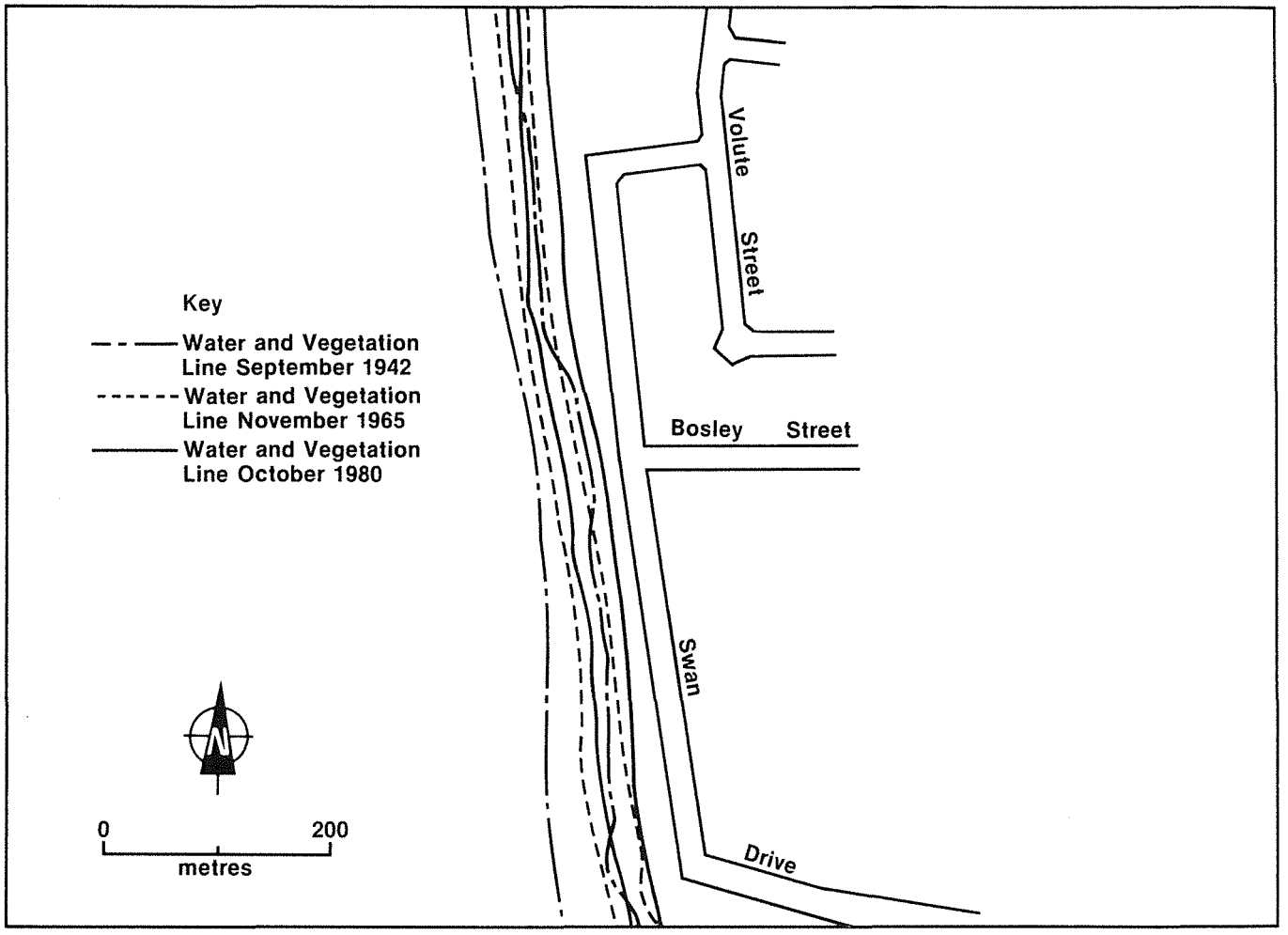
Point Moore, the western extremity of a beach ridge plain, is continuing to grow as a result of the deposition of sediment in the zone of swell wave interference behind the reef complex adjacent to the point. Point Moore is also supplied with sediment derived from beaches to the south. At Page's Beach, the little sediment that is transported around the point has built up behind the groyne.

Sediment in the littoral zone along the coast, to the northeast of the harbour, is limited due to entrapment by up-drift groynes and breakwaters, and by sand traps adjacent to navigation channels to the north of the harbour. Consequently the coast to the north has had to be protected by a rock wall to prevent erosion.

North of the railway yard rock wall, the western limestone ridge is exposed along the beach. There is little sediment supply to this section of shore but it is stable probably because the limestone base underlies and supports the sandy beach.

At Sunset Beach to the north of the Chapman River mouth, the coast is receding in places at over 1 m per year (See Map 5). As with southern coasts, net sediment transport is to the north. The lack of sediment supply from offshore, and the south, due to harbour developments, has restricted the replenishment of sediment for the beach and dunes leading to their erosion.

Eroded sediment is transported northwards to another beach ridge plain and so the process of erosion to the south and deposition around the western extremity of a beach ridge plain occurs again towards Drummond Cove (north of the Town boundary).



Map 5 Shoreline Movement — Sunset Beach

Soils

Soils in the Coastal Belt coincide with the Holocene sand dune and Pleistocene limestone formations. Soils which overlie coastal dune formations are calcareous. Inland, silaceous soils have developed on the undulating dune formations with aeolianite exposed in places (Northcote et al 1967). These coastal soils are friable, very permeable, highly alkaline and low in nutrients. Because of their unconsolidated nature, the soils are vulnerable to wind erosion, especially if vegetation cover is removed.

Vegetation

Geraldton is situated within the Greenough system vegetation as described by Beard (1976).

The coastal dune vegetation within the study area is distributed generally as follows:

Spinifex longifolius, Atriplex isatidea, Salsola kali, Threlkeldia diffusa and Scaevola sericophylla all occupy the foredune, joined by Scirpus nodosus, Olearia axillaris, Scaevola crassifolia and Myoporum insularae a little further inland. Present as scattered, stunted shrubs in the active dunes, Acacia rostellifera forms dense groves on the stable inner dunes.

The description of each Management Area will contain a brief outline of plant species present in that area.

Coastal vegetation has the following values:

- The intrinsic value of endemic plant species representing diverse ecosystems
- Vegetation provides diverse habitats for fauna
- Landscape values are linked to vegetation type and diversity as well as other factors
- Vegetation plays a key role in stabilizing dune sands

Fauna

There is very little recorded information on fauna within the study area. Recordings of animal sightings are kept with the Department of Fisheries and Wildlife officers in Geraldton. There have been no rare or endangered species recorded in the study area.

Landscape

A landscape is formed by a combination of landform and vegetation as modified by land use. Landscape in the study area may be categorized into three types: Settlement, Beach/Dunes, and Chapman River.

Settlement encompasses residential, commercial and industrial areas. Most structures are small to medium scale. Man-made and natural features such as tree plantings, water-front development and views may provide visual interest. The landscape quality of this category ranges from low to moderate. Strip development, industrial development and taller buildings contrast with the main elements of intrinsic landscape character.

Sandy **beaches and dune areas** generally have a moderate to high landscape quality. The intrinsic landscape character of this category is easily degraded due to its sensitivity to vegetation damage and low visual absorption capability.

The **Chapman River** area has a generally high landscape quality especially where the natural river environs are retained or where development has created attractive riverside areas such as to the southeast of the NW coastal highway bridge.

Any landscape assessment is to some extent dependent on the evaluator's subjectivity and other influences such as differences over time. Within the study area there is a wide range of landscape quality. Landscapes of high quality include the Point Moore area, the bay south of Separation Point and the Chapman River. Where ocean views have been maintained they add considerably to landscape quality.

Human Environment

History

Aboriginal Occupation

Within the study area Tindale (1974) records the presence of one Aboriginal tribe : the Amangu, which ranged from the area just north of Chapman River to Hill River in the south and out to Mullewa and Carnamah in the east.

Much knowledge of the original Aboriginal occupation of the area can be gained from an analysis of their midden sites. These consist of mounds or layers of shell material or other debris such as charcoal fragments, stone flakes and bone implements left by Aborigines adjacent to their food gathering sources.

One midden site has been discovered in the study area and is located to the east of Kempton Street, in Reserve 20127. There is also a burial site to the southwest of the Nazareth House grounds in sand dunes above Chapman River mouth (See Map 7).

Exploration and Settlement

The first exploration of the Geraldton area was in 1839, by Lieutenant George Grey, during a forced march from Gantheaume Bay to the Swan River. Later, in 1846 and 1848, the brothers A C and H C Gregory systematically explored the area, discovering much promising agricultural land as well as deposits of lead, coal and copper. Lead ore was eventually shipped from Geraldton.

Settlement of the Geraldton area was based on three primary industries : wheat, mining and wool. The townsite began to be occupied in 1851, was declared a Municipality in 1871 and a Town in 1961.

There are two confirmed shipwrecks off the coast at Geraldton. The oldest is that of the "African" which is located just north of the Chapman River mouth. The ship originally ran aground and broke up on a reef to the south of Point Moore, now called African Reef, around 1870. In 1895 the "Mayhill" ran onto reefs offshore from Point Moore.

The remains of the original Geraldton wharf which later became swimming baths are located off Town Beach.

Existing Tenure

The study area comprises vacant Crown land, vested and unvested Crown reserves, and freehold land (see Maps 2 and 3).

Photo 1 Champion Bay

Existing Use

The pattern of development at Geraldton has led to the establishment of the town to the north of Point Moore, which now occupies a large proportion of the coastal zone. This has resulted in the retention of most of the more environmentally unstable areas to the south of the point in a natural state but the expansion of the town is beginning to encroach on these environmentally sensitive areas. This northern development bias has also precluded recreational use of a significant portion of the sheltered northern shore.

The study area is used for a variety of recreational pursuits (swimming, surfing, diving, skiing, sailing, fishing and picnicking). A large section of the coast north of Point Moore is occupied by the Commercial Fishing Industry, Geraldton Port Authority and Westrail. A number of commercial fishing enterprises exploit the waters near the coast and the offshore reefs.

Existing Zoning

Under the Geraldton Town Planning Scheme, land in the study area is zoned Residential, Recreation/ Governmental/Institutional or Natural Bushland apart from port and railway developments mentioned above (See Maps 2 and 3).

Existing Planning and Management

The Department of Lands and Surveys administers and is responsible for the day to day management of vacant Crown land

and unvested reserves in the study area, whereas Crown reserves may be vested in a variety of authorities which care for and use them for specific purposes. Thus the Town is responsible for the management of reserves under its control.

As yet, no comprehensive policies on planning, managing, or on developing the coastal zone have been made nor have any objectives or strategies been put forward to ensure that planning, management and development occur in a systematic manner making optimum use of resources and based on the best advice available.

Existing Facilities

A number of facilities have been developed in the study area which are provided for residents, industry and tourists.

Roads

The study area is serviced by roads and tracks which provide access to much of the coast with the following exceptions: port and railway operations around the coast in Champion Bay limit vehicle access along the beach between Page's Beach and Bluff Point; there is no vehicle access along the coast in the Chapman River mouth area; north of Sunset Beach there is no vehicle access along the coast; between Separation Point and Point Moore the coast road (Willcock Drive) has been realigned further north limiting vehicle access to the coast in this area. Major roads in the study area are shown on Maps 2 and 3.

Car and Trailer Parking

Car parking exists at several locations along the coast. Formal carparks occur at the following locations:

. Geraldton Surf Club
. Separation Point Lookout
. Page's Beach
. Town Beach
. Rundle Park

Informal parking areas are located at:
. Western end of Grey's Beach (old Willcock Drive)
. Point Moore, north and south carparks
. Point Moore foreshore
. Page's Beach foreshore
. Railway reserve north of marshalling yards
. Chapman River mouth, south
. Chapman River north (adjacent to bridge)
. Sunset Beach (road verge)

Trailer parking exists at:
. Geraldton Surf Club
. Town Beach
. Harbour
. Rundle Park

Pleasure Boat Facilities

At present there are formal boat ramps at Town Beach and Rundle Park. In addition small boats are launched from Town Beach, Page's Beach and a small beach in the harbour area (See Photograph 2). A further boat ramp has recently been constructed at Town Beach.

At present there are no berthing facilities for pleasure boats along the coast. Some boats are moored in Champion Bay.

Photo 2 Boat Launching Beach Adjacent Fishing Harbour

Pedestrian Beach Access

Pedestrian access to the beaches along the Geraldton coast is mostly uncontrolled. Formalized access paths are provided to Tarcoola and Mahomet's (Back) Beaches.

Parks and Toilet Facilities

Formal parkland with toilets has been established at Page's Beach and Rundle Park. Toilet facilities are also provided at Mahomet's (Back) Beach and Town Beach.

Tourist Accommodation

Geraldton contains many hotels suitable for tourist accommodation.

The Town also includes a number of caravan parks, four of which are located in the study area at Tarcoola, Separation Point, Page's Beach and Sunset Beach (See Maps 2 and 3).

Use Pressures

The coastal zone is subject to use pressures which must be considered in the planning process so that they may be provided for in a rational manner. The growth of both the residential population and numbers of tourists will be a major cause of use pressure in the Geraldton coastal zone.

Population Growth

The population of the Town of Geraldton increased from 19,090 to 19,610 between 1981 and 1983, giving an average annual rate of population growth for that period of 0.9%. This growth of population will increase recreational demand on the coast for bathing, surfing, fishing, boat launching and berthing, picnicking etc. There are additional pressures associated with the provision of land for housing, the location of roads and waste disposal.

Tourism

Geraldton is an important tourist centre with many attractions including: a warm climate, fine beaches and clear waters. The town provides a wide range of facilities for tourists including accommodation , shops and services. The most recent visitor survey for Geraldton was carried out by the Department of Tourism in 1975-76. That survey found that the majority of respondents found their visit "enjoyable" or "satisfactory". No specific reason could be pin-pointed for the high degree of satisfaction, however, the major factors which influenced visitation were convenience as a stopping point and scenery. It was interesting to note the proportion of respondents (21%) who felt that other people would visit the town because of its reputation as a good holiday resort. This particular point tends to indicate Geraldton's high status as a holiday destination.

From more recent general observation and informal contact with visitors to the town (Tourism Commission), it is apparent that for some time there has been a restriction in the development of the tourist industry in Geraldton, i.e. in terms of demands on back-up services and accommodation in response to a lack of steady growth in tourist numbers. This has been caused by a lack of suitable beach developments near the town centre due to the location of railways and port facilities on foreshore areas.

Access

The demand for greater formal access to the coast will increase with the growth of population and tourists in Geraldton. This in turn will increase demands for carparks, pathways and beach facilities. Greater availability of vehicles for off-road use could lead to the creation of more informal tracks and a greater potential to initiate soil erosion on public and private land.

Pleasure Boat Facilities

Boat launching facilities are available at Town Beach and Rundle Park. Beaches themselves are also often used for launching small

boats. This is probably partly because it is easier to launch small boats from the beach rather than from a ramp and also that, at times, demand for use of boat ramps is high enough for boat owners to use the beach as an alternative launching site.

According to "A Study into Recreational Boating Facilities within Western Australia" (PA Australia 1981), there appears to be a need to upgrade launching, mooring and berthing facilities in the Town of Geraldton. The Town Council also sees a need to construct more launching ramps, but due to the ocean and wind conditions which prevail in the area, Council believes the ramps should be developed in association with a protective groyne and marina. This proposal is also supported by the Geraldton Yacht Club.

Bathing and Beach Recreation

The port, railways and town centre are all located to the north of Point Moore. This pattern of development has left limited space for protected swimming beaches near the town. The only beaches of this kind are Town Beach and Page's Beach. With an increase in population and tourists, demand for use of protected beach areas will grow.

Mahomet's (Back)/Tarcoola Beach is the only high- quality surfing beach in Geraldton. The Geraldton Surf Club at Mahomet's Beach provides a focal point with most bathing activity taking place in the vicinity of the club. Pressure on the unstable dune areas will grow with increasing use of the beach in this area.

Rundle Park is a very popular recreation area. The beach combined with adjacent grassed parkland offers visitors a choice of activities, placing pressure on the area not simply associated with beach recreation.

Other beaches in the town do not have well developed carparks, backing parkland or facilities. With the limited number of beaches in Geraldton, demand for use of areas with the best facilities will greatly increase if all available beach areas are not developed to maximize their use-potential.

Offshore Waters Recreation

Geraldton's immediate offshore waters comprise only a small area and cater for a wide range of activities including fishing, skindiving, waterskiing, surfing and sailing. The popularity and numbers of people enjoying these pursuits are increasing with population growth in the town.

Commercial Fishing

Rock-lobster fishing is the major component of this industry. Scallop and wet-line fishing also operate out of Geraldton. These fisheries are not expected to expand in the foreseeable future.

Railway Operations

Railways transport a large number and volume of commodities and there is an obvious requirement for continuation of a rail connection to the port, to the existing railway freight depot at Geraldton and to the fertilizer works. There is also likely to be continued demand for the passenger rail service to Geraldton. Therefore, no alteration to existing arrangements is envisaged for the foreseeable future. That is, the single railway line to the port will remain as will the railway marshalling yards.

Port Operations

Geraldton has been operating as a port since the mid-1880s. Port facilities are extensive, however, use of the port is limited by the fact that the Geraldton harbour is situated over a limestone shelf. This shelf has limited development of the harbour as further depth improvement beyond the present 9.75 m would involve drilling and blasting of the complete channel approaches and reconstruction of existing berths.

Because of the port's position in the town, it is unlikely that substantial areas of additional land will be made available to the port. Currently, there is no demand to expand the port.

Vehicles Off Road

4WD vehicles are presently used in the coastal zone for recreation and to gain access to, and along, the beach. Problems associated with use of these vehicles in the coastal zone include: destruction of vegetation (notably on the foredune and hind dunes); creation of noise; and disturbance of a peaceful atmosphere by their presence. With increasing population and numbers of tourists, their use can be expected to grow.

Photo 3 Grey's Bay at Sunset

Assessment of Planning and Management Needs

Effective management of the coastal areas in Geraldton has not always been achieved in the past for a number of reasons including inadequate funding and limited expertise which has resulted in inappropriate decisions being made.

An important step in the planning process is the consideration of management issues.

Management Issues

Pedestrian Beach Access

Along much of Geraldton's coastline pedestrians cross freely between the beach and nearby carparks, tourist accommodation and houses. This has led to a gradual deterioration of vegetation resulting in erosion problems, and a corresponding degradation of the amenity of beach areas.

