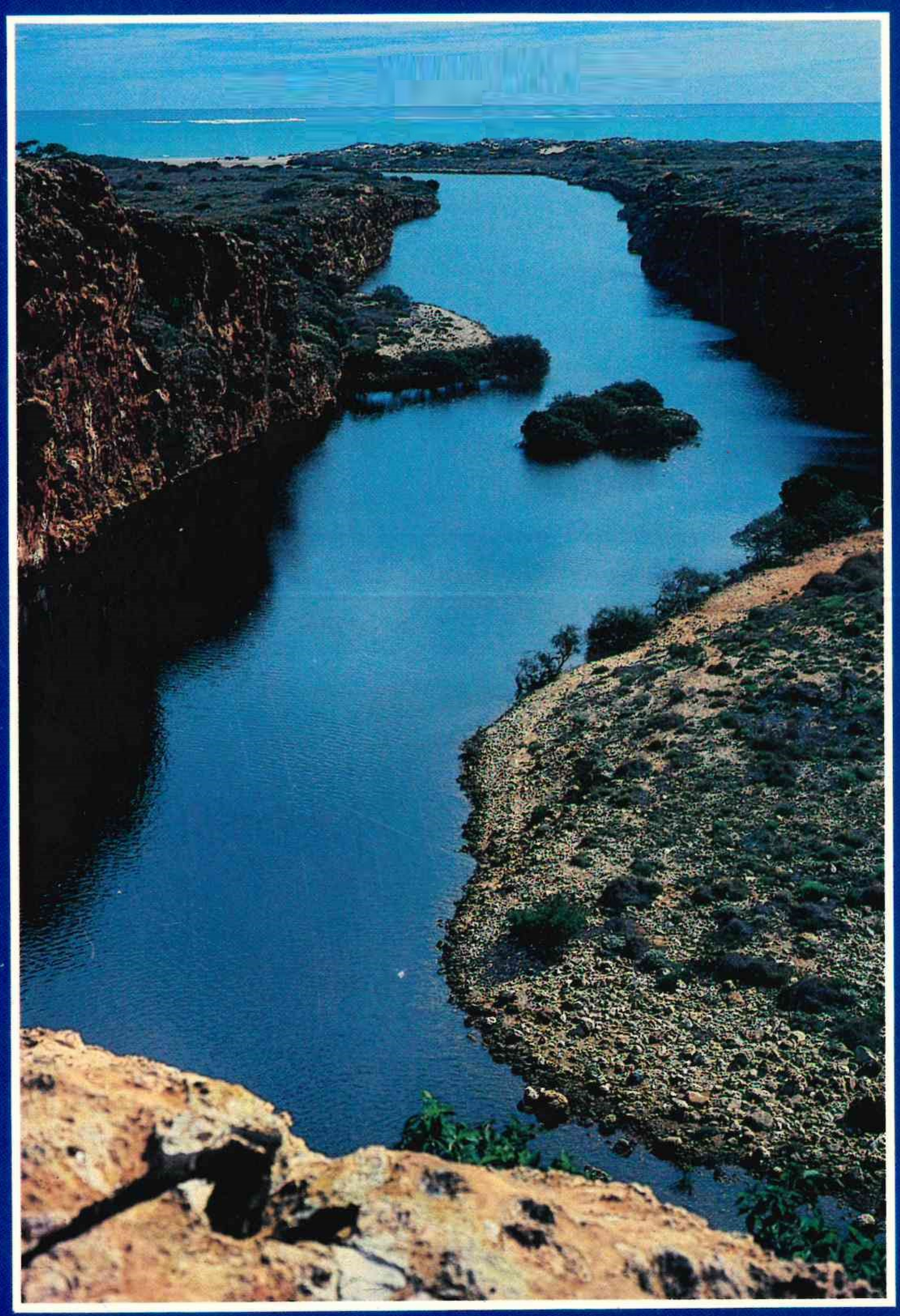
Cape Range National Park

Management Plan 1987 - 1997



MANAGEMENT PLAN No. 8

Department of Conservation and Land Management

ERRATUM

PAGE 11, 4th paragraph, 6th line, add *Cenchrus*

PAGE 11, 4th paragraph, 7th line, add *Triodia* sp

PAGE 31, 3rd paragraph, 7th line, add (*Thylacine*

PAGE 34, 2nd paragraph, 5th line, add *Thylacine*

PAGE 38, 2nd paragraph, 3rd line, add (*Milyeringa veritas*

PAGE 38, 3rd paragraph, 4th line, add (*Ophistermon candidum*

PAGE 39, 5th paragraph, 4th line, add (*Petrogale lateralis*

PARKS OF THE

CAPE RANGE PENINSULA

PART 1: CAPE RANGE NATIONAL PARK

MANAGEMENT PLAN

1987 - 1997

This management plan was adopted by the National Parks and Nature Conservation Authority on 11 September 1987, and approved by the Hon. B J Hodge M.L.A., Minister for Conservation and Land Management on 1 December, 1987.