This situation is probably most noticeable at Mahomet's Beach. The area from the beach through to Mahomet's Flats was originally a large blowout. In 1980, management works were commenced with the intention of rectifying the problem of a foredune which is continuing to rise due to the accumulation of wind-blown sand from the beach. An attempt was made to regenerate dune vegetation by controlling pedestrian movements across the foredune, and trapping wind-blown sand with brush matting and para-web fencing. This management programme was partially successful. However, a reappraisal of the situation is necessary.

With the prospect of increasing use of beach areas in Geraldton, and in order to minimize management costs whilst providing maximum access, the design and location of beach access paths and fencing is very important.

Coastal Processes

As outlined previously, the Geraldton coast is continuing to adjust to the latest rise in sea level in that sand is still being supplied to the coast and the shape of sandy parts of the coast is changing in response to changes in sand supply and wave direction.

There are two major types of coast in Geraldton:

- eroding or stable sandy coasts cut into the seaward margin of the veneer of younger dunes
  that overlie the limestone basement.
- sandy coasts around beach ridge plains that project beyond the general trend of the coast.

This second type may be further divided into north and south facing flanks which are separated by sandy points. In general south facing flanks are eroding, or at best stable, whereas north facing coasts are accreting. It is evident from development of dunes, banks and beach ridge plains, that in the past, a lot of sand has been supplied, to the coast. It is also evident from the seagrass-covered banks, the vegetated dunes, and erosion of the beach ridge plains, that only a small amount of sand is being supplied to the coast from offshore. A possible exception is at Mahomet's Beach where dune building is continuing.

The planning and management implications of the preceding are:

- another phase of dune building is unlikely except at Mahomet's Beach;
- erosion of sandy parts of the coast is likely to continue;
- further growth of sandy beach ridge plains is likely with the consequence that southern beaches especially Grey's Beach will be liable to continued erosion.

Thus, from a planning point of view, it would be unwise to sanction any development on sandy coasts likely to be subject to prolonged erosion.

The wind and wave regime attempts to drive sand onshore, inland and to the north. From a management point of view it is important to realize that the sand on the beach is recycled during storms and during longer cycles possibly related to changes in climate, and that loss of sand from the active system will lead to coastal erosion. In this respect, maintaining an available store of sand behind the beach and preventing its loss inland is critical to shoreline stability. That requires a buffer to be set aside and managed to ensure that a well-vegetated zone capable of trapping all sand blowing off the beach is maintained and that the sand held in this zone is available for recycling during storms or during longer periods of erosion.

The fact that sand tends to travel to the north has further implications for the design and construction of any structures that protrude into the surf zone.

Soil Conservation

Beaches and sand dunes are dynamic systems and are responsive to coastal processes. As well as being sensitive to natural processes the immediate coast, is also subject to a great deal of pressure from man.

Soil erosion can be caused by:

- pedestrian pressure through coastal dunes;
- vehicles in dunes;
- urban develoment involving clearing and recontouring;
- natural causes.

The risk of degrading the environment visually and/or ecologically is great, and may lead to costly artificial erosion prevention and restoration measures. The problem at Sunset Beach is a good example of the extent of dune rehabilitation required following interference with the natural coastal system. All modifications to beach and dune systems need to be carefully planned and proper design parameters followed.

Landscape

Definition of open space within Geraldton's coastal zone is generally poor which leads to confusion about the function of each space. Indiscriminate vehicle tracks, informal parking areas, unused reserves of space together with insufficient planting to give some visual relief, all create an unattractive coastal setting and leave little character about the landscape with which locals and visitors can identify.

Vehicles Off Road

The destruction of vegetation, and noise problems are valid reasons why off-road vehicle use is looked upon with disfavour.

Probably there are three types of user: the one wanting access to the coast, another wanting to test his skills on the existing sandy tracks, and the one who simply cannot resist the opportunity of exploring a track off the main road.

Given the limited area of natural land in the Geraldton coastal zone, the use of vehicles off gazetted roads could severely damage coastal dune systems.

Foreshore Management

Management of vacant Crown land and unvested reserves in the study area is the responsibility of the Department of Lands and Surveys. Management of vested reserves is the responsibility of the authority in which the reserve is vested. As Lands and Surveys does not have adequate staff or funding to actually carry out day to day management of areas under its jurisdiction, that responsibility is left to the local authority.

That is, the Council must respond to local coastal management needs because of its role as the "on the ground" manager of land within the Town boundary. When areas that are not vested in Council require management action, the Council is not likely to be able to avail itself of adequate funding or legislative control for management of these coastal areas within the town.

Coastal Reserves

Narrow coastal reserves along the entire west coast were set aside for recreational purposes during initial survey of the State. Expansion of these narrow reserves is deemed necessary in order to:

- prevent private ownership of land susceptible to marine erosion;

- maintain a viable dune/vegetation system behind the beach to prevent inland encroachment of sand;

- ensure public access to the coast and space for back up facilities;

- preserve development options near the coast;
  preserve selected areas for landscape, views or scientific reasons.

  As the land in Geraldton is mostly developed, such an expanded reserve would only apply to land east of vacant Crown land adjacent to the coast, north of the present Sunset Beach residential area (See Map 3).

In general, this coastal reserve should include: any erosion-prone land; a sufficient width of dunes behind the beach to prevent inland transport of sand; as well as an area of land in which facilities can be provided to make use of coastal resources.

Chapman River

The study area for this coastal management plan include only that section of the Chapman River from the ocean to the road bridge. A suggestion was put forward, during the preparation of this plan, that the section of river to be included in the study area for this plan be extended to some point well to the east of the road bridge.

After some deliberation, it was considered that planning for management of the Chapman River would be best achieved by the preparation of a separate management plan for the river and its environs from the ocean to a least the Geraldton Town boundary. The scale of such an exercise is too large to warrant inclusion in the Geraldton Coastal Management Plan.

Pleasure Boat Facilities

A marina and associated launching ramps would certainly ameliorate the present lack of facilities. However, there is the difficulty of siting such a development within the limited protected waters at Geraldton. A suitable site would need to include adequate space for car and trailer parking, and hard stand area.

Zoning

Most of the study area is zoned as two "Environmental Areas", under the Geraldton Town Planning Scheme, namely:

Recreation, Governmental, Institutional (RGI) or Natural Bushland.

In areas zoned Natural Bushland, 100% of the site is to remain in its natural state, while in areas zoned RGI, there is no such limitation. Also, in Natural Bushland, public recreation is not usually a permitted use.

It is desirable for conservation purposes, that as much as possible of Geraldton's foreshore areas remain in a natural state. However, this would conflict with use of these areas for public recreation.

Wherever possible, foreshore areas should be zoned Natural Bushland. However, there is a problem with foreshore areas that presently have and are likely to continue to have, vehicle access and car parking, and which are zoned Natural Bushland e.g. the Point Moore area.

Where there is a need to provide vehicle and pedestrian access to the foreshore through areas zoned Natural Bushland, pedestrian paths, minor roads and small carparks could be allowed on a strictly limited basis. It would also be appropriate to alter the permitted uses in Natural Bushland to include public recreation.

Planning and Management Strategies

The purpose of management planning is to achieve a systematic and co-ordinated approach to planning, management and development that takes into account the natural environment as well as human uses and needs. The process involves consideration of an area's natural resources and its capacity to support particular uses as well as recognizing the potential impact of natural forces upon developments. Implicit in this approach is the allocation of appropriate uses to resources capable of sustaining those uses without degradation of the environment or the development.

Opportunities and Constraints

Geraldton has a variety of resources which offer opportunities for human needs whilst the nature of the resources limit, or constrain, the type and level of use that can occur without a loss of natural values or increasing management costs. Recognizing constraints as well as opportunities is vital if effective resource management is to be achieved.

Increasing development and use of the coastal zone in Geraldton without guidance to maximize benefits to all users and managers, may well lead to diminishing opportunities whilst constraints are at best maintained at the same level. This plan aims to guide future use of the resources in the Geraldton coastal zone by the allocation of appropriate use in the light of the constraints that exist.

Opportunities

- A large, prosperous town based on agriculture, commercial fishing, mining and tourism.
- A sound management infrastructure based on the Town of Geraldton.
- Good beaches - surf beaches to the south of Point Moore and quiet beaches in Champion Bay north of Point Moore.
- Attractive coastal scenery.
- A coastal dune system mostly stabilized by vegetation.
- A large rateable population.
- An existing port.
- A wide variety and large supply of tourist accommodation.
- Good fishing, especially in the reef zones.
- An attractive river and environs.
- Few apparent constraints in relation to biota and Aboriginal sites.

Perhaps the greatest opportunity is the fact that Geraldton has the time to plan use of its coastal zone in the light of experience of others.

Constraints

- Sandy parts of the coast (especially Grey's Beach and Sunset Beach), which are liable to major long-term changes in shoreline position as a result of marine erosion.

- Large areas of relatively fragile dune systems based on sandy soils with low fertility and dependant on vegetation for stability.
- Climate regime which limits vegetation type and growing season.
- Strong southwesterly winds in summer which make Geraldton, especially south of Point Moore, uncomfortable at times.
- Onshore winds which are capable of transporting sand inland.
- Storm waves and longshore currents which are capable of causing erosion and transporting sand along the coast.
- Fragile reef ecology.
- A pattern of development which has left limited areas of quiet beach near the town.
- Large seaweed build-up on some beaches.
- An open landscape easily degraded by poorly sited and designed developments.
- A sensitive river environment.
- The construction of groynes and breakwaters which interrupt longshore sediment transport and thus restrict replenishment of sand to beaches down current.

Perhaps the greatest constraint is that all resources are limited, and careful planning and management is required to ensure maintenance of resources and allocation of use in the best possible manner.

Goal

In view of the fact that there is time and space to plan for optimum benefits for all users of the coast; that the nature of the coast sets limits on the types and levels of use that can be accommodated; and the possibility of increased management and maintenance costs, the Council should adopt the following goal:

- to develop a long-term planning and management strategy which recognizes both the opportunities and constraints in the coastal zone so that allocation of resources to a wide range of recreational, urban, conservation and other development demands will occur in a rational and systematic manner so that management and maintenance costs are minimized.

Objectives

Council should adopt the following objectives to assist in achieving the above-mentioned goal:

1. Maintain terrestrial and marine ecosystems, coastal processes, landscape, groundwater and sea water quality wherever possible.

2. Integrate Coastal Management Planning into the overall Town Planning process so that the Geraldton Town Planning Scheme incorporates coastal management guidelines, aims and recommendations.

3. Provide a wide range of activities and developments in the coastal zone, consistent with the ability of the natural system to absorb the use.

4. Establish a priority system for development of coastal land.

5. Permit in the coastal zone, uses that are dependent on a coastal location.

6. Provide and ensure public access to the coast in such a way that minimal environmental damage takes place.

7. Preserve and manage places of scientific, cultural or recreational importance.

8. Encourage the development of adequate boating facilities to cater for the requirements of the boating public.

9. Encourage and cater for tourist development along the coast.

10. Develop a public education programme which will aid conservation of the area and assist public enjoyment of Geraldton's coastal zone.

11. To control development in such a way as to preserve the visual amenity of a sensitive environment.

12. To improve the existing landscape quality of the study area.

General Recommendations

In order to achieve its goal and objectives, the Council should follow the recommendations outlined below when addressing use pressures and management needs outlined in this coastal management plan.

Administration

Town Planning Scheme

In view of the Council's recognition of the importance and complexity of the coastal zone, the Geraldton Town Planning Scheme is to incorporate the goal, objectives and recommendations of this coastal management plan.

Time Framework

Any planned use of a coastal resource is to be considered in the light of long-term benefit or management implications, the long- term effect on natural ecosystems, landscape, coastal processes and ground and sea water resources. Short- and medium-term solutions to immediate problems and pressure are only to be allowed so long as long- term degradation or loss of the resource does not result. As a rule of thumb the planning scale should be taken as 100 years.

Priority Definition

Priority is to be based on a long- term plan in which future financial resources, perceived use pressures and the capacity of coastal lands has been considered rather than an ad hoc response to development pressures.

Funding

Each year a budget item is to be created providing for costs associated with the long-term management of resources in the coastal zone under Council's control. Applications for grants from appropriate agencies are to be made as the need arises in the light of the long-term plan.

Resource Allocation

Before any area in the coastal zone is allocated for a particular use, the proponent must demonstrate that the use requires a coastal location. Only uses which can be accommodated without degradation or increased maintenance costs are to be permitted, unless there is a benefit to be gained which overrides these costs.

Allocation of a resource should be on the best use of the best resource basis.

Resource Units

In order to provide a guide to potential resources and uses, the coastal zone is classified into three broad units based on importance to the ecosystem and its capacity to absorb development or use (See Maps 6 & 7).

These three units, which recognize both opportunities and constraints, provide a basis for planning and management recommendations and for resource allocation.

Development Unit

These are areas which can be developed or used with normal levels of caution and with minimal impact. The development unit generally refers to all land east of the management unit, excluding the preservation unit.

Allocation of land in the development unit, within and adjacent to the coastal zone is to be undertaken to avoid conflicts between incompatible use pressures and users.

Management Unit

These are sensitive areas with particular ecological and physical constraints or with special recreation or

development opportunities, the use of which must be controlled or managed. Developments in the unit are usually expensive (capital and maintenance) and special precautions must be taken to manage use and to avoid damage to the resource or to the development. Any proposed development is to be preceded by adequate planning.

Preservation Unit

These are areas vital to preservation of the ecosystems, which are intolerant of development and must be preserved and protected from most human activities.

Land Tenure

Alteration to the vesting or tenure of several areas of land would assist the management of coastal land within Geraldton.

Vacant crown land in the study area is either to be incorporated into adjacent reserves or to become new Crown reserves vested in the Town of Geraldton for Recreation and Foreshore Management.

All unvested reserves listed in Appendix 1, with the exception of reserve 5660, are to be vested in the Town of Geraldton (See Table 2).

Alteration to the vesting purposes of a number of reserves is recommended (See Table 1). The changes give recognition to more appropriate management control over these reserves.

Council should approach the Under Secretary for Lands seeking the recommended vestings.

Soil Conservation

- Every effort is to be made to ensure that sand in dune areas is stabilized beneath a vegetative cover and that minimal disturbance of natural areas takes place.
- Pedestrian access through dunes is to be controlled and restricted to formal pathways.
- Use of vehicles is not to be permitted in the management unit except along designated tracks.
- Destruction of vegetation and landform recontouring during urban development is only to be permitted after a programme of works has been agreed to by the Commissioner of Soil Conservation.
- The advice of the Commissioner of Soil Conservation is to be sought in the event that any soil erosion warrants implementation of the Soil Conservation Act.

Landscape Protection and Enhancement

Coastal landscape is a visual resource and susceptible to degradation, therefore every effort should be made to protect and enhance the landscape where necessary.

TABLE 1 PROPOSED ALTERATION OF RESERVE VESTING PURPOSES

Reserve	Present Purpose	Proposed Purpose
A27529	Esplanade & Recreation	Recreation & Foreshore Management
A20194	Esplanade & Recreation	Recreation & Foreshore Management
A2562	Esplanade & Recreation	Recreation & Foreshore Management
A29729	Public Recreation	Recreation & Foreshore Management
23177	Public Recreation	Recreation & Foreshore Management
20127	Recreation	Recreation & Foreshore Management
27553	Recreation	Recreation, River and Foreshore Management
36765	Recreation	Recreation & Foreshore Management
A20195	Park and Recreation	Recreation & Foreshore Management

TABLE 2 PROPOSED RESERVE VESTING

Unvested Reserves	Proposed Vesting
5660	Minister for Railways
A27322	Town of Geraldton
23177	Town of Geraldton
31671	Town of Geraldton
31658	Town of Geraldton
A2562	Town of Geraldton
5525	Town of Geraldton

Where possible, developments are to occur on the edge of spaces which are defined, for example, by hills, stable sand dunes and clumps of tall vegetation. Structures are not to be constructed in open spaces and are not to occupy central or highest points in any area. They are best located away from the foreshore and screened by shrub and tree planting (Suitable plant species are listed in Appendix 2).

Roads, tracks and paths are to be designed to harmonize with the landscape through which they pass. That includes the use of suitable materials e.g. limestone, gravel, pine log fences and so on.

New development within the study area that would have a significant visual impact shall be subject to design assessment and review. This process will be to ensure that development is consistent with maintaining maximum landscape quality in the coastal zone.

Public Education

A public education programme is to be developed that will encourage the best use of coastal resources. An important part of this education process is an interpretation of the natural features and processes of the coast so that local people and visitors may have a greater understanding of the coastal environment and an increased sympathy for its conservation. This would be best achieved by:

- including relevant information in a pamphlet which will also include details of roads, paths, boat ramps, fishing spots, caravan parks, beaches, picnic areas, lookouts, etc
- the inclusion in the pamphlet of information about the proper use of vehicles and boats in Geraldton's coastal zone
- the erection of well-designed signs at appropriate locations
- continuing contact between Council staff and the public

It would be advantageous in many respects to encourage the involvement of schools in both landscape improvements, e.g. tree planting, and dune protection and rehabilitation programmes. Such involvement would have a great influence on a large number of people, for the maintenance of environmental quality along Geraldton's coastline.
The Department of Conservation and Environment will offer every possible assistance in environmental interpretation.

Pleasure Boat Facilities

Protected Facilities - Marinas and Boat Launching Ramps.

Facilities that require protection by engineering structures are only to be permitted on sites:

- where there are relatively few other opportunities to use natural resources
- where established patterns of other use are not deeply entrenched
- where other works have altered the environment or provided other benefits that can be integrated with a new facility

Facilities that require protection are not to be permitted at sites:

- which have significant natural attractions or recreational opportunities
- where sediment movement is relatively high
- where there would be conflict with established users
- after research has indicated that the benefits associated with the facility do not outweigh the detrimental effects

The Public Works Department has chosen Town Beach as the most suitable site for the marina proposed for Geraldton.

This site has the following advantages:

- It is situated in an area of relatively quiet water
- Sediment movement in the area is low
- The Geraldton Yacht club is already established in the vicinity
- A beach will be retained and possibly expanded to the north of the existing northern groyne. This will provide space for bathing and surfcat launching
- The marina will ameliorate the present lack of pleasure boat facilities in Geraldton

The disadvantages of this site are:

- access to the proposed marina will be difficult
- a reduction in the area of beach available for bathing/surfcat launching
- a possible conflict with water skiing in the area

Unprotected Launching Facilities

Launching ramps are only to be permitted at sites:

- where there is suitable back-up room for carparks
- where there is a degree of natural protection
- where sand movements, both longshore and seasonal, are relatively small
- where beaching of craft can be achieved without affecting adjacent swimmers

Control of Vehicles Off Road

Rationalization of access will be an important programme in the implementation of the plan. The Town Council is to request that the Ministerial Advisory Committee on Off-Road Vehicles declare the whole of the study area a prohibited area, with the exception of designated roads, tracks and parking areas. The prohibited area is to be made subject to the provisions of the Control of Vehicles (Off-Road Areas) Act 1978.

Council is to inform the Committee that:

- Road registered and unregistered vehicles are creating environmental problems and are a danger to the public
- Council wishes to have control over vehicles in the area

. Town Council staff will be available to inform the public and enforce the provisions of the Act

Council will liaise with the Shire of Greenhough, which has undeveloped off-road land adjacent to the Town being used by vehicles, to reach a suitable arrangement to control vehicle movements along the coast.

Access Management

The maintenance of roads, carparks, paths, tracks and trails is the responsibility of the Town of Geraldton.

To prevent damage to vegetation and associated erosion, vehicle use of the coastal zone must be confined to designated roads and tracks. The provision of adequate access to popular points, not disregarding conservation and landscape values, will be achieved by the development of roads, tracks and paths.

Historic Sites

All sites of importance to Aboriginal people are protected under the Aboriginal Heritage Act 1972-1980. This Act provides for the preservation of places and objects customarily used by, or traditional to Aborigines. Where development will affect the natural environment it is important to seek advice as to whether significant Aboriginal sites occur in the area. Any development in Geraldton which is likely to disturb these sites will necessitate an application in writing to the Trustees of the WA Museum.

Historic shipwreck sites are protected under the Commonwealth Shipwrecks Act 1976. Their value should be recognized and their protection is imperative.

The remains of the old jetty off Town Beach are to be preserved in part, especially given the prospect of a marina sited in the area.

Chapman River

It is recommended that the Geraldton Town Council either prepare or request preparation of a management plan which will address future conservation and recreation needs along the river. This could be prepared in collaboration with the Greenough Shire since the river runs through land under its jurisdiction. The Department of Conservation and Environment would provide assistance in the preparation of such a management plan.

Zoning

Regulatory controls for the Natural Bushland zoning, under the Geraldton Town Planning Scheme, are to allow strictly limited vehicle and pedestrian access and carparks in these areas. All other controls for this zone will still apply. Given those provisions, some areas zoned RGI are to be rezoned as Natural Bushland. This will ensure that a large proportion of foreshore areas in Geraldton remain in a natural state.

Planning and Management Strategies for Specific Management Areas

Management Areas are defined by landform and/or present land use. Each contains a Priority Management Area (PMA) which is a section of the Management Area requiring particular attention (See Maps 6 and 7). Recommendations for specific areas will complement the coastal planning and management objectives, and the general recommendations outlined above.

Mahomet's/Tarcoola Management Area

This management area comprises the land south of Willcock Drive and Broadhead Avenue between Separation Point Caravan Park and the Town Boundary. It also includes reserve 20194, north of Willcock Drive (See Map 2).

The beach is wide and backed by a foredune ranging in height from high (10 m) to medium (4 m) along the coast from south to north respectively. With the exception of a short section, these dunes are stable and support a medium to thick vegetation cover. The exception mentioned above is a section of foredune between approximately 50 m south and 100 m north of the surf club. This area is naturally unstable and will continue to be so in the foreseeable future.

This management area contains a dense stand of Atriplex isatidea which dominates foredune vegetation cover from the southern Town boundary to just north of the Geraldton surf club. Near the surf club Scaevola sericophylla appears in medium density on the fore and hind dune. At the west end of Mahomet's Beach S. sericophylla is marginally dominant with A. isatidea and Threlkeldia diffusa also common.

Management Issues

Priority Management Area - Mahomet's Beach
Numbers refer to numbers on Map 8.

1. Post and wire fence is in poor condition and allows access across it to the beach (See photograph 4).

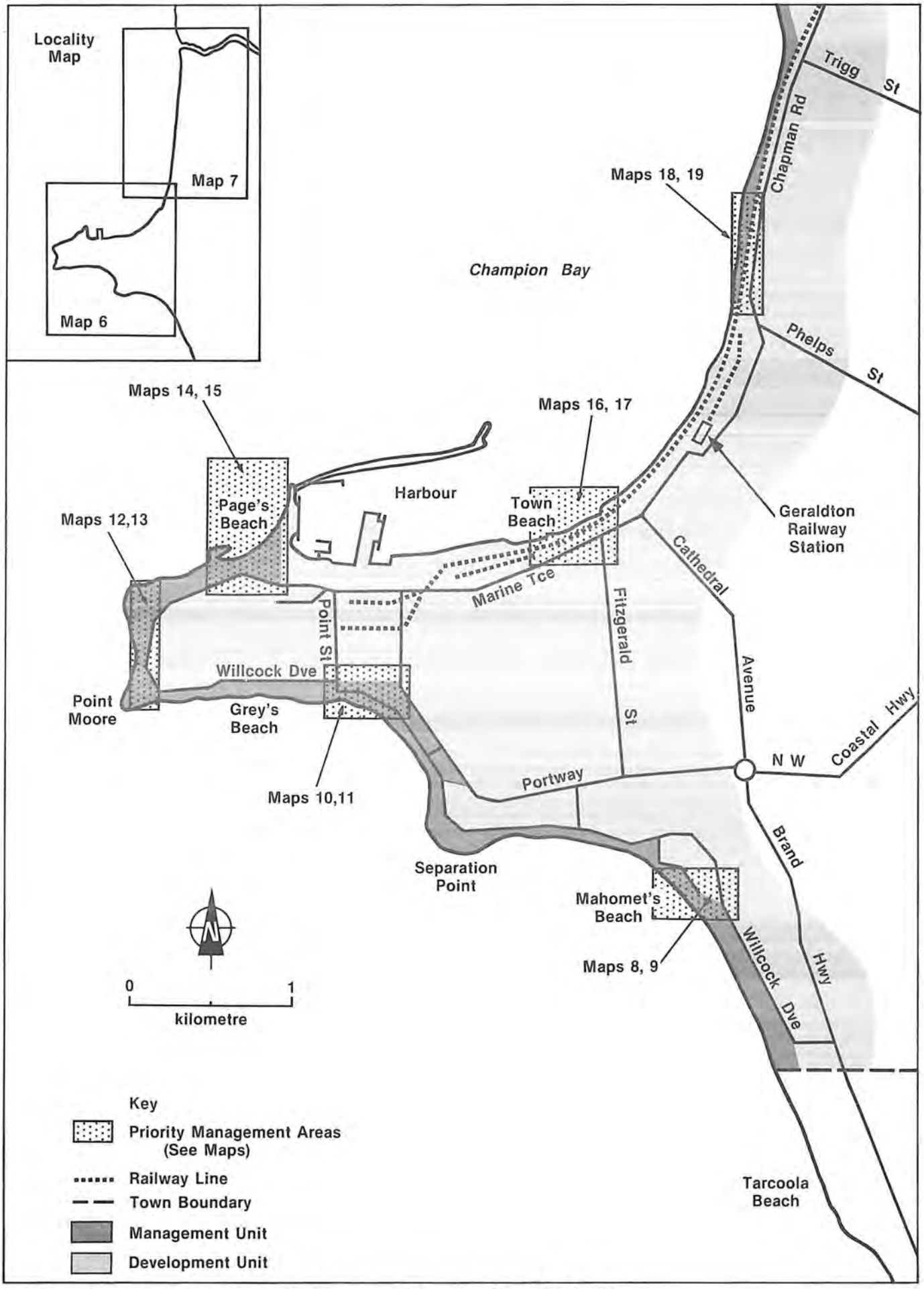
2. No landscaping in the car park and especially no shade trees (See Photograph 5).

3. This car park is too large a car parking unit (See Photograph 5).

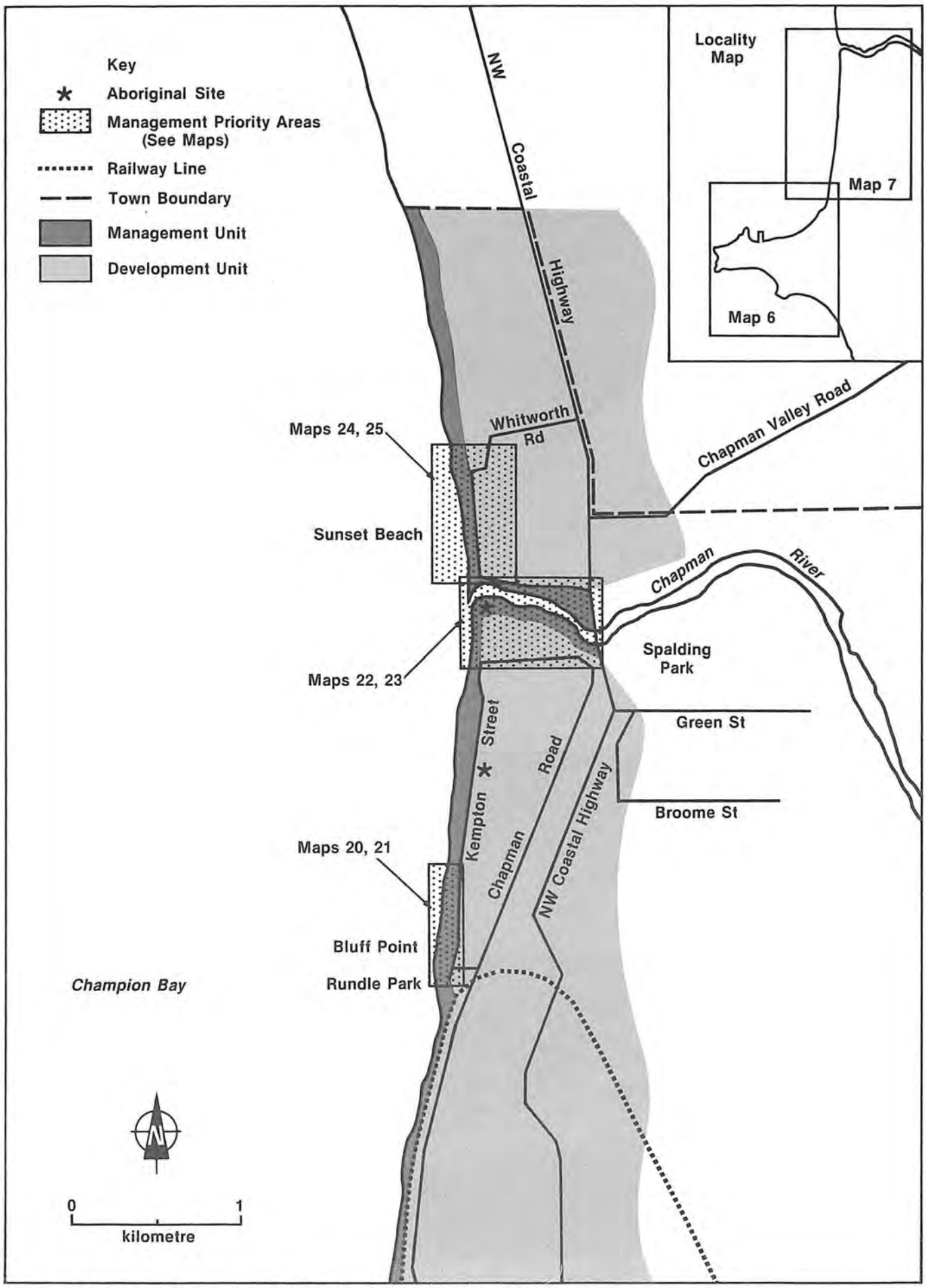
4. Access paths and fences to the beach are being overlain with sand.

5. Vegetation on the foredune slope facing the beach is still too far up slope and therefore there is no natural sand-trapping device over this bare area (Photograph 6).

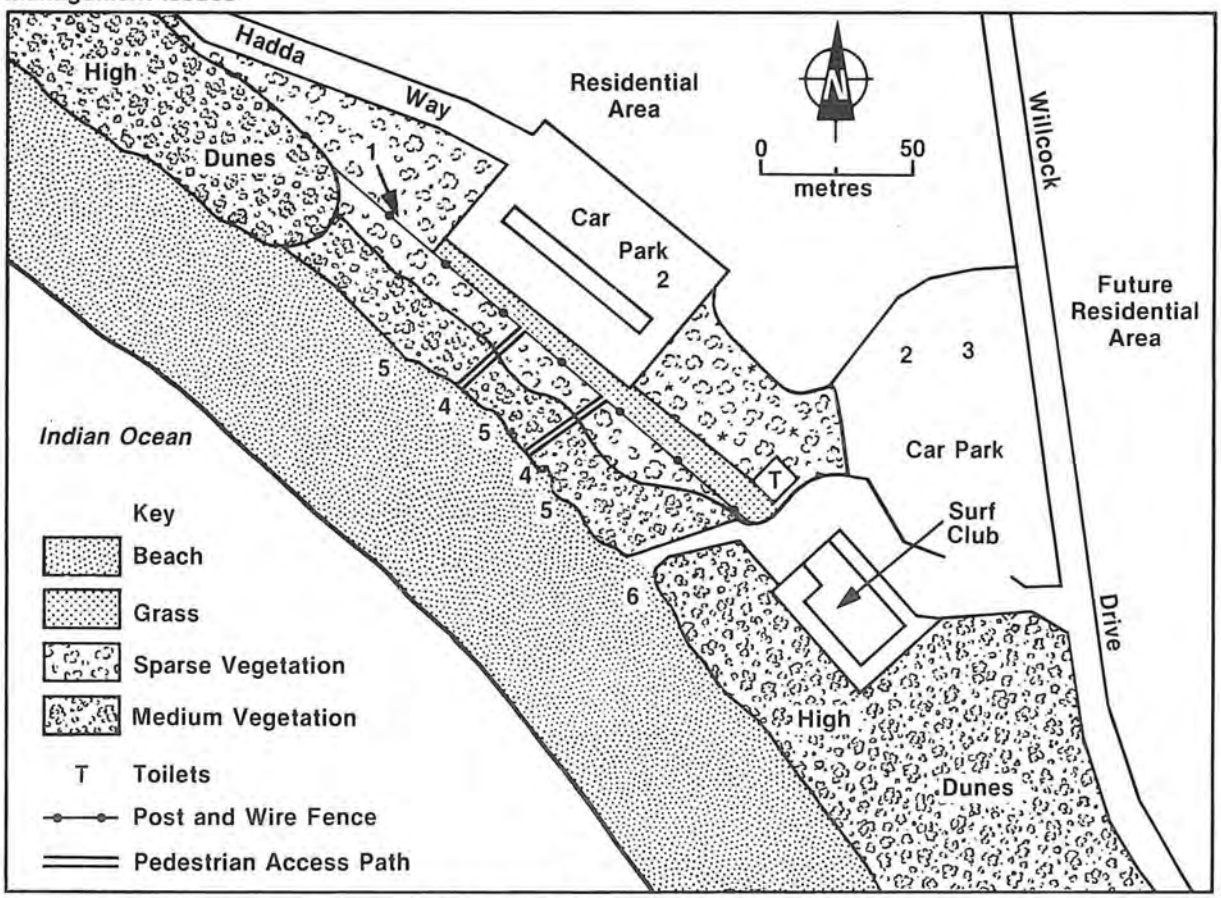
6. Sand is building up at the beach entrance of the vehicle access track.



Map 6 Resource Units and Priority Management Areas — Geraldton South



Map 7 Resource Units and Priority Management Area — Geraldton North



Map 8 Priority Management Area — Mahomet's Beach

Photo 4 Mahomet's Beach - dune rehabilitation adjacent carpark

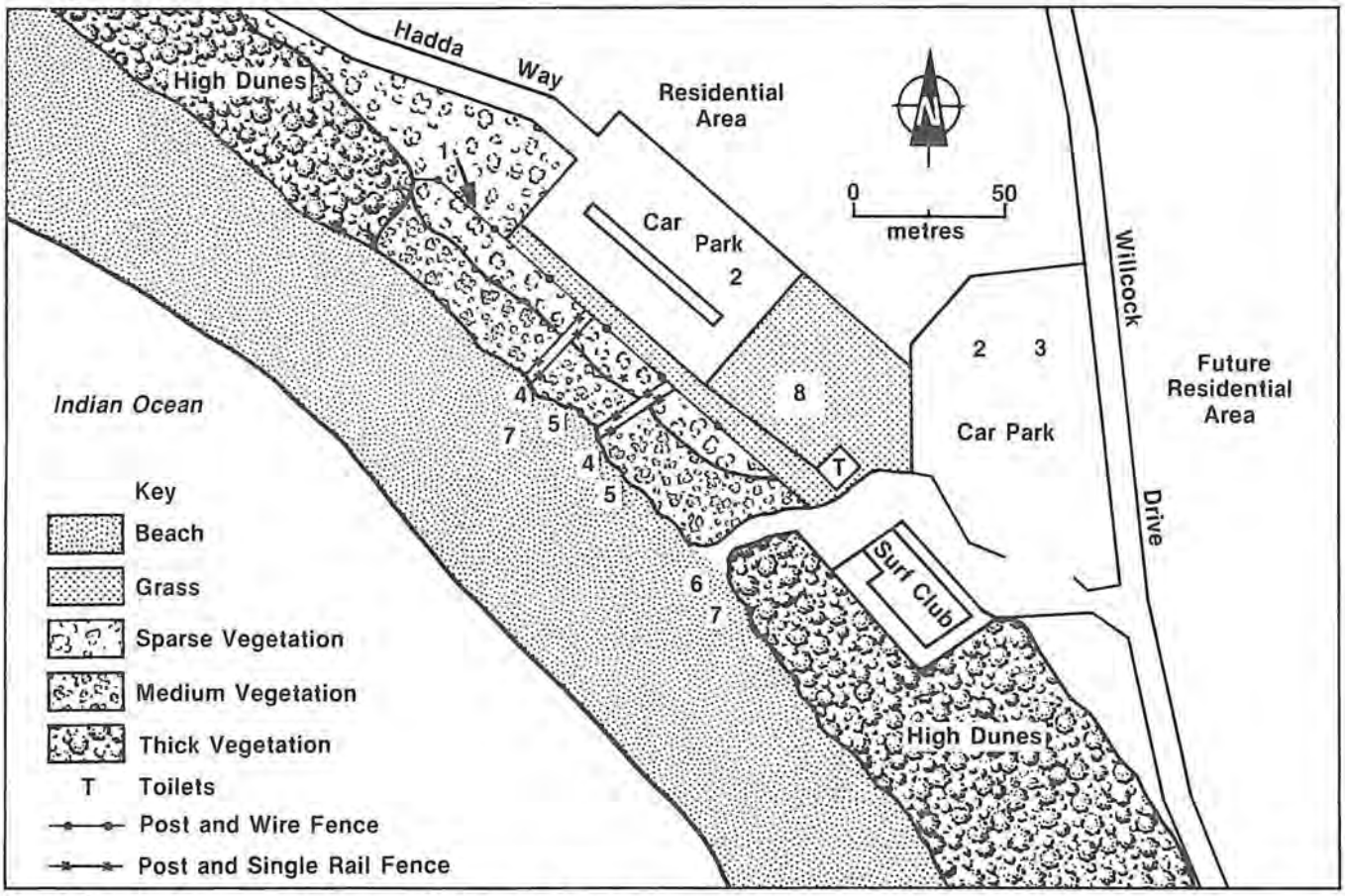
Photo 5 Mahomet's Beach - carpark

Photo 6 Mahomet's Beach - dune rehabilitation adjacent beach

Management Recommendations

Priority Management Area - Mahomet's Beach
Numbers refer to numbers on Map 9.