This management plan was endorsed by the Bush Fires Board under the provisions of Section 34(1) of the Bush Fires Act (1954) on 27 November, 1987.

Department of Conservation and Land Management
State Operations Headquarters
50 Hayman Road
COMO
PERTH, WESTERN AUSTRALIA

MANAGEMENT PLAN No. 8

CAPE RANGE NATIONAL PARK

MANAGEMENT PLAN

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ACKNOWLEDGEMENTS

Members of the project team which formulated and prepared this draft plan were Richard May, Ian Parker, Geoff Mercer, Jenni Bartle, and Barry Wilson.

Valuable information was provided by George Kendrick and Kate Morse from the Western Australian Museum and Tony Allen and Philip Commander from the Geological Survey Section of the Mines Department.

Thanks also to Melinda Walker and Debbie Bowra for their great patience and diligence in word processing and to Mapping Branch for preparation of the maps.

PREFACE

This document is the first of three draft management plans dealing with parks in the vicinity of the Cape Range Peninsula: Cape Range National Park; Ningaloo Marine Park; and two small areas of coastal land at the northern end of the peninsula, which is to be reserved for recreation and foreshore management. The three parks are to be managed integrally.

This management plan deals with Cape Range National Park.

1. INTRODUCTION

Cape Range National Park encompasses 50 581 ha of the Cape Range peninsula near Exmouth (Fig. 1). The Park comprises a heavily dissected limestone range and a fringing coastal plain directly adjacent to the northern part of the Ningaloo Marine Park (Fig. 2).

The Cape Range National Park, will protect a significant segment of Western Australia's environment and wildlife for the benefit and enjoyment of the community in perpetuity. The Park will be developed to accommodate public recreation, within its capacity for long-term stability and maintenance of its resources.

The Park has a high tourist potential. Its splendid scenery, abundant wildlife, and the associated coral reef are already gaining the Park national and international recognition. To enhance public enjoyment and appreciation of these resources, interpretive facilities and educational programs are to be provided (greatly assisted by a grant from the Australian Bicentennial Authority). It is considered that the development of the Park will make a significant contribution to the economic development of the region. If this contribution is to be sustained in the longer term, however, it is essential that the integrity of the environment and ecology is maintained through competent management, and the co-operation of the park users.

Cape Range National Park and the State component of the Ningaloo Marine Park are vested in the National Parks and Nature Conservation Authority. The Commonwealth component of the Ningaloo Marine Park is declared under the Commonwealth National Parks and Wildlife Conservation Act. They will be managed solely by the Department of Conservation and Land Management (CALM). Two small areas of coastal land north of Cape Range National Park will be jointly managed by CALM and the Shire of Exmouth. All of these areas will be managed as one intergrated unit. This will ensure consistency of operations, and minimise management costs through use of combined facilities and staff. Separate management plans will be prepared for each area to enable the separation of principles for management, but they will be considered as one for the purpose of management.

This plan sets out the management intent for the Cape Range National Park. It will be used to guide and direct management and development. Implementation is subject to availability of funds and resources.

Where management intent implies modification of natural resources the implications are addressed. Natural resources that will not be affected by the implementation of management proposals are generally not described in order to make concise strategies without addressing issues which are peripheral to, and will not be affected by, proposed strategies.