1. Repair or replace the post and wire fence to protect dune vegetation.



Map 9 Priority Management Area — Mahomet's Beach

2. Landscape the carpark, at least with shade trees (See Appendix 2).

3. Divide the single large carpark unit into smaller units (two units at least).

4. Replace the existing fences bordering access paths with moveable post and single rail fences so that these may be pulled up as sand accumulates on paths.

5. Brush-mat to the base line of beach-facing vegetation to trap sand and allow revegetation of bare area above the general base line.

6. Brush-mat to the base vegetation line south of the vehicle access track to trap wind-blown sand passing in front of the track entrance.

7. Remove sand from the backshore as necessary once dune vegetation has established along the base line.

8. Level, grass and plant trees in this area between the carparks.

Other Recommendations

- Erect low signs reading "Landscape Protection Area" adjacent to the west of Willcock Drive along the section of Atriplex dune vegetation at Tarcoola/Mahomet's Beaches.

- Vacant Crown land in this management area (shown in Map 2) is to become part of reserve 20195, vested in the Town of Geraldton for Recreation and Foreshore Management.

- All land to the west of Willcock Drive/Hadda Way that is presently zoned RGI except reserves 31671 and 30063 (See Map 2), is to be rezoned Natural Bushland.

Grey's Beach/Separation Point Management Area

This management area comprises the land to the south of the existing and proposed Willcock Drive alignment between the lighthouse and the east side of the Separation Point caravan park. It also includes reserves 25439, 31658, 20194, and a short section of vested and vacant Crown land to the west of Portway between Shenton Street and the western edge of the caravan park (See Map 2).

Grey's Beach is narrow and receding. The recession has led to the collapse of a section of the original Willcock Drive west of Point Street. This road has been relocated further to the north and an extension of this new alignment is proposed to link up with Portway (See Map 10).

The foredune height ranges from high (12 m) to medium (4 m) with the highest located just to the east of Point Street. Foredune vegetation cover is medium to thick. Along Grey's Beach S. sericophylla dominates the eastern end of the coast on the foredune. A. isatidea becomes marginally dominant in the centre of the bay coast and S. sericopylla again dominates on the west bay coast with A. isatidea and T. diffusa common.

Management Issues

Priority Management Area - Grey's Beach
Numbers refer to numbers on Map 10.

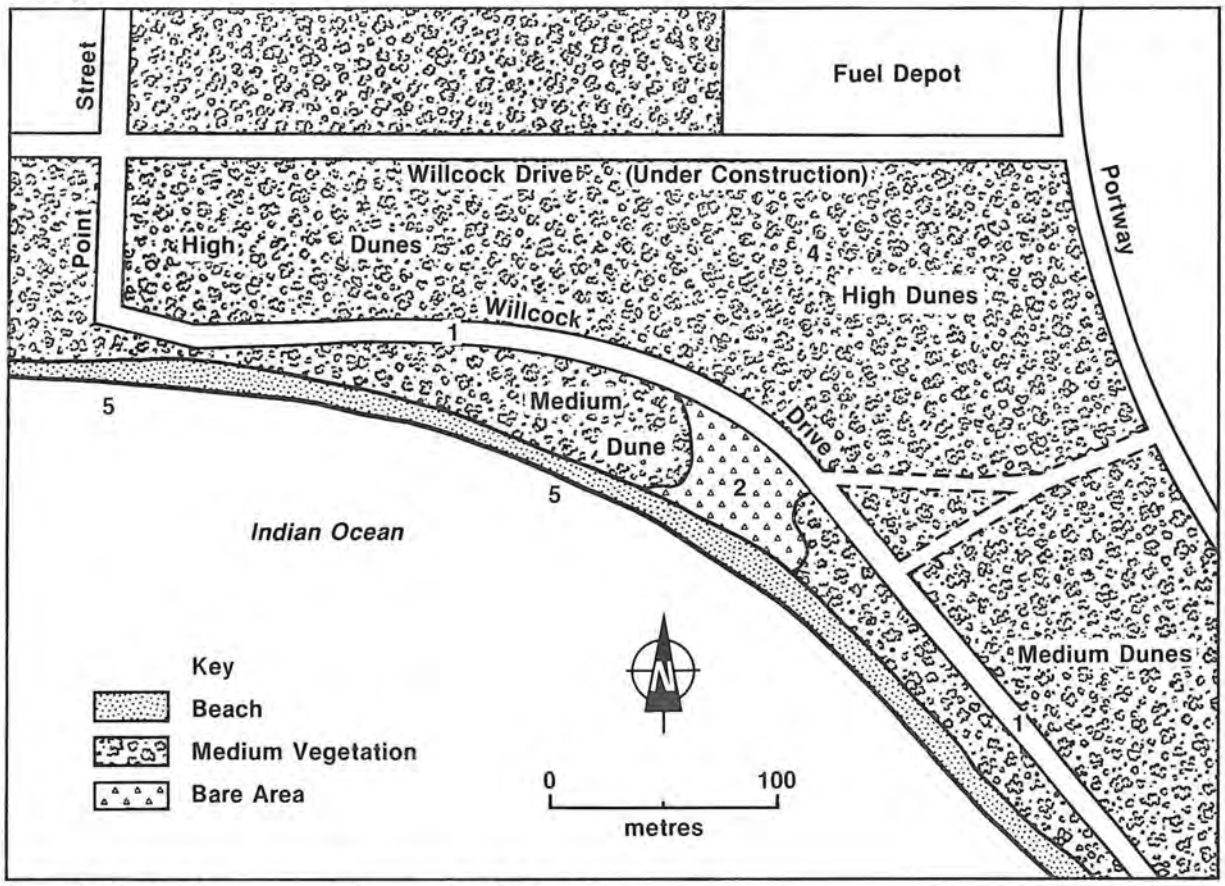
1. Willcock Drive between Point Street and Separation Way has been ripped up.

2. This bare area detracts from the visual quality of an almost continuous foredune around the bay (Also see Photograph 7).

3. Vehicles using this track are damaging dune vegetation.

4. Once the extension of Willcock Drive from Point Street to Portway is completed, beach access around the bay will be limited to Separation Point and near Point Moore.

5. Receding shoreline.



Map 10 Priority Management Area — Grey's Beach

Photo 7 Grey's Beach - vehicle beach access

Management Recommendations

Priority Management Area - Grey's Beach
Numbers refer to numbers on Map 11.

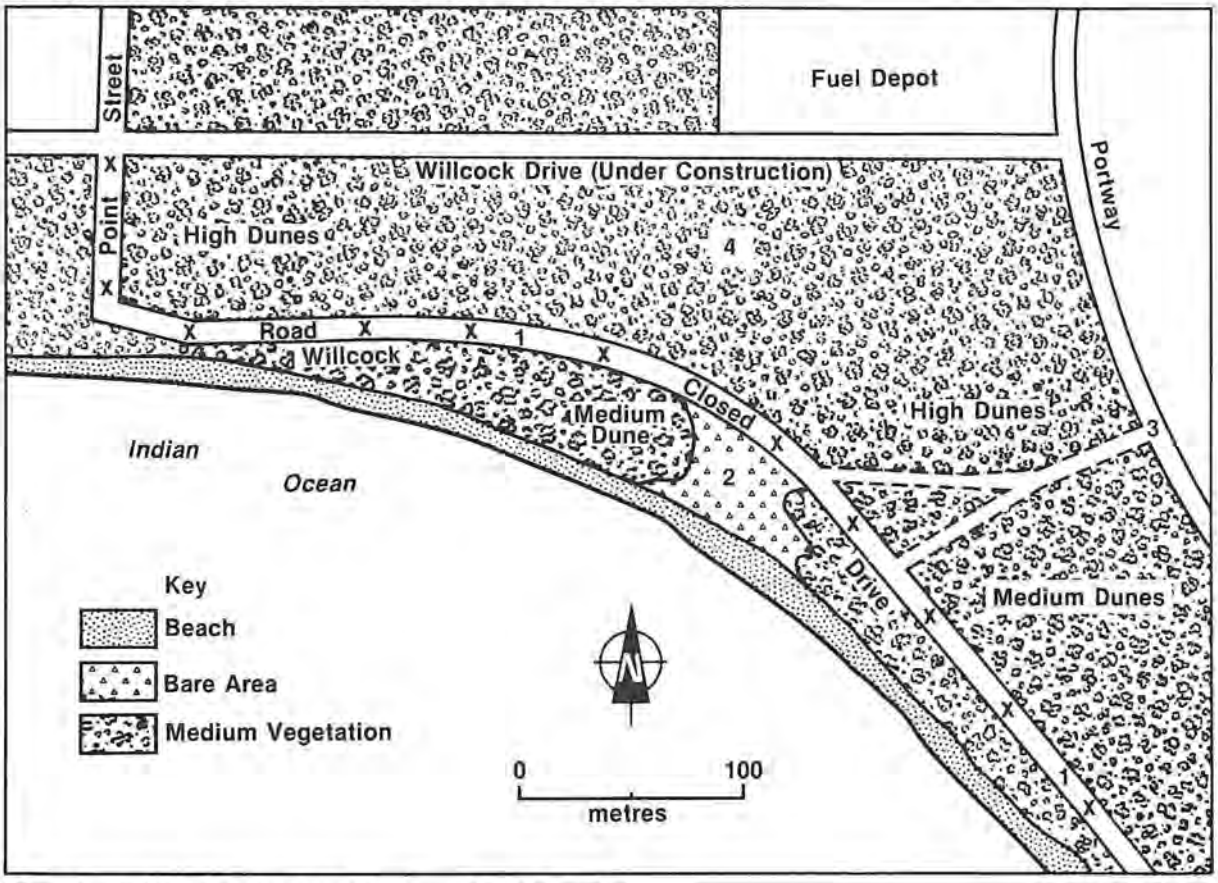
1. Willcock Drive is to be closed at Separation Way and the old road allowed to revegetate.

2. This bare area brush-matted, especially at the top of the foredune face, and allowed to revegetate.

3. This access track is to be closed at Portway to prevent further dune damage.

4. Vehicle beach access is not to be provided through the high dunes between Point Street and Separation Way; alternative access to the south and to the west of this area is advised.

Management Recommendations



Map 11 Priority Management Area — Grey's Beach

Other Recommendation

. No facilities are to be constructed to the south of Willcock Drive/Portway between Separation Way and Point Moore.

Point Moore Management Area

This management area comprises land to the west of Willcock Drive between Page's Beach and the southern edge of the lighthouse land and includes a large portion of reserve 2562. The management area also includes the lighthouse land as well as holiday residences just to the north of the lighthouse (See Map 2).

To the west of Willcock Drive, reef flats and a shallow bay are backed by a wide accreting beach and low (2 m) dunes. Vegetation cover on the low dunes is generally sparse with denser vegetation towards Willcock Drive. Around Point Moore to Page's Beach S. sericophylla and Olearia axillaris together with Spinifex longifolius are all common on the low dunes.

Management Issues

Priority Management Area - Point Moore
Numbers refer to numbers on Map 12.

1. The unformed carparks, especially the northern one, are in poor condition. The northern car- park is too close to the beach.

2. Vehicle access to the beach and low dunes is uncontrolled.

3. The access track is in poor condition (See Photograph 8).

4. Many vehicle tracks traverse the land west and northwest of Willcock Drive.

5. This area is devoid of vegetation and sand is being churned up by vehicles.

6. This historic lighthouse must be preserved.

Management Recommendations

Priority Management Area - Point Moore
Numbers refer to numbers on Map 13.

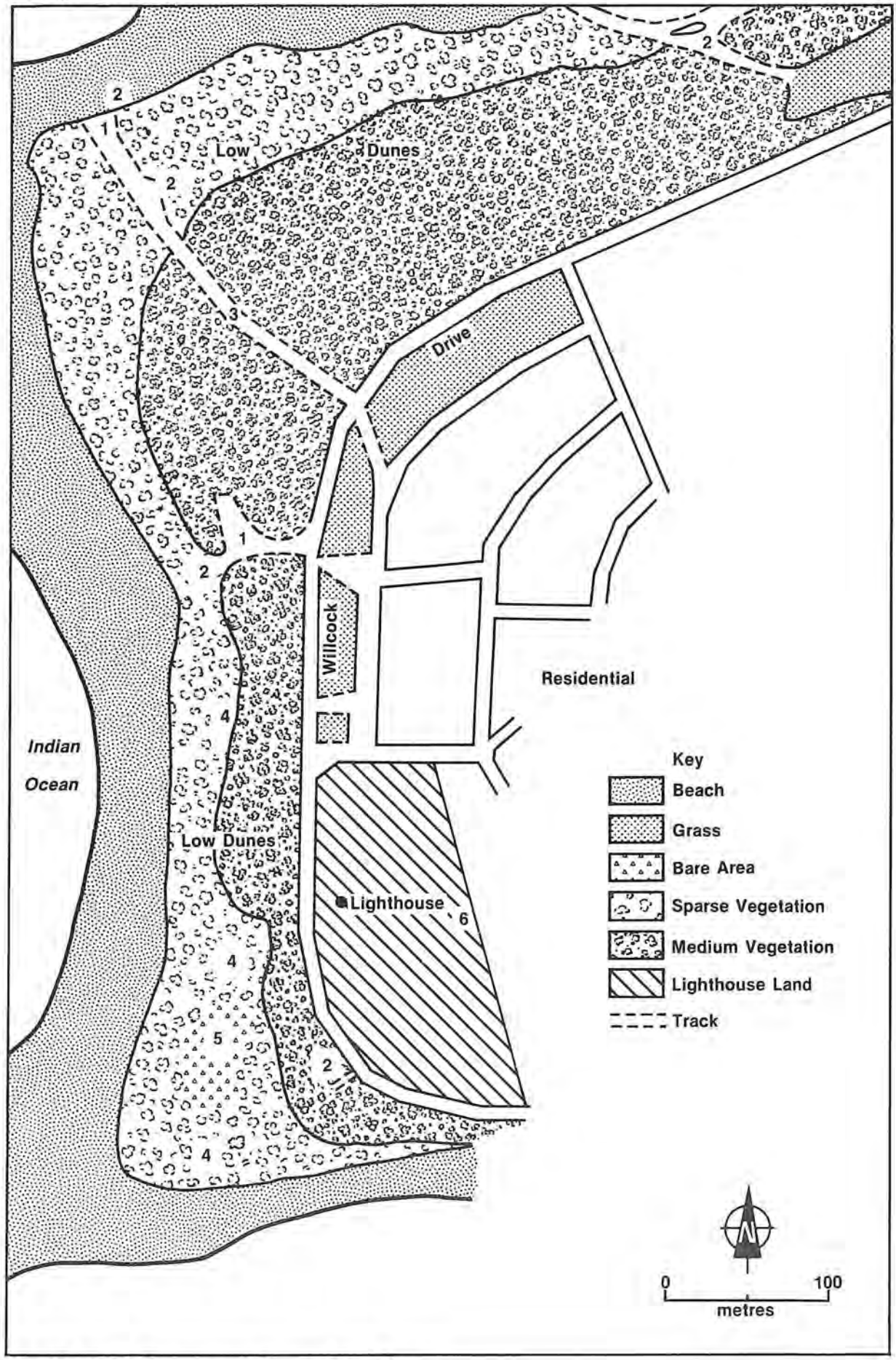
1. Upgrade the carpark and move the north end of it back 20 metres inland from its present position adjacent to the beach.

2. Close vehicle access to the beach and low dunes.

3. Provide pedestrian beach access paths.

4. Upgrade this vehicle access track with at least a gravel or limestone base.

5. Erect post and wire fencing to protect dune vegetation.



Map 12 Priority Management Area — Point Moore

Photo 8 Point Moore - vehicle beach access

6. Rip this bare area and allow to revegetate. Fence in if human interference continues.

7. Upgrade this carpark within the present parking area.

8. Erect low signs with the inscription "Landscape Protection Area".

Other Recommendations

. No buildings are to be constructed to the seaward side of Willcock Drive.

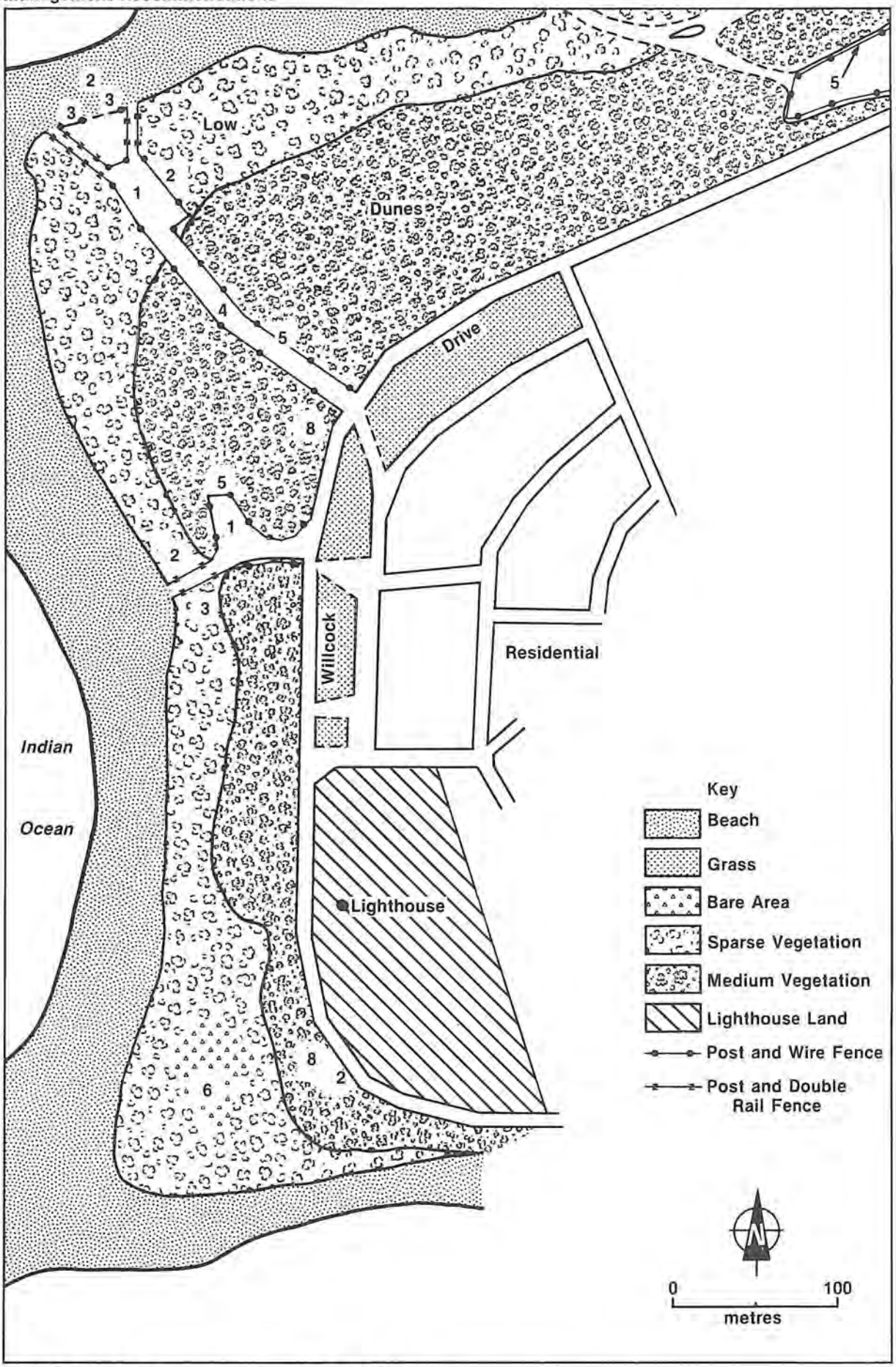
. Land west of Willcock Drive that is presently zoned RGI (See Map 2), is to be rezoned Natural Bushland.

Page's Beach Management Area

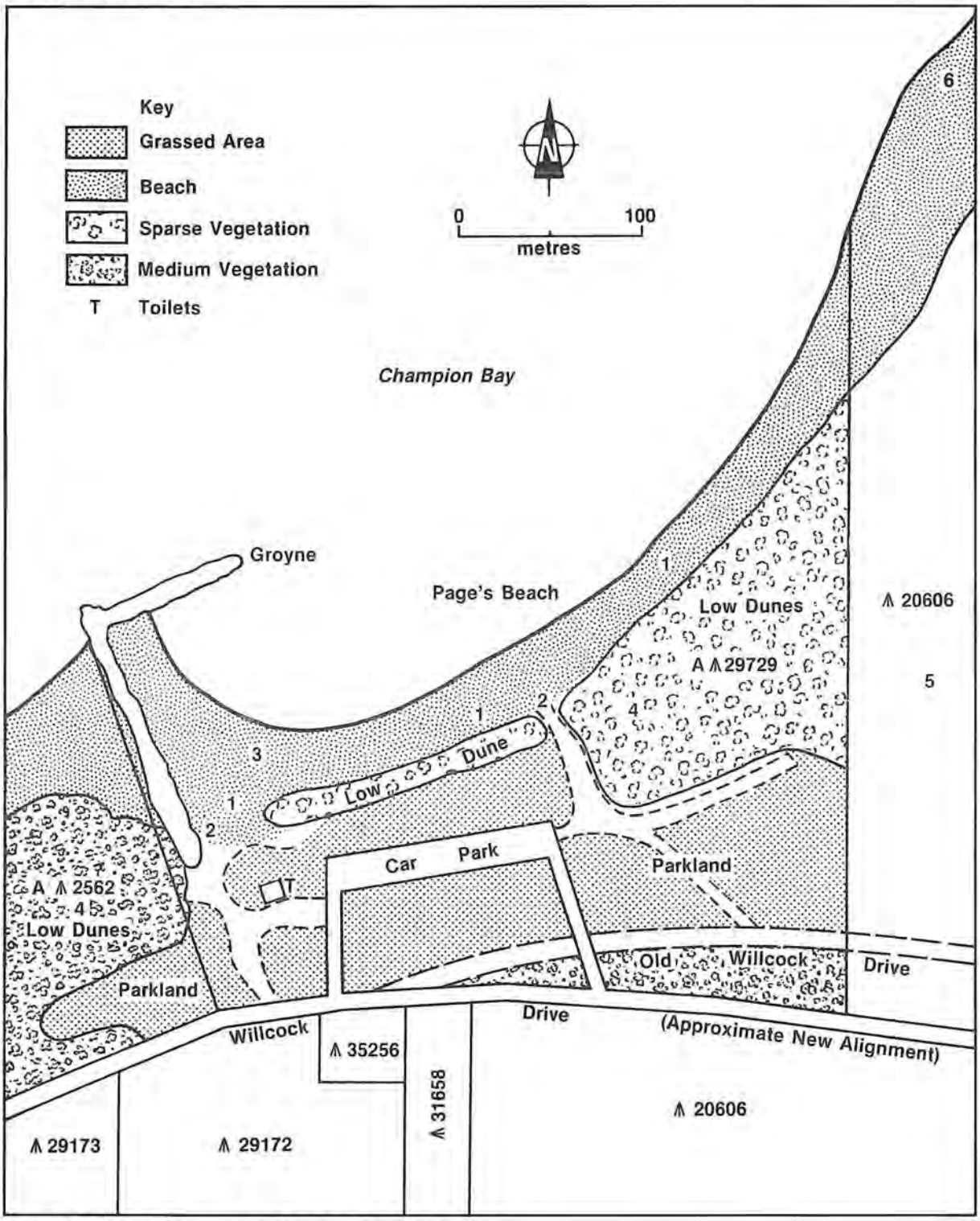
This management area comprises all land to the north of Willcock Drive between the Page's Beach groyne and the fishermen's harbour groyne. It includes all of reserve 29729 and part of reserve 20606 (See Maps 2 and 14).

To the east of the management area the land is occupied by the commercial fishing industry. The realignment of Willcock Drive further south in this area has resulted in an extension of the Fishery's back-up facilities as well as an extension of the land backing Page's Beach.

Page's Beach is backed by low (2 m) dunes with a generally sparse to medium vegetation cover. To the west only the foredune remains while to the east are low dunes inland up to 100 m from the



Map 13 Priority Management Area — Point Moore



Map 14 Priority Management Area — Page's Beach

beach. On the foredune and hind dunes Olearia axillaris and Spinifex longifolius are common. Grassed parkland backs these dunes and the area contains a large number of established trees.

Management Issues

Priority Management Area - Page's Beach
Numbers refer to numbers on Map 14.

1. Uncontrolled pedestrian beach access.

2. Vehicle access to the beach is uncontrolled (See Photograph 9).

3. Vehicles park on the beach during summer.

4. Vehicle access to these low dunes is uncontrolled.

5. This light industrial area detracts from the visual amenity of the Page's Beach area.

6. Large amounts of sand are being removed from this end of the beach by the Geraldton Port Authority.

Photo 9 Page's Beach - vehicle beach access

Management Recommendations

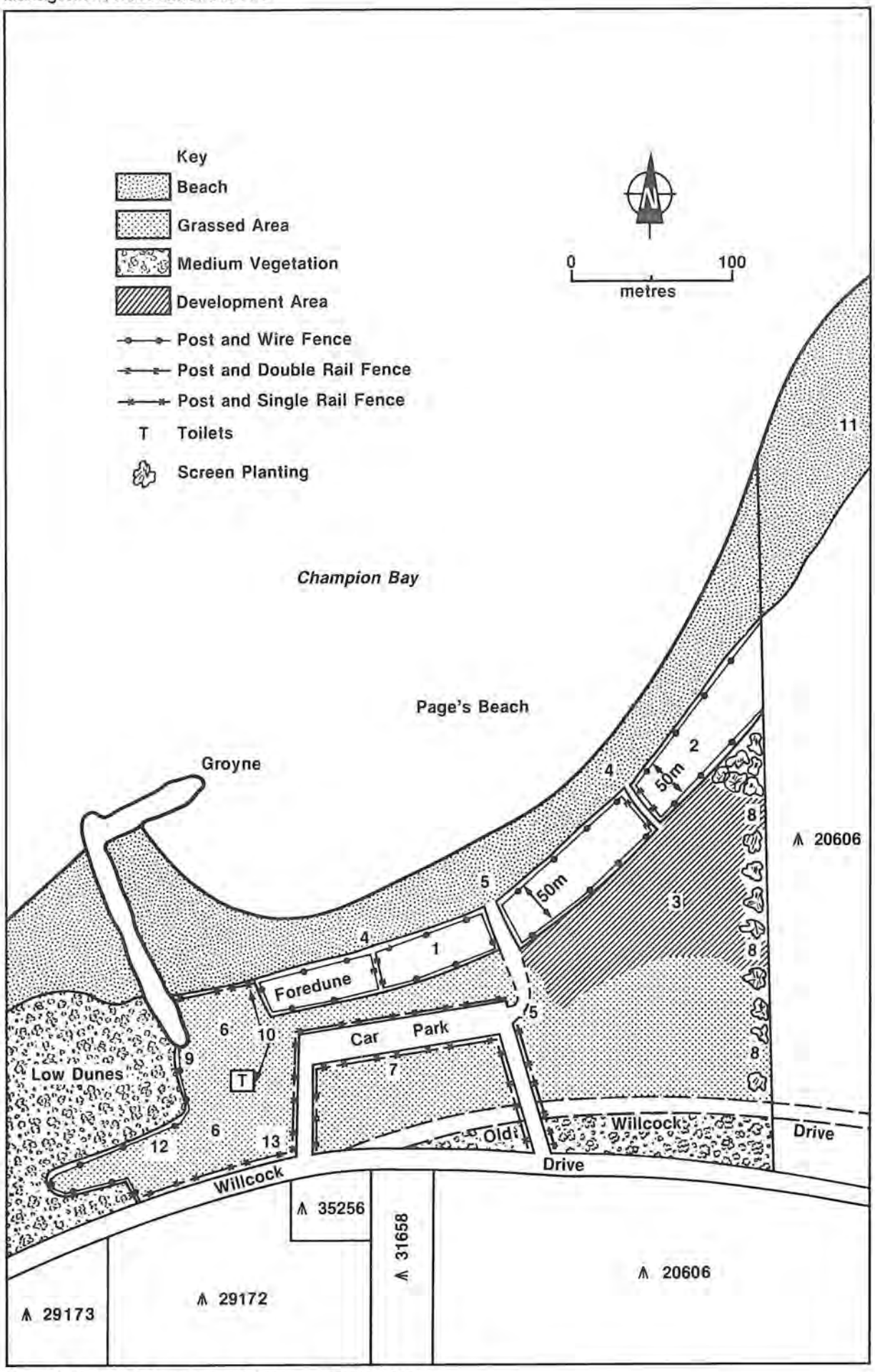
Priority Management Area - Page's Beach
Numbers refer to numbers on Map 15.

1. Fence in this foredune to its greatest present width.

2. Fence in the area of low dunes to the northeast of the carpark, at least 50 m in from the beach.

3. This area is allocated for parkland development.

4. Provide pedestrian beach access paths bordered by post and double rail fences.



Map 15 Priority Management Area — Page's Beach

5. Provide limited vehicle beach access, to be used by council workers, hire operators and horse trainers but not for public use.

6. Level and grass this area. No vehicle access is to be permitted. Border the road, beach and car park access road with post and single rail fences. Border the low dunes to the west with post and wire fencing.

7. Any extension to the carpark is to be southwards i.e. away from the foredune.

8. Tree and shrub planting to screen light industrial area (see Appendix 2).

9. Tree planting to provide shade (see Appendix 2).

10. Provide formed pedestrian paths to the beach and toilets/showers.

11. As long as the beach is retained, removal of sand from this area by the Geraldton Port Authority should follow the present arrangements.

12. Close vehicle access to the low dunes and beach.

13. Close vehicle access to the grassed area.

Town Beach/Harbour Management Area

This management area comprises, firstly all land vested in the Geraldton Port Authority (ie. reserve 20606), except that area of 20606 included in the previous management unit. Reserve 20606 south of Marine Terrace is undeveloped while to the north it is virtually totally developed.

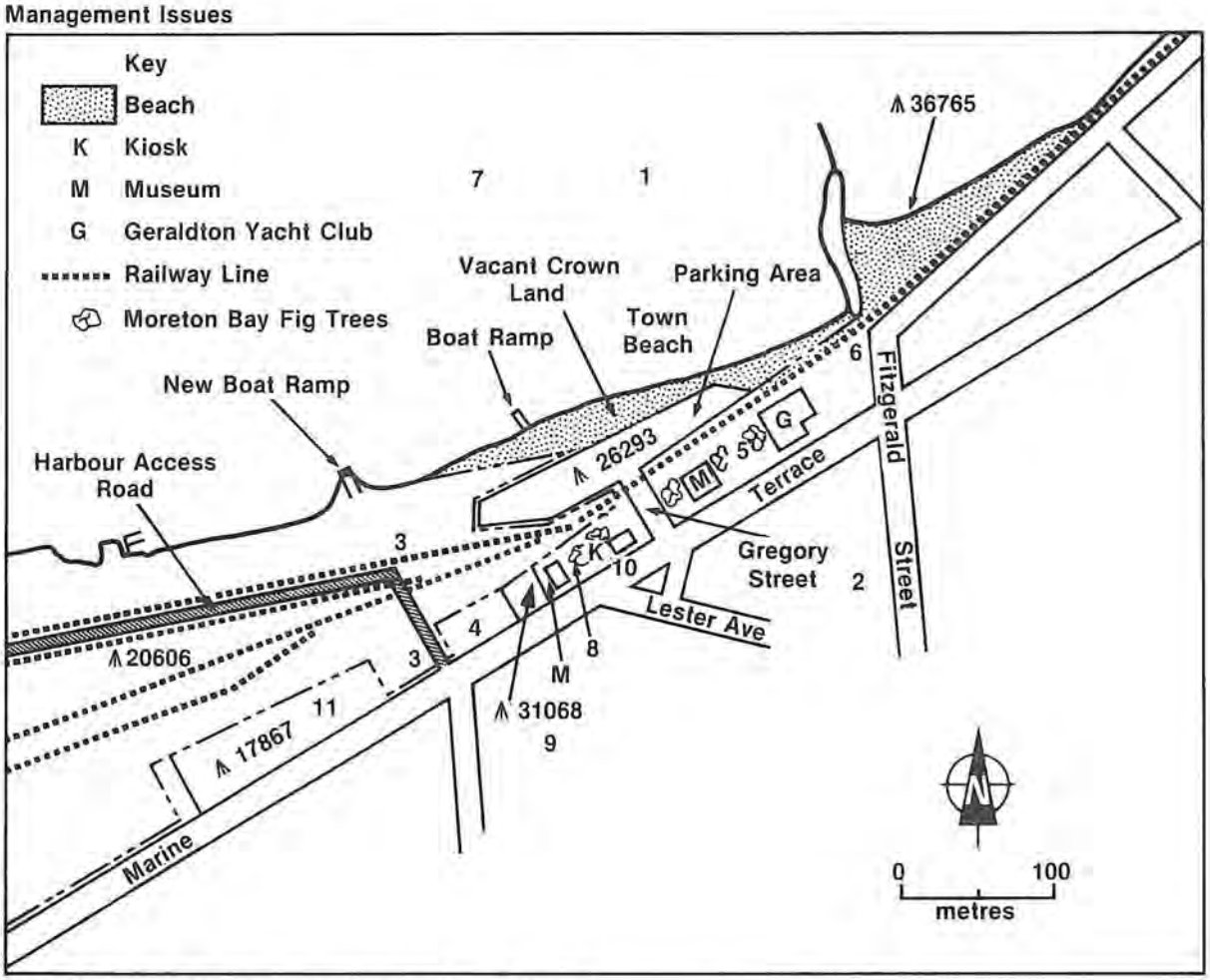
Secondly the management area comprises the small beach to the east of the groyne opposite Fitzgerald Street and the beach to the west of this groyne as far as reserve 20606 i.e. Town Beach. Also included in this management area is a strip of buildings north of Marine Terrace between Fitzgerald Street and Cunningham Street and parking area adjacent to Town Beach (See Map 2).

Management Issues

Priority Management Area - Town Beach
Numbers refer to numbers on Map 16.

1. A marina is proposed for Town Beach and two plans are presently being assessed. Town Beach has been chosen by the PWD as the most suitable site along the Geraldton coastline for the development of a marina.

   With increased use of the Town Beach area associated with a marina sited here, access to the area needs to be reassessed. The options include the following:



Map 16 Priority Management Area — Town Beach

2. With increased use of **Gregory Street** for marina access, congestion of vehicles will hinder pedestrian movements in the area as well as cause traffic problems in Marine Terrace. Making this a one-way access road, in conjunction with a suitably sited one-way access in the opposite direction, would improve traffic flow through the area and decrease the number of vehicles passing across the pedestrian promenade between the museum buildings.

3. Access to the proposed marina area **via the harbour access road** would congest this important port access route. The Geraldton Port Authority is concerned to maintain its development options and any increased use of access around the harbour area that is not associated with harbour business will mar efficient port operations.

4. Access via a road constructed **through the service station block.** There would be no interference with pedestrian movements by vehicles moving through this area. As a one-way entrance or two-way access road this option could cause traffic congestion in Marine Terrace.

5. Access **via a road between the eastern museum building and the Geraldton Yacht Club building** is restricted by the presence of classified Moreton Bay fig trees between these buildings. A road could be constructed but it would come very close to the trees. Certainly a two-way access would be inappropriate here.