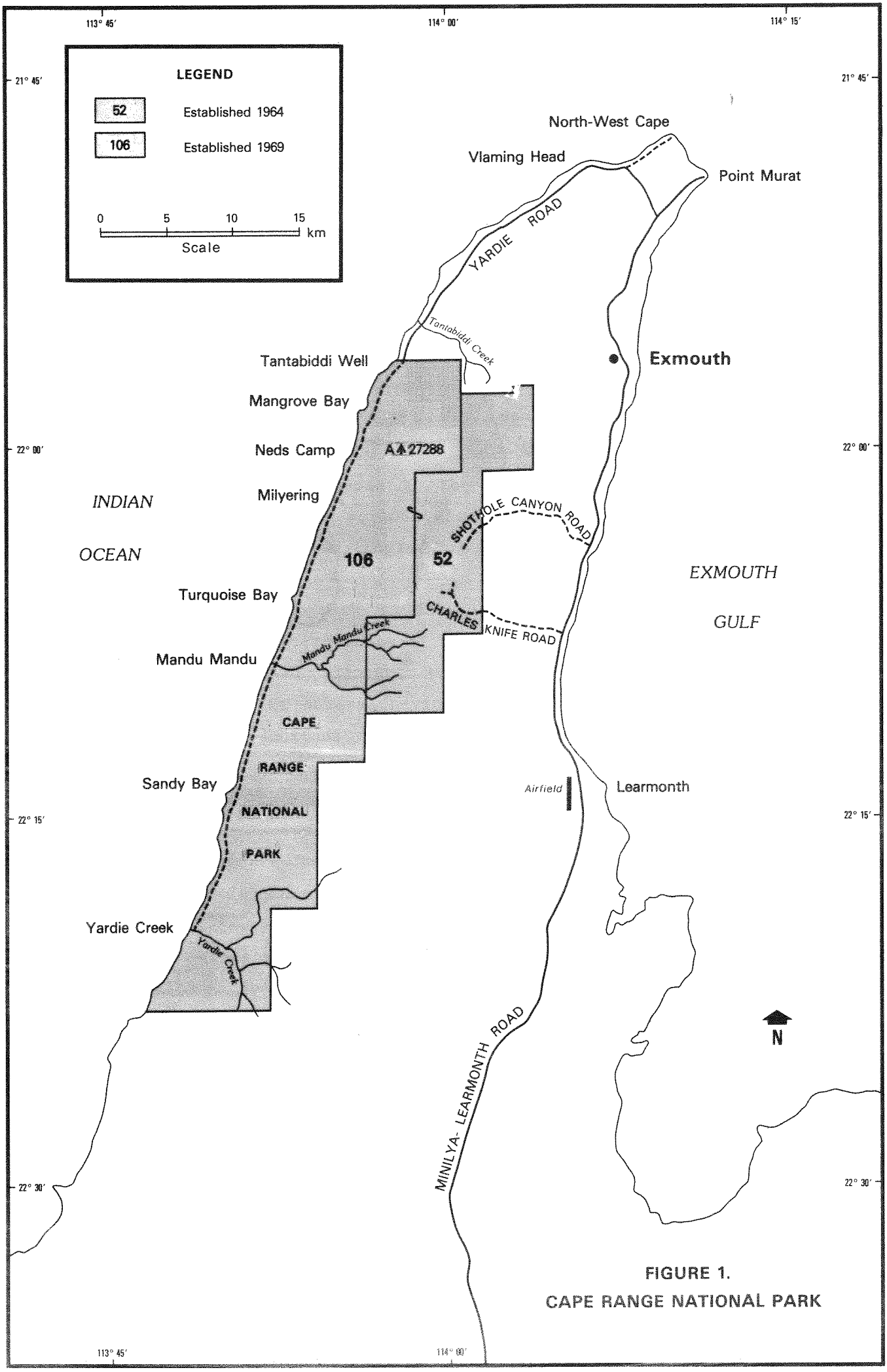

FIGURE 1.
CAPE RANGE NATIONAL PARK

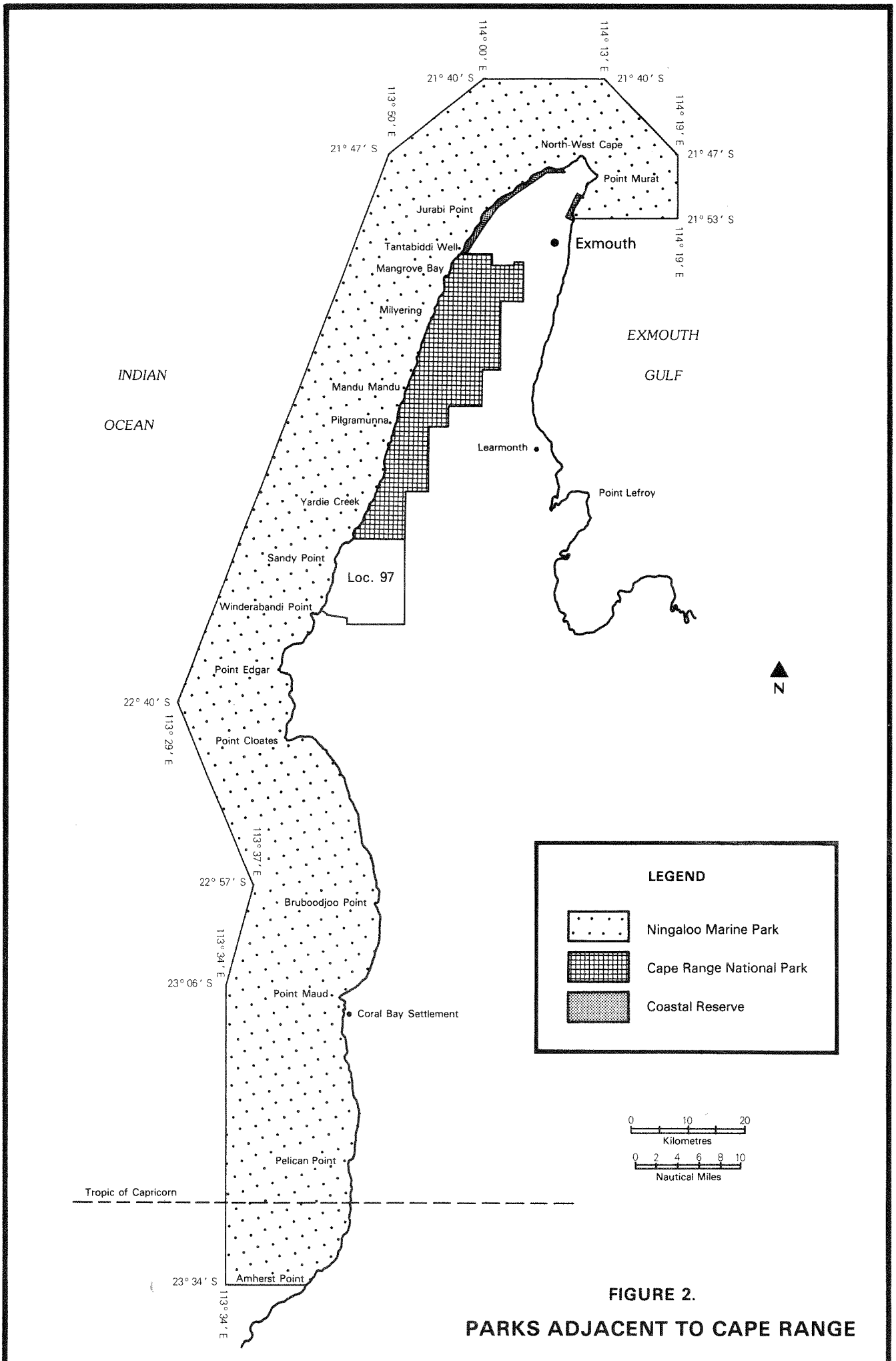

FIGURE 2.

PARKS ADJACENT TO CAPE RANGE

2. CONSERVATION AND RECREATION VALUES

Natural resources of the Park have been described in the publications listed at the back of this draft plan. The Cape Range peninsula is exceptionally rich in scientific, cultural, scenic and recreational features.

Scientifically and culturally the area is of considerable significance because:

1. It is biologically rich with representative flora and fauna from temperate, tropical and arid biogeographic provinces.

2. Many animals endemic to the peninsula have evolved in relative isolation during periods when it was separated from the mainland, e.g. reptiles and troglodytic (cave dwelling) species.

3. The Range is rich in fossils. Although research has not been extensive, discoveries of considerable significance have been made both in and adjacent to the Park. Pleistocene coral reefs representing several periods of coral reef development provide an unusual opportunity for the study of the reef development process.

4. One of the earliest known sites in Australia of Aboriginal occupation based on a marine economy occurs in the Park. Although sites have not been substantially documented, they have the potential to provide a significant insight into regional changes in climate, flora and fauna, and the lifestyles of the Aborigines.

5. The pastoral history, early exploration and regional development of the area are of significant historical interest to residents and visitors.

Scenically and recreationally the area is important for:

1. The outstanding nature of its landscape. The dissected limestone range, with its deep canyons and precipitous ridges, provides a dramatic contrast to the vista of the adjacent coral reef.

2. The variation in landform, diversity of vegetation, spectacle of colour in rocks and wildflowers, and abundance of wildlife which attract many tourists to this arid peninsula.

3. Its proximity to the people of the north-west, both from Exmouth and further afield in the mining and pastoral communities north and east of the area. The cooler summer temperatures on the coast combined with relatively protected beaches and safe swimming make this area particularly attractive.

4. Its variety of opportunities for viewing the diversity of native animals and plants.