6. Access via the **north end of Fitzgerald Street.** Access through this area will pass between yacht club facilities. Also Marine Terrace east of Fitzgerald Street is to become a pedestrian mall. Marine Terrace is then to be diverted to the north along Fitzgerald Street, then east along the foreshore road. A one-way entrance or two-way access from this corner may lead to significant congestion around this corner.

7. The remains of a jetty built from Town Beach in the 1850s, are present off shore and are of historical significance.

8. The Moreton Bay fig trees are classified by the National Trust.

9. The Mission to Seamen building is of historical significance and is not classified by the National Trust.

10. "Sail Inne" is a food outlet located in the promenade between the museum buildings and has recently been extended. Its location has been questioned by various bodies with interests in maintaining the character of the area.

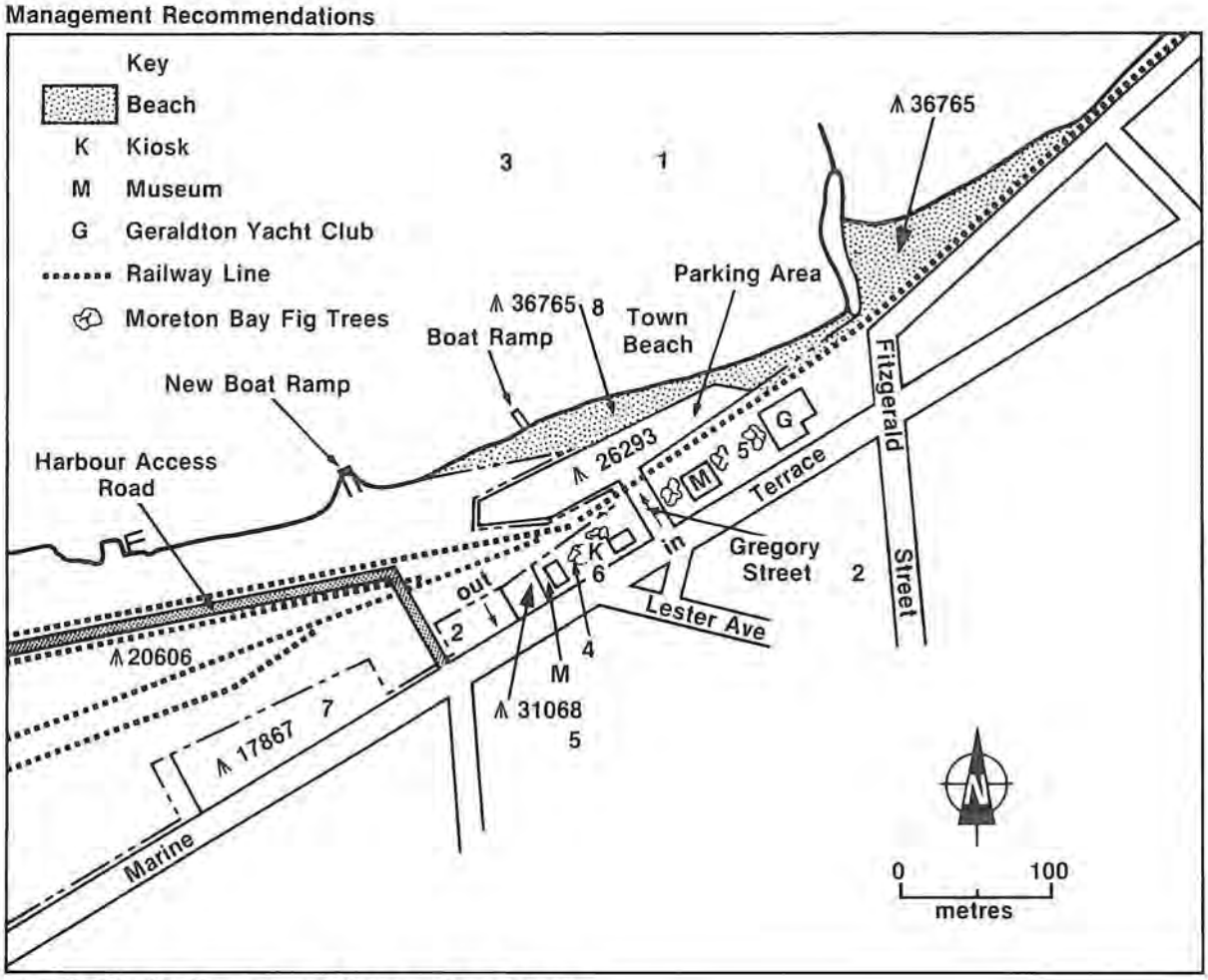
11. Reserve 17867 (Shepherd's Park), vested in the Town of Geraldton, has been swapped for an area of beach within reserve 20606, vested in the Geraldton Port Authority. That beach area is the site of the new boat ramp facility. It is unfortunate that this parkland will be removed from public use. The parkland is to become a site for further port facilities.

Management Recommendations

Priority Management Area - Town Beach
Numbers refer to numbers on Map 17.

1. A marina is an appropriate solution to Geraldton's need for pleasure boat facilities. The siting of a marina at Town Beach is a logical choice, given the limited area of quiet water along the Geraldton coast.

2. The choice of the most suitable access system for a marina at Town Beach is difficult. Given the options outlined above, a one-way entrance and exit would appear to be the most suitable access arrangement. Following from this, it would not be suitable to use options 3, 5 and 6 above.



Map 17 Priority Management Area — Town Beach

That, therefore, leaves the present access through Gregory Street and the option of going through the service station area. Given that scenario, then the better arrangement would be to enter via Gregory Street and exit through the service station area. This arrangement would not result in vehicles queuing across the pedestrian promenade to leave the Town Beach area and would remove any problems of traffic congestion in Marine Terrace with two entrances for harbour and marina. Some rearrangement of traffic lanes along this section of Marine Terrace may be necessary.

3. The remains of the historic jetty are to be removed and preserved in part, before any development takes place at this site.

4. Protection of the Moreton Bay fig trees is imperative.

5. The Mission to Seamen building should be classified by the National Trust and eventually incorporated within the museum promenade precinct.

6. Extensions to the Sail Inne have been designed in a manner which makes the building more in sympathy with its surroundings than previously. However, the long-term

wisdom of siting this large food outlet in its present location must be seriously questioned.

7. If possible, some other arrangement of land compensation should be sought so that Shepherd's Park may remain public open space.

8. This area of vacant Crown land is to become part of reserve 36765, which is to be vested in the Town of Geraldton for Recreation and Foreshore Management.

Railways Management Area

This management area comprises railways land to the west of Chapman Road/Marine Terrace between Fitzgerald Street and Trigg Street. Included in the management area are the marshalling yards, railway station, adjacent light industrial and commercial area, and in the north, a narrow strip of undeveloped land (See Map 2).

A rock wall extends along the western edge of this unit between Fitzgerald Street and Phelps Street. To the north of this management area low (2 m) dunes are present with a sparse to medium vegetation cover. Scaevola sericophylla dominates, with Olearia axillaris, Scaevola crassifolia and S. spinescens, Threlkeldia diffusa and Acacia rostellifera all common. A large area, mostly of gravel, backs the narrow beach just to the north of the marshalling yards.

Management Issues

Priority Management Area - Railway Reserve
Numbers refer to numbers on Map 18.

1. A narrow remnant foredune is present to the south of A.

2. Pedestrian beach access is uncontrolled.

3. No foredune exists north of A for approximately 150 m. The scarp from the beach is reinforced with rubble and rocks (See Photograph 10).

4. Access to the area is limited to the railway crossing which is badly sited near a bend in Chapman Road and is in poor condition.

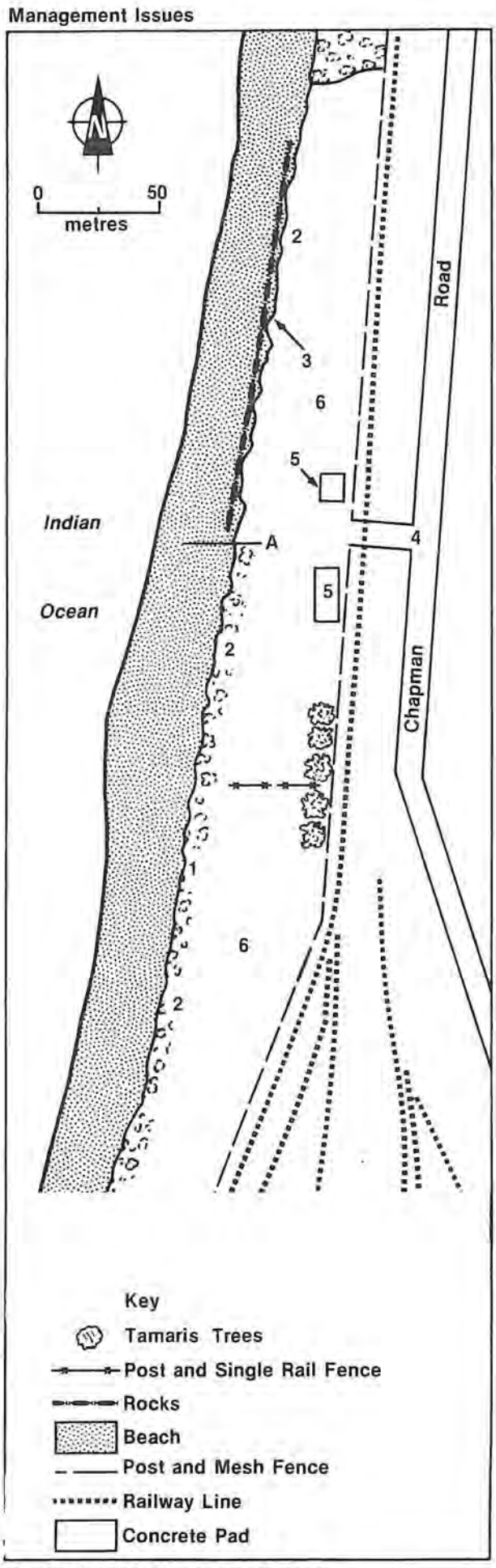
5. Concrete pads remain from previous railway buildings.

6. A large area of level land backs the beach; the surface is mainly gravel and partly grass (See Photograph 10).

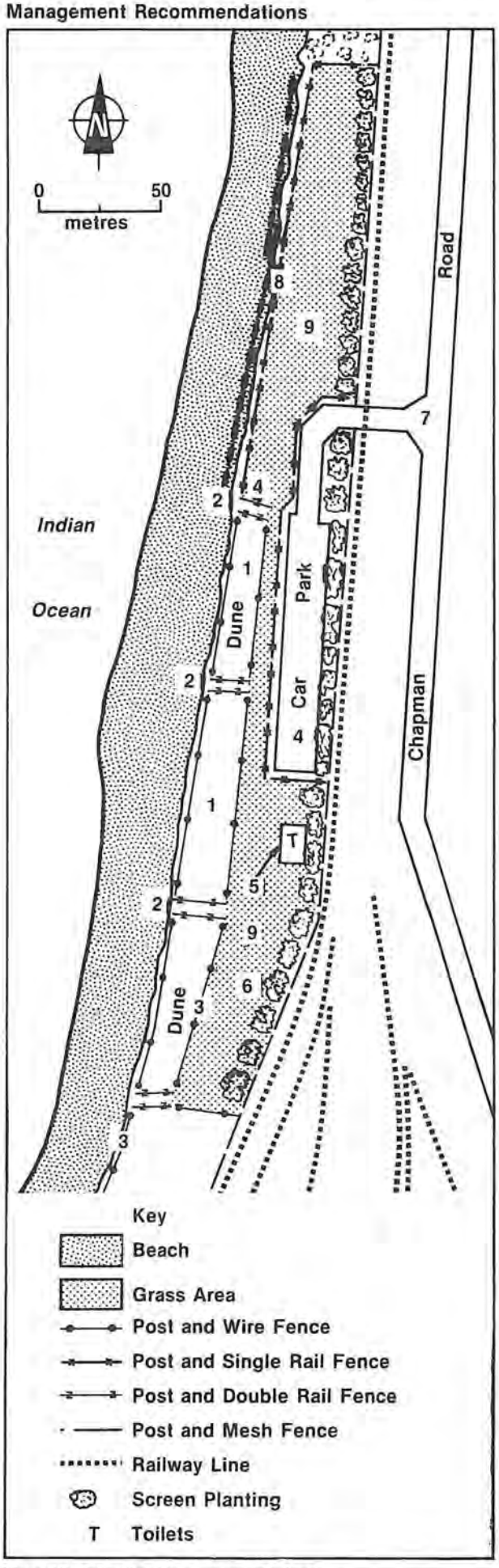
Management Recommendations

Priority Management Area - Railway Reserve
Numbers refer to numbers on Map 19.

1. Fence in the foredune plus an extension 5 m further inland to provide a more viable foredune system.



Map 18 Priority Management Area — Railway Reserve



Map 19 Priority Management Area — Railway Reserve

Photo 10 Railway Reserve - rock wall and backing level land

2. Provide pedestrian beach access paths bordered with post and double rail fences.

3. Post and wire fencing to protect dune vegetation. Fence along the beach to the railway's rock wall.

4. Remove building pads and construct a carpark in a single, linear arrangement, bordered by post and single rail fencing.

5. Construct a toilet block south of the existing post and single rail fence, adjacent to the existing Tamaris (Athol) trees.

6. Planting to screen the railway line and Chapman Road with Tamaris trees and shrubs (see Appendix 2).

7. Relocate the entrance from Chapman Road to this area further north, at a distance not less than 150 m north of the bend in Chapman Road and south of the present entrance.

8. Construct steps for pedestrian beach access across rocks.

9. Level and grass the area behind the foredune and rock wall.

Other Recommendations

. Reserve 5660 is to be reduced in size and will include: the portion of land in reserve 5660 west from the Chapman

Road reserve to the existing wire-mesh fence, and where this fence is not present (i.e. to the north), to a line corresponding to a continued alignment of that fence parallel to the railway line.

. That portion of reserve 5660 to the west of the reserve outlined above is to become a new reserve, vested in the Town of Geraldton for Recreation and Foreshore Management. Also to be included in this new reserve is that portion of vacant Crown land to the west of the present reserve 5660 near Trigg Street (See Map 3) and the road access (20 m reserve) to the foreshore area from Chapman Road.

Bluff Point Management Area

This management area comprises land to the west of Kempton Street between Crowtherton Street and the southern end of Kempton Street. It includes a section of reserve 20127 to the east of Kempton Street as well as a small portion of land between Trigg Street and the southern extremity of Kempton Street west of Chapman Road. It also includes two houses and vacant Crown land west of Kempton Street just to the north of Fuller Street (see Map 3).

The beach is narrow and stable with low (2-3 m) dunes supporting a sparse to medium vegetation cover. At Rundle Park Spinifex longifolius dominates the narrow foredune almost to the exclusion of other plant species. Further north a wide band of vegetation ranges, in general, from S. longifolius at the beach-foredune interface, Olearia axillaris and Scaevola spinescens behind, with S crassifolia also present. Further inland Acacia rostellifera, Dianella sp and Threlkeldia diffusa appear. In some sections to the north of this management area, grassed areas have been established adjacent to Kempton Street.

Land to the west of reserve 23177 as well as between 23177 and reserve 5660 is vacant Crown land (See Map 3).

Management Issues

Priority Management Area - Rundle Park
Numbers refer to numbers on Map 20.

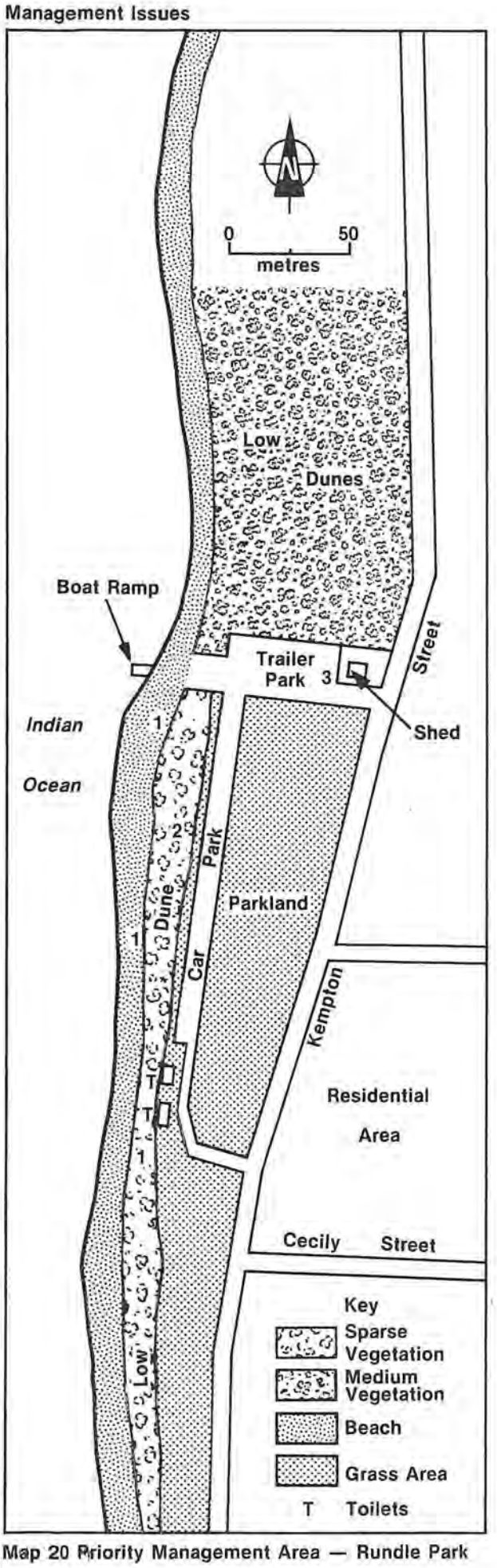
1. Uncontrolled pedestrian beach access.
2. Foredune vegetation is sparse and deteriorating.
3. The area for trailer parking is small.

Management Recommendations

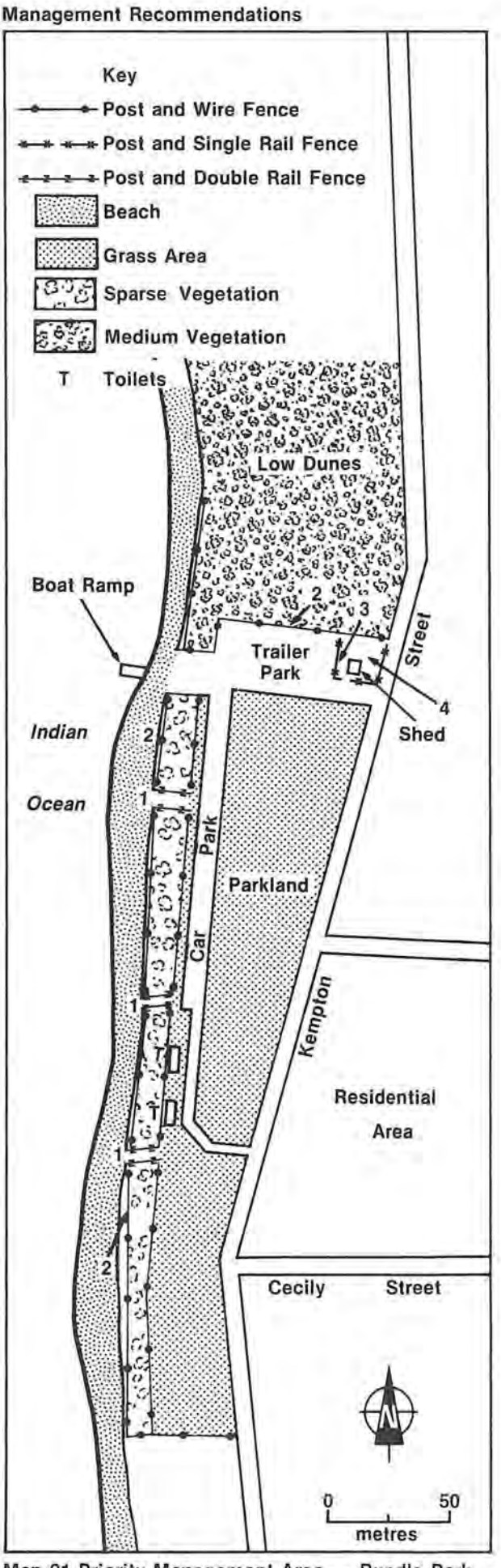
Priority Management Area - Rundle Park
Numbers refer to numbers on Map 21.

1. Provide pedestrian beach access paths bordered by post and double rail fences.

2. Fence in to protect dune vegetation. Any extension to the trailer park is to be to the north.



Map 20 Priority Management Area — Rundle Park



Map 21 Priority Management Area — Rundle Park

3. Surround this area with post and single rail fence.

4. Planting in this area to screen or at least soften the presence of the St George's Catamaran Club building (See Appendix 2).

Other Recommendations

- The vacant Crown land between reserves 23177 and 5660 and adjacent to reserve 23177 is to be included as part of reserve 32177 (See Map 3).
- Vest reserve 23177 in the Town of Geraldton for Recreation and Foreshore Management.
- Use of the Control of Vehicles (Off-Road Areas) Act 1978 to stop vehicles moving over grassed and dune areas west of Kempton Street.
- Parking areas are to be provided adjacent to Kempton Street within the large grassed areas north of Rundle Park.
- Vacant Crown land to the west of the two houses, as described previously, is to be incorporated into reserve 20127.
- Fuller Street and Hosken Street, west of Kempton Street, are to be closed and included in reserve 20127.

Chapman River Management Area

This management area comprises the Chapman River mouth and immediate beach as well as the river and environs to the road

Photo 11 Chapman River Mouth

bridge. It is bordered in the north by Swan Drive and by Crowtherton Street in the south, and includes the grounds and buildings of Nazareth House, two houses just north of Crowtherton Street and an area of bare land and beach to the southwest of these houses (See Map 3).

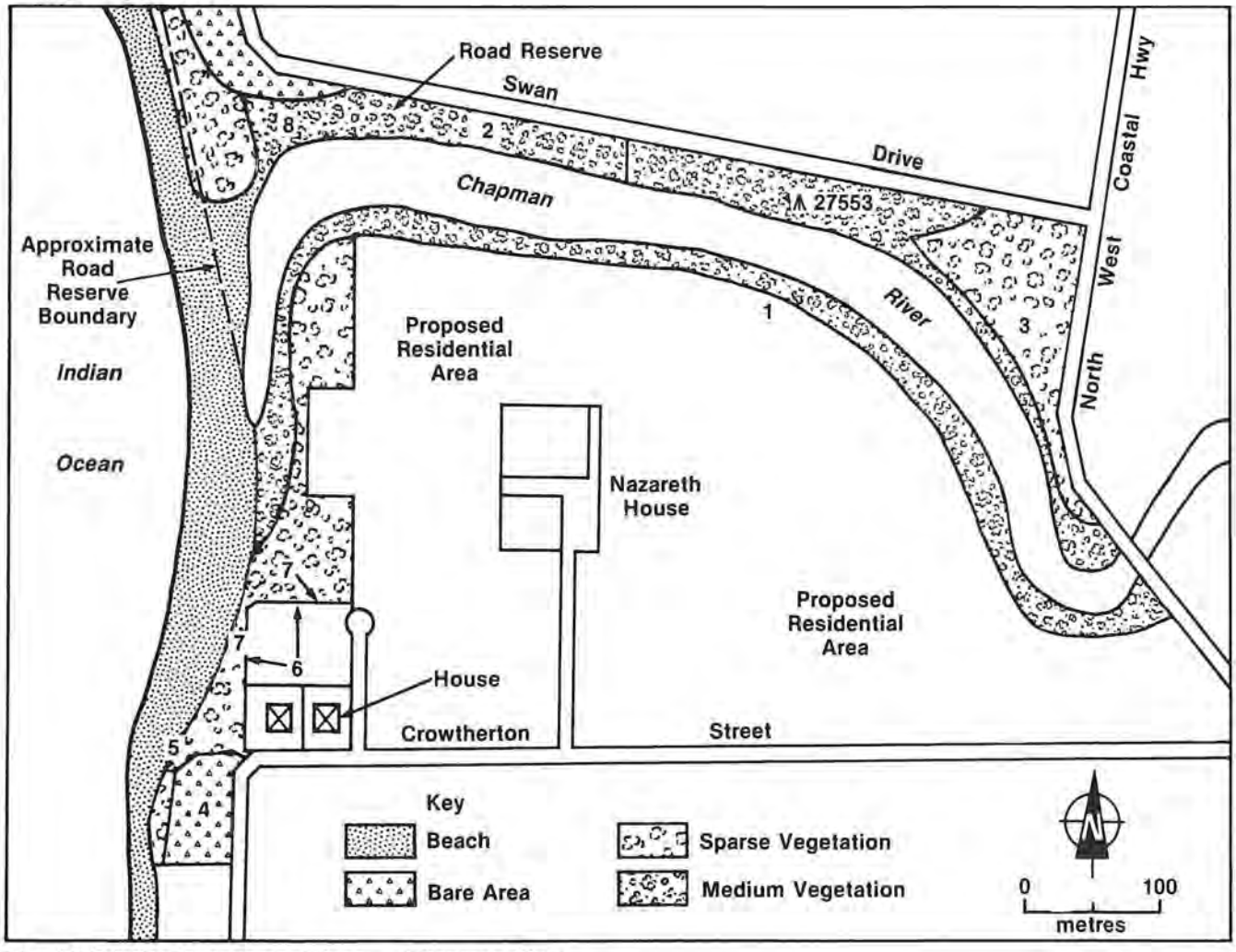
Land to the north of the river includes reserve 27553 and road reserve. The vegetation cover is sparse in reserve 27553 and medium to the west of it. South of the river, vegetation cover adjacent to the river is sparse to medium.

Management Issues

Priority Management Area - Chapman River
Numbers refer to numbers on Map 22.

1. The river reserve under the subdivision proposal south of the river is too narrow, being only 5 m in places. This does not adequately protect estuarine flora and fauna, nor provide adequate space for passive river-shore recreation.

Management Issues



Map 22 Priority Management Area — Chapman River

2. A path runs through vegetation along the river from the park (3) to the beach. The path is ill defined and damage to vegetation is significant in places.

3. This park has not been fully developed and detracts from the visual amenity of the area. Erosion is occurring on the slope down from Swan Drive and there is no control of vehicle movements around the park.

4. Vacant blocks have been levelled and the area used as a carpark which has low visual quality.

5. There is no control of pedestrian access from the carpark to the beach and river.

6. At present the designated Residential area, under the Geraldton Town Planning Scheme, extends too close to the river and beach.

7. At present the designated area of Natural Bushland, under the Geraldton Town Planning Scheme, extends only to this line.

8. At present the Swan Drive road reserve, west of reserve 27553, runs to the river high water mark. The Town Council's management control of the area is diminished under a road reserve designation.

Management Recommendations

Priority Management Area - Chapman River
Numbers refer to numbers on Map 23.

1. River foreshore reserve is to be at least 30 m landwards from the high water mark.

2. Walkway is to be constructed to control pedestrian movements along the river.

3. Provide pedestrian paths to the beach and Swan Drive (carpark), bordered by post and wire fences.

4. Upgrade the parkland to a standard similar to that of parkland to the southeast of the road bridge.

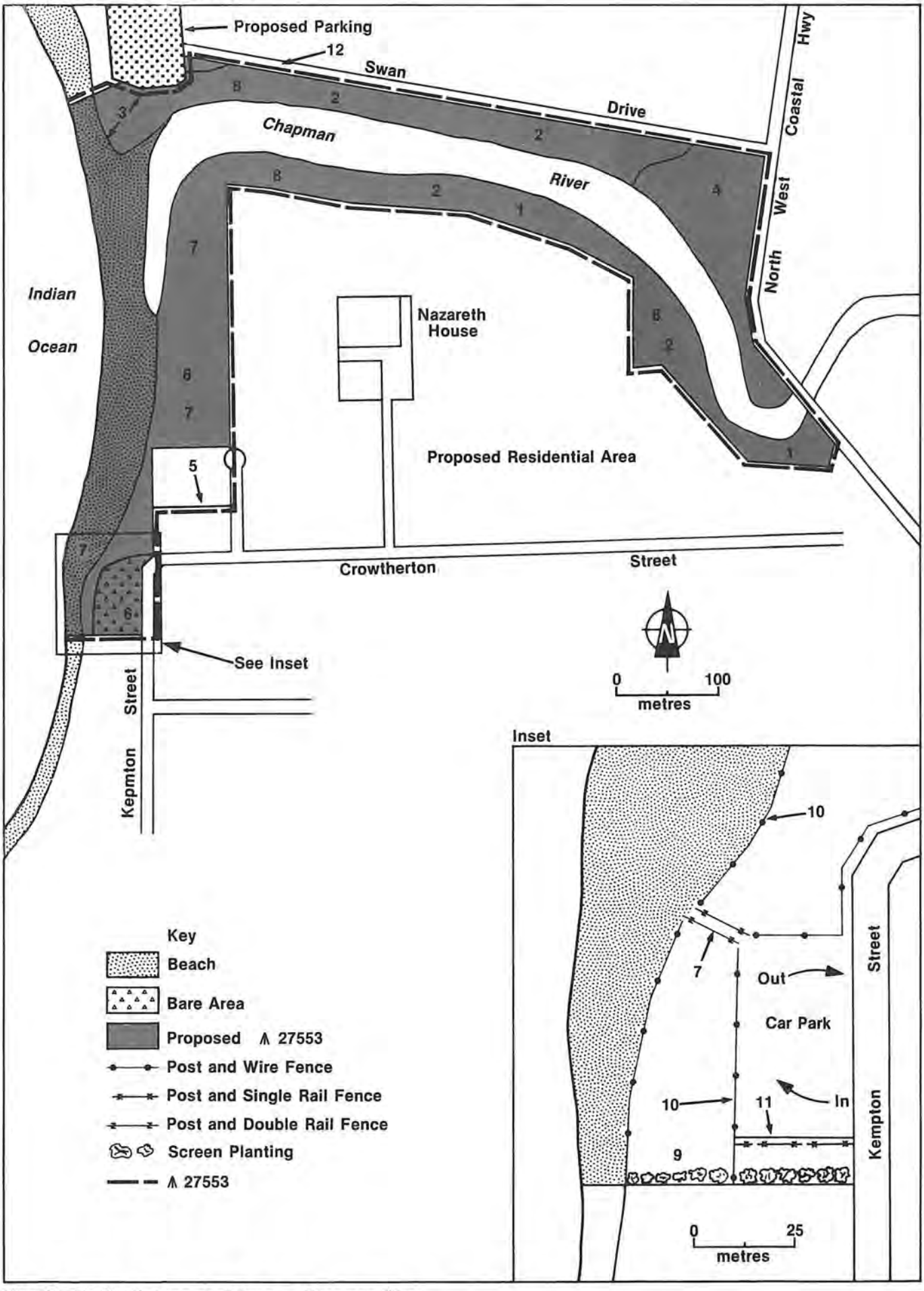
5. Extend the Natural Bushland zone to this line.

6. Upgrade this area as per inset.

7. Control pedestrian beach and river access.

8. Extend reserve 27553 to include all river foreshore reserves on north and south of Chapman River from the high water mark plus the beach adjacent to the river mouth.

9. Plant trees and shrubs to screen residence (See Appendix 2).



Map 23 Priority Management Area — Chapman River

10. Erect post and wire fence to protect vegetation.

11. Erect post and single rail fence to control vehicle movements.

12. Reduce the Swan Drive road reserve width to 20 m and incorporate the remaining part of the existing road reserve into reserve 27553.

Sunset Beach Management Area

This management area comprises all land to the west of Swan Drive from Swan Drive (south) to Bosley Street as well as the Sun City Caravan Park and reserves A27322 and 27321. It also includes land approximately 300 m from the high water mark north from Bosley Street to the Town Boundary (See Map 3).

In the north of this management area, the land is undeveloped with high foredunes (18 m) supporting no vegetation over large areas, and over much of the remainder, sparse to medium cover. This area encompasses part of the proposed extension of the Sunset Beach residential development.

The southern portion of this area has been developed. The development procedure included levelling the dunes and depositing pindan soil over levelled area seaward to form a scarp. The revegetating foredune to the north of the developed section of Sunset Beach contains mainly Spinifex longifolius and Olearia axillaris.

Management Issues

Priority Management Area - Sunset Beach
Numbers refer to numbers on Map 24.

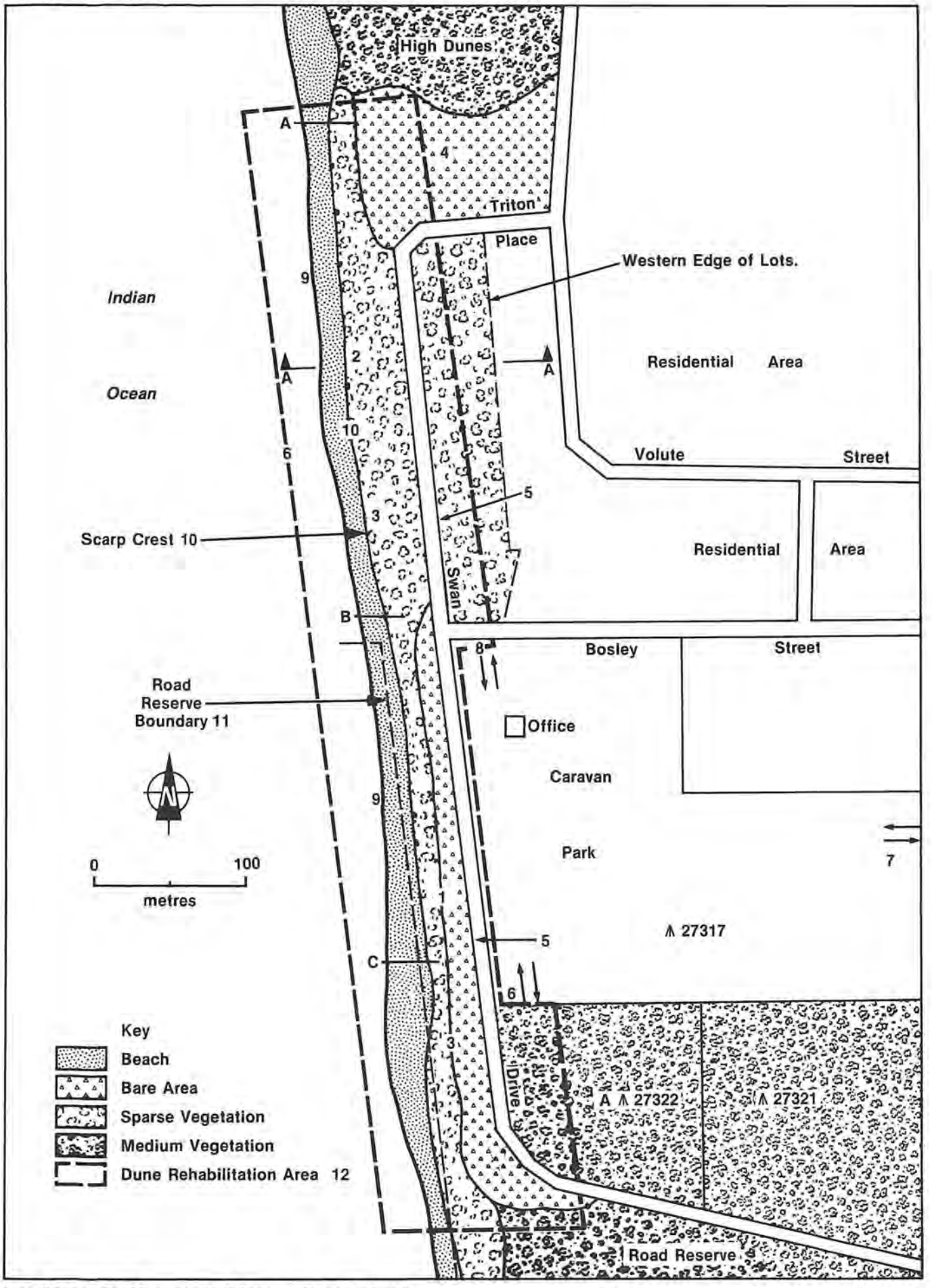
1. The scarp and backing level land between B and C is low in visual quality. No foredune remains, and vegetation cover is very sparse (See Photograph 12).

2. A foredune is being established, by natural processes, between A and B. Vegetation cover is sparse. See Figure 7 for cross section through this foredune.

3. Pedestrian beach access is uncontrolled along Sunset Beach (See Photograph 12).

4. This large bare area is in very poor condition (See Photograph 13).

5. If this section of road is closed, analternative access to the caravan park will need to be located since present access is via this section of Swan Drive. Also, parking areas will need to be provided at the beach, given the closure of this section of road. The various options for access to the caravan park, should Swan Drive be closed, are outlined in 6, 7 and 8 below.