5. The adjacent coral reef. Many people enjoy the diverse attractions of Cape Range National Park, but others use it solely as a staging point for marine recreation.

3. HISTORICAL CONTEXT

3.1 Pastoral Use and Mineral Exploration

3.1.1 Pastoral

Thomas Carter was one of the first Europeans to settle in the region when he took permanent residence at Point Cloates on the North West Cape, in 1889. Carter acquired 54 600 ha on the northern and western side of the peninsula, and engaged in pastoral activities for 14 years. The property was known as Yardie Creek Station.

In 1907 Carter's holding was subdivided into a number of leases. Some of the leases were again amalgamated in 1933 into a revived Yardie Creek Station, which was smaller than the original and occupied lands at the northern and western parts of the peninsula, including areas now contained in the National Park.

Despite early setbacks of droughts and cyclones, pastoral activities continued, and in the early 1960's the land carried on average between 7 000 and 7 500 sheep. These were pastured on the coastal plain as the Range was too rough for stock to graze. A small number of cattle and

horses were also held. The lease was surrendered to the Crown in 1959 and reverted to vacant Crown land.

3.1.2 Mineral Exploration

After the discovery of oil at Rough Range in 1953, and subsequent failures to find further reserves in that area, attention was directed to the Cape Range in the late 1950s. Geologists were optimistic that the anticline would yield good reserves of oil.

Road construction through the Range proved difficult and, despite three wells, no oil was discovered. Shothole Canyon Road, Charles Knife Road and extensive seismic lines are legacies of that early exploration.

Petroleum exploration in the Park is provided for under the Petroleum Act (See 3.3). In 1980 an exploration well for gas was drilled in the Park, south of Neds Camp, in accordance with National Park Authority and Environmental Protection Authority (EPA) approved guidelines, but it was not successful. The oil and gas potential of the Park itself is not known but understood to be low, however, potential hydrocarbon-bearing strata in Ningaloo Marine Park can be reached be deviated drilling on the coast.

Two Temporary Reserves for limestone, TR2614H and TR5980H, are under the control of the Minister for Mines (see Fig. 3). They were established in 1963 and 1975 respectively, in consideration at that time for a steel mill to process raw materials from the Pilbara.