Map 24 Priority Management Area — Sunset Beach

Photo 12 Sunset Beach - beach and scarp

Photo 13 Sunset Beach - large bare area

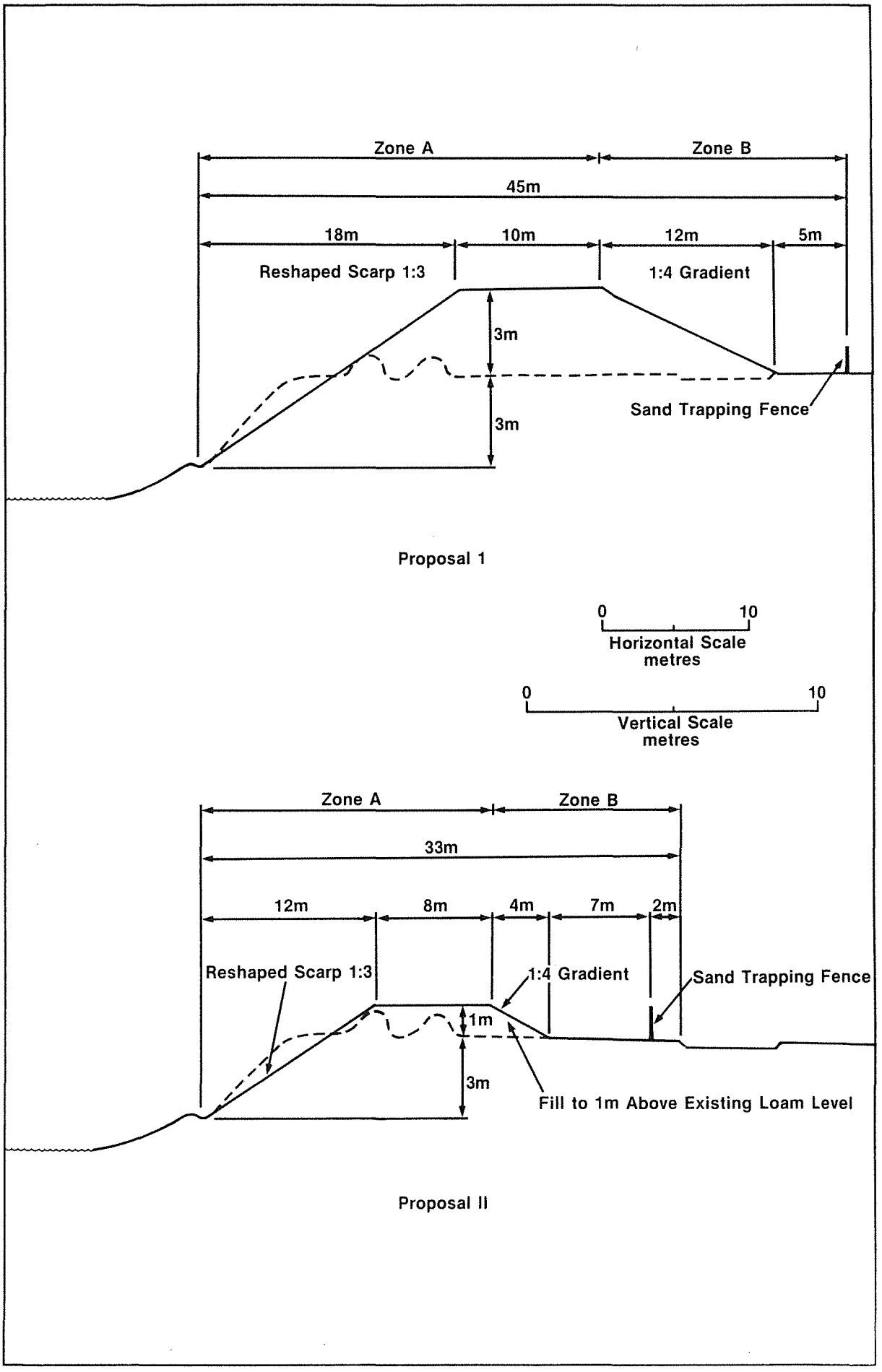
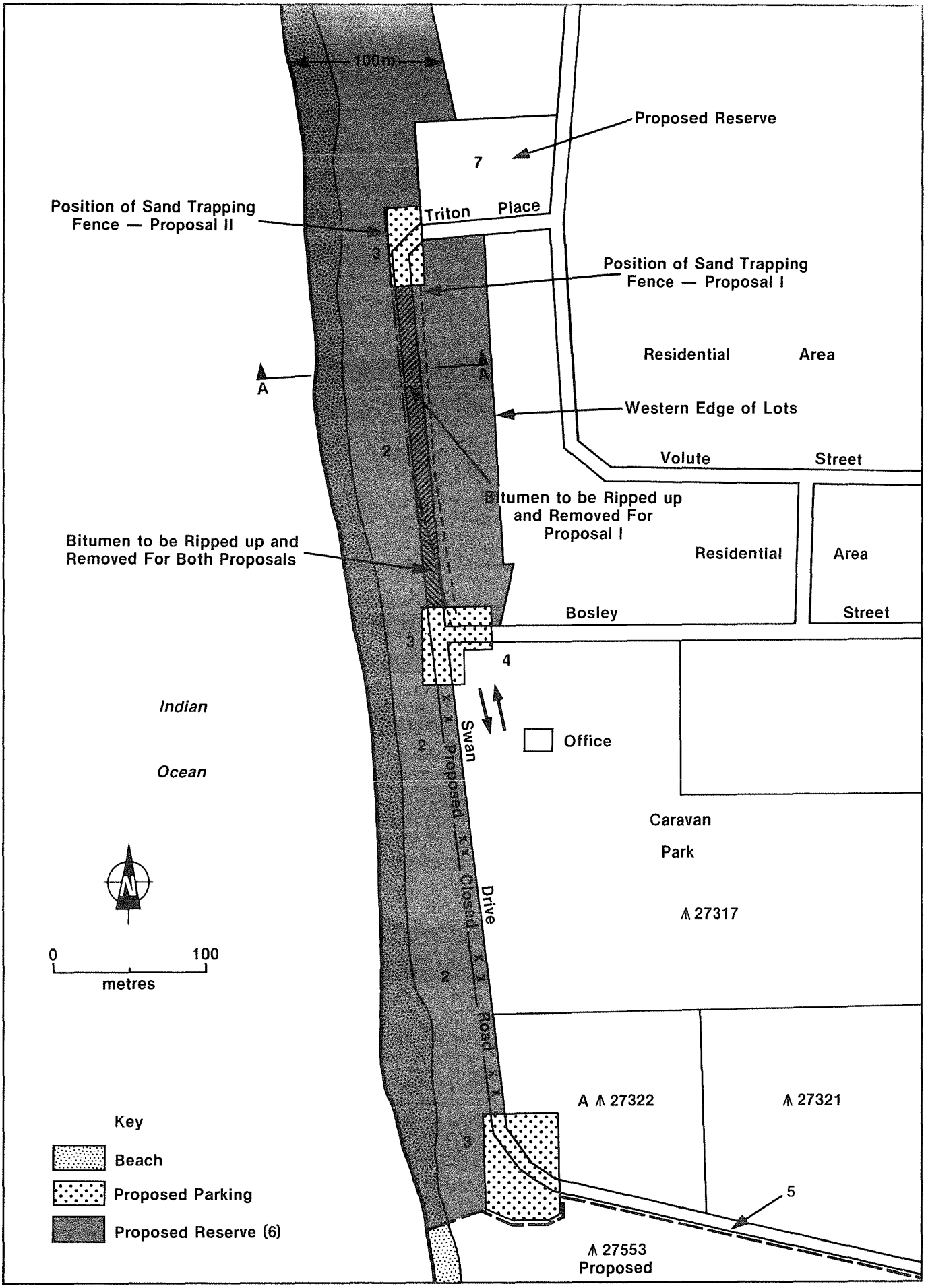


Figure 8 Recommended Restoration Proposals — Schematic Cross Section Thru A-A (Map 25) (Dept. of Agriculture, 1984)



Map 25 Priority Management Area — Sunset Beach

2. Once a dune is re-established, pedestrian access to the beach is to be controlled.

3. Provide parking bordered by post and single rail fencing, when Swan Drive is eventually closed along the coast.

4. If Willcock Drive is closed, access to the caravan park through this area would be the most appropriate choice from the three options outlined above.

5. The road reserve is to be reduced to 20 m in width, and the remaining land south of Swan Drive to the river high water mark included in the extension to reserve 27553.

6. A new reserve is to be created, vested in the Town of Geraldton for Recreation and Foreshore Management. This reserve will include the previous road reserve and vacant Crown land, west of the caravan park and reserve 27322. North of Bosley Street the reserve will include vacant Crown land and some residential land to the east of the closed section of Swan Drive. North of Triton Place the reserve will include vacant Crown land and freehold land to a distance of 100 m from the high water mark, except in the area just to the north of Triton Place (See 7 below).

7. This area of bare land is to be levelled and grassed, and vested in the Town of Geraldton for Parkland.

Other Recommendations

. A foreshore reserve at least 100 m in width from the high water mark, is to be included in any future subdivision north of the present residential area. This reserve is to be vested in the Town of Geraldton for Recreation and Foreshore Management.

. Pedestrian beach access from the high dunes north of Triton Place will be designed with co-operation between the Geraldton Town Council officers and officers from the Department of Conservation and Environment.

Implementation

The implementation of this management plan is primarily the responsibility of the Town of Geraldton, but various government agencies may provide further advice and assistance.

The first step in implementation is to consider this draft plan.The second is to process comments from Council, residents and other interested bodies so that a final Management Plan may be prepared. The third step is to adopt the final Management Plan and any recommendations it may contain.

Role of State Government

The State Government is committed to sound planning and management of the Western Australian coast. The establishment of the Coastal Co-ordinating Committee has provided a focal point for Local Government authorities to make submissions on their own coastal management needs and in turn receive co-ordinated advice from State Government departments.

Various State Government authorities can provide advice and financial assistance for management of the coast.

Role of Local Government

Local Government authorities are the "front-line" managers of the coast, with wide-ranging responsibilities. Councils can fulfil an important role in the management of the coast provided they are given technical assistance and financial incentives. One of the important aims of this management plan has been to recommend management strategies in the coastal zone so that the Geraldton Town Council can become involved in management of land under its jurisdiction.

Funding

Finance is required to undertake any development or management works and currently most of this cost is borne by the Town of Geraldton. However, recommendations that require only administrative changes (i.e. reserve vestings) can be addressed immediately.

As for recommendations that do require funding, the existing system of Town Council management funding, supplemented by grants from appropriate Government departments, should prove sufficient to initiate management and development action for areas under most pressure. Most facilities and services provided on the coast are funded by ratepayers, through the Geraldton Town Council. As these facilities are generally used by tourists who do not contribute toward the expense of their development and maintenance, the cost burden falls unfairly on the ratepayers.

In the present climate of tourist promotion and unemployment relief, the two bodies that should be approached immediately are the State Tourism Commission and the Commonwealth Department of Labour and Industry. Other State Government departments that do provide grants include:

. The Department of Youth, Sport and Recreation (community sport and recreation facilities fund)

. Main Roads Department (tourist road grants)

. DCE (beach management grants)

. Department of Agriculture (soil conservation grants)

. PWD (foreshore and erosion repair grants)

Applications for funding are likely to be more successful if presented in the context of a long-term management plan. The fact that a Coastal Management Plan has been prepared and accepted by Council should assist these agencies in making funds available.

References

Albertus, Sister,
(1975) **Ancient Landmarks,**
UWA Press, Nedlands.

Anon.
(1950) **The First One Hundred Years - Centenary Souvenir Booklet,**
Geraldton Newspapers Ltd, Geraldton.

Beard, J.S.,
(1976) **The Vegetation of the Geraldton Area, W.A. Vegetation Survey of WA 1:250,000 Series,**
Vegmap Publications, Perth.

Bureau of Meteorology,
(1962) **Average Annual Rainfall Map of WA,**
Government Printer, WA.

Department of Agriculture,
(1984) **Sunset Beach - Geraldton - Draft Proposals**

Department of Industrial Development,
(1976) **Regional Planning Survey - Geraldton**
Government Printer, WA.

Department of Tourism,
(1976) **Geraldton Visitor Survey**
Government Printer, WA.

Feilman and Associates,
(1977) **A Survey of Places of Historic and Landscape Significance in Northampton, Dongara and Geraldton, W.A.**

Lullfitz G.
Plants for Seafront Gardens - WA Gardening,
Panorama Books, Perth.

Northcote, K.H., Bettenay, E., McArthur, W.M. and Churchward, H.M.,
(1967) **Perth-Albany-Esperance Area. Atlas of Australia Soils Sheet 5.** CSIRO, Melbourne.

P A Australia,
(1981) **A Study into Recreational Boating Facilities in Western Australia.**

Playford, P.E., Horwitz, R.C., Peers, R. and Baxter J.L.,
(1970) **Explanatory Notes, 1:250,000 Geological Series, Geraldton.**
Aust. Bur. Min. Resources, Canberra

Tindale, N.B.,
(1974) **Aboriginal Tribes of Australia.**

Wood and Grieve Pty Ltd
(1978) **Southgates Sand Dune Investigation for Greenough Shire Council,** Job No. 6405C.

Woods, P.J.
(1984) **Shire of Wanneroo: Coastal Study.**

APPENDIX 1 **Crown Reserves in the Study Area**

Reserve Number	Area (ha)	Vested in	Purpose
31671	0.6409		Changerooms and Parking Area
30063	0.5868	Town of Geraldton WPL 21 yrs.	Surf Life Saving Club House
A20195	23.2431	T of G	Park and Recreation
27530	3.7861	T of G WPL 21 yrs.	Caravan Park
A27529	3.1212	T of G	Esplanade and Recreation
A20194	3.2426	T of G	Esplanade and Recreation
20606	27.1650	G. Port Auth. WPL 21 yrs..	Harbour Works
31658	7.2526		Parklands
25459	13.4567	T of G	Recreation
A2562	18.6155		Esplanade and Recreation
A29729	4.2492	T of G	Public Recreation
25300	14.5004	G. Port Auth. WPL 21 yrs.	Harbour Works
17867	0.4043	T of G	Recreation
31068	0.8720	CE Trustees of Diocese of NW Aust.	Mission to Seamen Site
5525	0.5426		Municipal Endowment
26293	0.4937	T of G WPL 21 yrs.	Recreation : Swimming Pool, Yachting, Rowing

APPENDIX 1 Crown Reserves in the Study Area

Reserve Number	Area (ha)	Vested in	Purpose
36765	0.6110	T of G	Recreation
5660	6.4750		Railways
23177	0.5271		Public Recreation
20127	18.5023	T of G	Recreation
A27322	1.4152		Park and Recreation
27533	2.5293		Recreation
24111	0.5487	Minister for Transport	Harbour Works Leading Lights
29173	0.5817	T of G	Recreation
25458	2.9032	T of G	Site for Motel and Beach Cottage
29172	4.8678	T of G WPL	Caravan Park
21773	1.7098	Minister for Railways	Railway Purposes
27321	2.3446	Aboriginal Lands Trust	Use and Benefit of Aborigines
27317	4.9032	T of G	Caravan Park

APPENDIX 2 Plants For Coastal Landscaping

(Adapted from Lullfitz)

HEAVILY EXPOSED AREAS

Trees

Casuarina equisetifolia - Dune sheoak
Eucalyptus platypus var. heterophylla - Coastal moort
Langunaria pattersonnii - Norfolk Island hibiscus
Melaleuca lanceolata - Rottnest Island tea tree
Metrosideros excelsa - New Zealand Christmas tree
Metrosideros excelsa variegata - Athol tree
Tamaris aphylla - Athol tree

Shrubs

Acacia cyclops - Red-eyed acacia
Acacia pulchella var. lasiocarpa - Sand-heath acacia
Acacia rostellifera - Suckering dune wattle
Alyxia buxifolia
Agave
Calothamnus quadrifidus - One-sided bottlebrush
Eremophila glabra
Coprosma retusa - Mirror plant
Coprosma picturata - Mirror plant
Cortaderia selloana - Pampas grass
Hemiandra pungens - Snake bush
Leptospermum laevigatum - Coastal tea tree
Myoporum insulare - Boobyalla
Olearia axillaris
Pelagonium capitatum - Native geranium
Phormium tenax - Green NZ flax
Phormium tenax purpurea - Red NZ flax
Phormium tenax variegata - Green and white NZ flax
Pittosporum crassifolium
Pimelea ferruginea
Scaevola crassifolia
Senecio cimeria
Templetonia retusa
Westringia rigida
Yucca
Melaleuca acerosa

Ground Covers

Arctotis stoechadifolia - Swanbourne daisy
Coprosma repens - Mirror plant
Coprosma kirki (also variegated form)
Conostylis candicans
Calocephalus brownii - Cushion bush
Gazania
Hibbertia scandens - Snake vine
Hemiandra pungens - Snake bush
Myoporum parvifolium - Prostrate boobyalla
Myoporum parv. purpurea - Red form

APPENDIX 2 Plants For Coastal Landscaping

(Adapted from Lullfitz)

Rhagodia baccata
Tetragonia decumbens
Grevillea thelemanniana - Spider net grevillea

PARTIALLY EXPOSED AREAS

Trees

Agonis flexuosa - Weeping peppermint
Acacia longifolia - Sydney golden wattle
Callitris preissii - Rottnest Island pine
Eucalyptus ficifolia - Red flowering gum
Eucalyptus erythrocorys - Illyarrie
Eucalyptus camaldulensis - River gum
Eucalyptus gomphocephala - Tuart
Eucalyptus caesia - Gungunnu
Pittosporum phylliraeoides

Shrubs

Acacia cuneata
Chamelaucium uncinatum
- Purple pride - Geraldton wax
- University
- Alba
- Newmarracara
- Wilsonii
- Munzii
- Dowellii
- White correa
Correa alba - White correa
Dodonaea aptera Dryandra sessilis - Parrot bush
Eucalyptus tetragona - White-leafed marlock
Grevillea crithmifolia
Leptospermum sericeum - Esperance tea tree
Melaleuca nesophila
Melaleuca huegelii
Melaleuca globifera
Melaleuca megacephala
Melaleuca pentagona
Melaleuca diosmifolia - Windy Harbour form
Trachymene caerulea - Rottnest daisy, annual only

Ground Covers

Kennedia prostrata - Red runner
Kunzea pomifera

Climbers

Kennedia nigricans - Black coral pea
Kennedia rubicunda - Dusky coral pea