3.2 Establishment of the Park

Following a proposal by the Shire of Exmouth, Reserve 28288 (Location 52) was gazetted a Class 'C' reserve for the purpose of National Park on October 9, 1964 (Fig. 1). The Park covered an area of only 13 424 ha, its size limited by boundaries of adjoining pastoral leases. The reserve was vested in the National Parks Board in October 1965. Tracks initially established by W.A. Petroleum during attempts to discover oil provided access to the magnificent and unique scenery of the Range.

In February 1968, the Shire proposed that the southern part of the Yardie Creek pastoral lease from Tantabiddi Well to 6 km south of Yardie Creek (the watercourse) be added to the Park. The area was transferred to the Park as Location 106 in December 1969, increasing the Park area to 50 581 ha.

In 1974, the status of the Park reserve was amended to Class 'A' and it was named 'Cape Range National Park'. The National Parks and Nature Conservation Authority (NPNCA) is now the vesting body, following the replacement of the National Parks Authority in March 1985, when responsibility for management was assumed by CALM.

3.3 Park Extension Proposals

In 1974, the Conservation Through Reserves Committee (CTRC) recommended to the Environmental Protection Authority (EPA) that the existing Park be expanded to include important features that would incorporate a more representative cross-section of the northern, western and eastern coastal areas adjacent to the Park (Fig. 3). The proposed extension included vacant Crown land (formerly part of Yardie Creek Station), parts of the Exmouth Gulf pastoral lease not used for grazing and Reserve 31637 at Tantabiddi Creek. The CTRC also recommended that the EPA prescribe conditions which should apply before exploration may be permitted in the National Park.

The CTRC's report was reviewed and approved in principle by the EPA in 1975 and subsequently endorsed by Cabinet.

When the western area (Location 106) was added to the Park and gazetted as Class 'A' reserve, additional proposed areas to the north, east and south were not included. Lyndon Location 97, on the southern boundary of the Park, was acquired by the Commonwealth in 1975 for an RAAF bombing range (Fig. 2).

The National Parks Authority recommended to the EPA in 1976 that it seemed appropriate to extend the Park boundaries to the east to Murat Road so as to include all the gorge scenery in the area covered by pastoral leases, and to the north-east along the Cape Range itself.

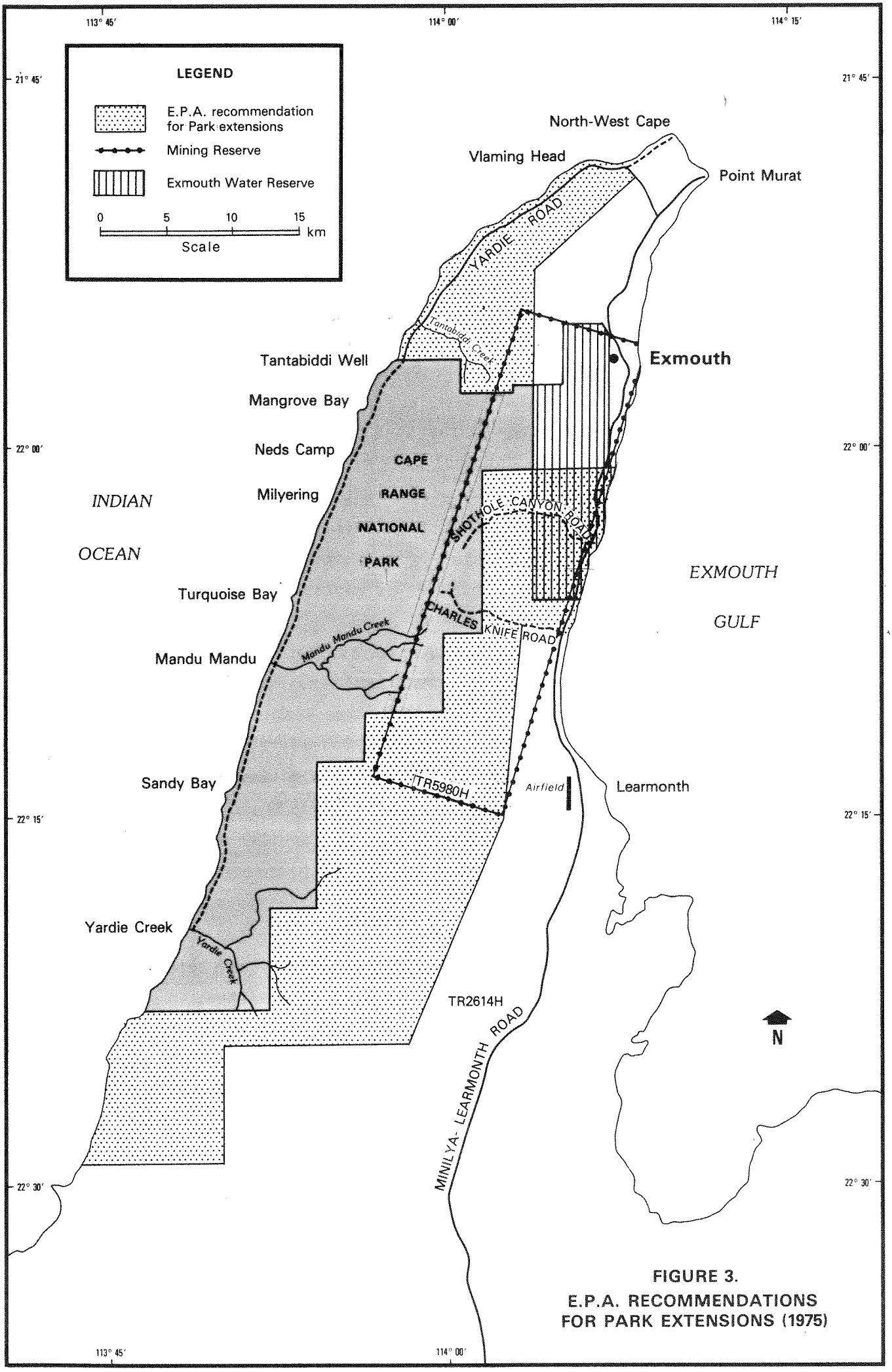

FIGURE 3.
E.P.A. RECOMMENDATIONS FOR PARK EXTENSIONS (1975)

In the same year, the National Park was proclaimed as Crown land under the Petroleum Act, thereby allowing exploration for oil and gas within environmental guidelines laid down by the EPA. Despite this proclamation, in 1977 the Mines Department lodged an objection to the proposals to extend the reserve north and east, because the areas were subject to mineral and/or petroleum tenements (See 3.1).

In 1979 Cabinet rescinded the earlier endorsement of the EPA recommendation to extend the Park north from Tantabiddi Well to Vlaming Head, but directed that this area be managed in sympathy with the Park.

In 1981, the National Parks Authority reaffirmed its views to the Minister for Lands that the National Park boundary be extended eastwards and it contended that, provided adequate precautions were taken with limestone extraction for a proposed steel mill, the Park could still be extended (See 7).

3.4 Park Management

From the time that it was first established until the first resident ranger was located in Exmouth in 1974 the Park was managed by an occasional visit from a mobile ranger. Considerable assistance was provided by the district Civil Commissioner in the early years, followed by support from the Shire when it was formed in 1979. The present level of staffing is one resident ranger, with a mobile ranger assisting during the tourist season from April to October.

Although development has been minimal, limited supplies of bore water are available, some borehole toilets are provided, and picnic areas, camping areas, walk trails and roads have been established.

Vegetation on both the coastal plain and the Range is so sparse that fires quickly burn out. Nevertheless, there is moderate risk of damage to campsites and habitats by wildfires. Open camp fires are banned to reduce the risk of wildfire and to prevent damage to the sparse natural vegetation by collection of firewood. Programs to control goats and foxes have been undertaken. Degraded areas, including unnecessary tracks, have been closed off and rehabilitation initiated.

4. IMPLICATIONS FOR MANAGEMENT ARISING FROM HISTORICAL USE, MANAGEMENT PRACTICE, PHYSICAL AND ENVIRONMENTAL CONDITIONS, AND MARINE PARK PROPOSAL

4.1 Historical Use

The effect that Aboriginal occupation may have had on park resources is unknown for two principal reasons:

1. The peninsula has undergone dramatic changes in climate during the late Pleistocene and the Holocene periods (i.e. the last 100 000 years). This would have tended to mask any changes that may have been induced by Aboriginal occupation.

2. Evidence of past Aboriginal use is entirely prehistoric and there is little documentation of Aboriginal occupation and land management practices in the area.

In contrast, the effect of European settlement, particularly through pastoral use from the late 1880s to the mid 1900s, has been dramatic. Stock, feral animals and weeds have been introduced. Fences, windmills and buildings have been constructed. Vehicle tracks have been established and fire has been used as a management tool. These activities have favoured the invasion of buffel grass, (which has replaced the native spinifex , in many parts of the coastal plain), modified wildlife habitats, altered landscape characteristics and caused erosion.

4.2 Management Practice

As outlined in Section 3.4 there has been little development in the Park, and management has attempted mainly to respond to demands for use and to protect and conserve natural resources.

New roads have opened up opportunities for recreation and facilities have been developed. This has largely established the future direction of development in the Park and will have the most significant influence on patterns of use.

One legacy of past management practice is the urgent need for upgrading and in many cases re-locating facilities including campsites and access roads. Camping is restricted to designated sites, and some vehicle tracks to sensitive coastal areas have been closed. Generally, however, past management policies need retention.

4.3 Physical and Environmental Conditions

Most of the Cape Range peninsula and the Park is a heavily dissected limestone range. The Ranges though pleasant and attractive in cooler months are hot and inhospitable in summer. The coast, while cooler than the Range due to the influence of sea breezes, is also hot in summer. In winter coastal temperatures range on average between 14°C overnight to 24°C during the day.

The Park includes two major physiographic units (Fig. 4) possessing very different opportunities for recreation:

1. The coastal plain, where major access, camping and other facilities are located.

2. The dissected Range, where access is limited to only two roads, a rough four-wheel-drive track and a number of walk trails.

The implications for management are twofold:

1. Intensity of use will be higher in the cooler winter months than in summer. Most development for camping and other use will occur on the coastal plain. Staff requirements will need to reflect these factors and roads and other facilities will have to be carefully sited.

2. Visitors need to be aware of natural hazards and how to prepare for a trip. Management will need to provide and disseminate public information on this aspect, establish search and rescue protocols, and provide appropriate staff training and equipment.

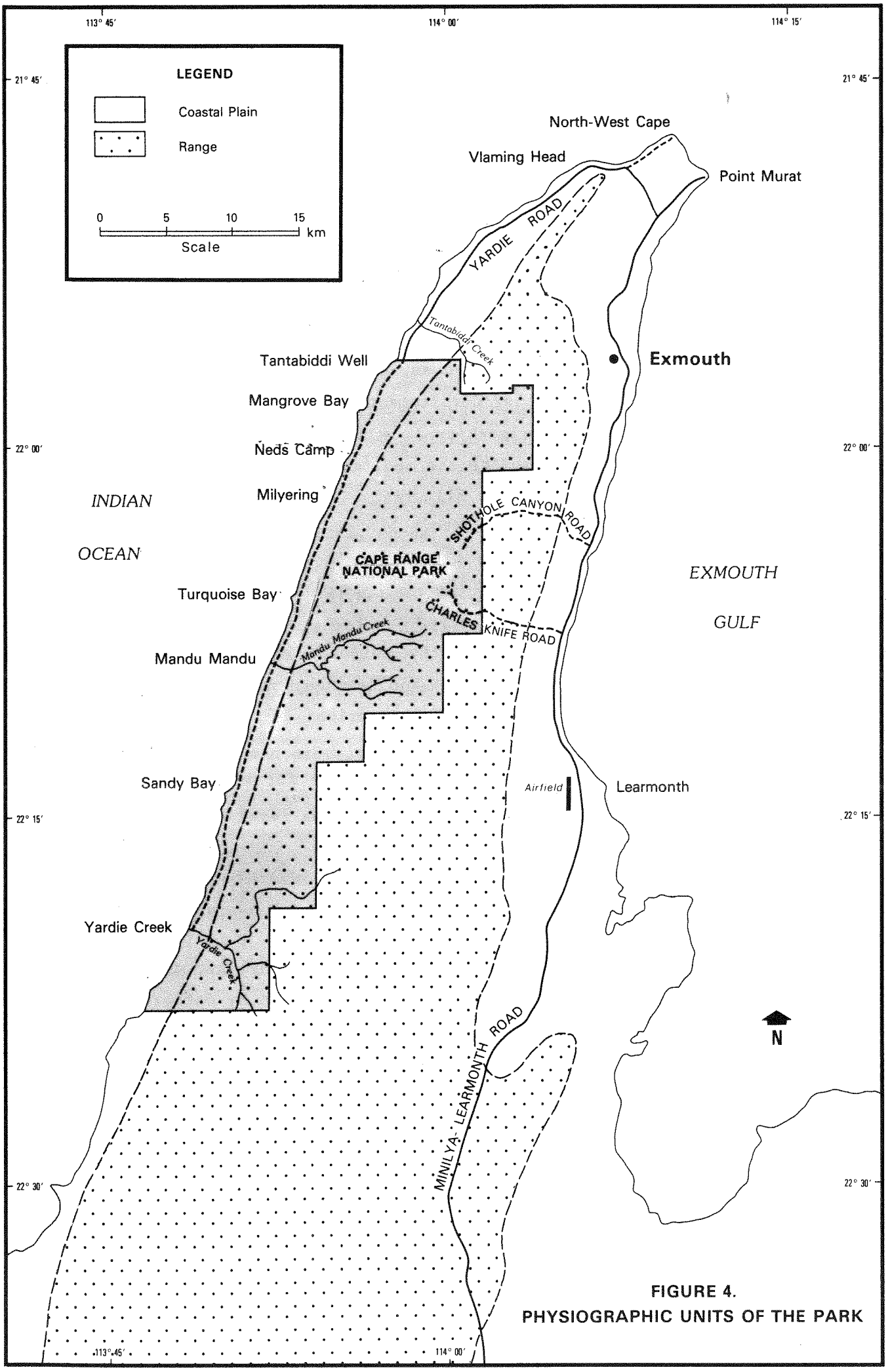

FIGURE 4.
PHYSIOGRAPHIC UNITS OF THE PARK

4.4 Marine Park Proposal

The proposed Marine Park will extend for around 260 km along the coast from north of Exmouth around the Cape and south to Amherst Point, and seaward for about 10 nautical miles (Fig. 2). Land components will include coastal sections of pastoral leases, and other Crown land.

The proposal to establish Ningaloo Marine Park has already had a major influence on the management of Cape Range National Park. This is particularly true of the heavily-used, nearshore area of the coastal plain. Most of the pressure for development of visitor facilities in the Park will arise from people seeking to visit the Marine Park. Current road development will accommodate the additional traffic, and a visitor centre to be constructed at Milyering (see 6.2) will meet the orientation requirement of Park users.

5. MANAGEMENT OBJECTIVES

Management objectives derive from the purposes and uses of national parks as defined in the CALM Act 1984 and from departmental policies for management. Objectives fall into two categories:

1. General objectives relating to the purpose for which the land is reserved.

2. Specific objectives applicable to a particular park.

The CALM Act (1984) requires that management plans of national parks incorporate as an objective the purpose for which the land is reserved i.e., 'to fulfil as much of the demand for recreation by members of the public as may be consistent with the proper maintenance and restoration of the natural environment, the protection of indigenous flora and fauna and the preservation of any feature of archaeological, historic or scientific interest'.

Management proposals specify the intent of management, and the strategies outline the means to implement the objectives.

General management objectives for Cape Range National Park are to:

1. Protect and conserve indigenous plants and animals and their habitats.

2. Protect and conserve physical, cultural and scenic resources.

3. Provide opportunities and facilities for appropriate public recreation.

4. Regulate use to be consistent with the maintenance and protection of natural resource values and to minimise conflict between uses.

5. Promote visitor safety, awareness and appreciation of natural processes and the scientific and cultural attributes of park resources.

6. Provide information, education and interpretive programs.

Specific management objectives for Cape Range National Park are to:

1. Maximise contact between visitors and staff.

2. Maintain scientific reference areas.

3. Conserve and protect groundwater resources.

4. Control feral animals and noxious weeds within the Park.

5. Restore natural conditions which have been altered by inappropriate management in the past.

6. Contribute to the cultural, economic and social development of the community.

7. Integrate management of the Cape Range National Park with the Ningaloo Marine Park and with the coastal reserves north of the Cape Range National Park.

8. Manage any additional environments and landscapes which may be incorporated into the Park to enhance the representativeness of the Park estate.

6. MANAGEMENT PRESCRIPTIONS

6.1 Roads and Associated Development

Vehicle access is one of the key issues affecting management control and development of the Park.

6.1.1 The Coastal Plain

Vehicle access on the coastal plain began with meandering tracks established during early pastoral use. They were largely replaced by straight seismic lines constructed during petroleum exploration in the 1950s. Subsequently, a coastal road was developed from Vlaming Head to Neds Camp. A further 3 km was constructed in 1980 to accommodate the establishment of a petroleum exploration well. From this point the Yardie Road deteriorates to a track, which is occasionally graded by the Shire following maintenance of the Vlaming Head - Neds Camp section. This road and track provide the only access to camping areas and places of interest along the coast and the foot of the Range north of Yardie Creek.

Access to the Park from the south is by a station track which runs north through Ningaloo Station and the Defence Department land to the southern portion of the Park below Yardie Creek. Yardie Creek forms a barrier preventing traffic between the north and south coastal parts of the Park, except for four-wheel-drive vehicles which may cross the sandbar at the creek mouth, when conditions permit.

Tourist road funds have been acquired from the Main Roads Department (MRD) for a complete re-design and relocation by CALM of the Yardie Road between Tantabiddi Well and Yardie Creek. By agreement, construction and maintenance work is carried out by the Shire of Exmouth. A road of curvilinear design is being built along the base of the Jurabi Terrace, up to 500 m inland from the existing track and away from low-lying samphire flats. It takes advantage of the rise in elevation and provides views of the sea which cannot be obtained from the present track, except through occasional breaks in the dunes. Construction of the new road was commenced prior to the introduction of the CALM legislation which requires that such operations be provided for in an approved management plan.

The new road was designed by CALM to have minimal visual impact and incorporate construction specifications and design standards established for roads in national parks. The alignment has been carefully selected to avoid sensitive areas and disturbance widths have been kept to a minimum in keeping with resource conservation objectives for the Park. Pre-construction assessment for flora, geological features and archaeological deposits has been carried out.

The program has been staged, with priority sections constructed to take maximum advantage of stable sections of the existing track and funds available each year from the MRD. The MRD assisted greatly by surveying the alignment to provide constant radius curves thus ensuring that the road will meet standards required for bitumen sealing without reconstruction.

Prescriptions

1. The construction program will continue in stages, until a new road runs from the Park entrance (Tantabiddi Well) to Yardie Creek, aligned mostly inland of the existing track. It is expected to be constructed from Tantabiddi to Mandu Mandu by the end of 1988.

2. Short spur-roads from the new road to campsites and day use areas will be constructed in such a way that they do not interfere with maintenance of coastal features. Following completion of the new road, those portions of the existing coastal track no longer required will be rehabilitated.

3. The track south of Yardie Creek will not be upgraded nor is there any intent to bridge Yardie Creek. Future road development, if any, south of Yardie Creek will hinge to a large extent on proposals yet to be formulated for Ningaloo Marine Park.

4. Sealing of parking areas and sections of road at Milyering will be done as a priority. Sealing of the road will continue from the Park entrance to Yardie Creek as funds permit.

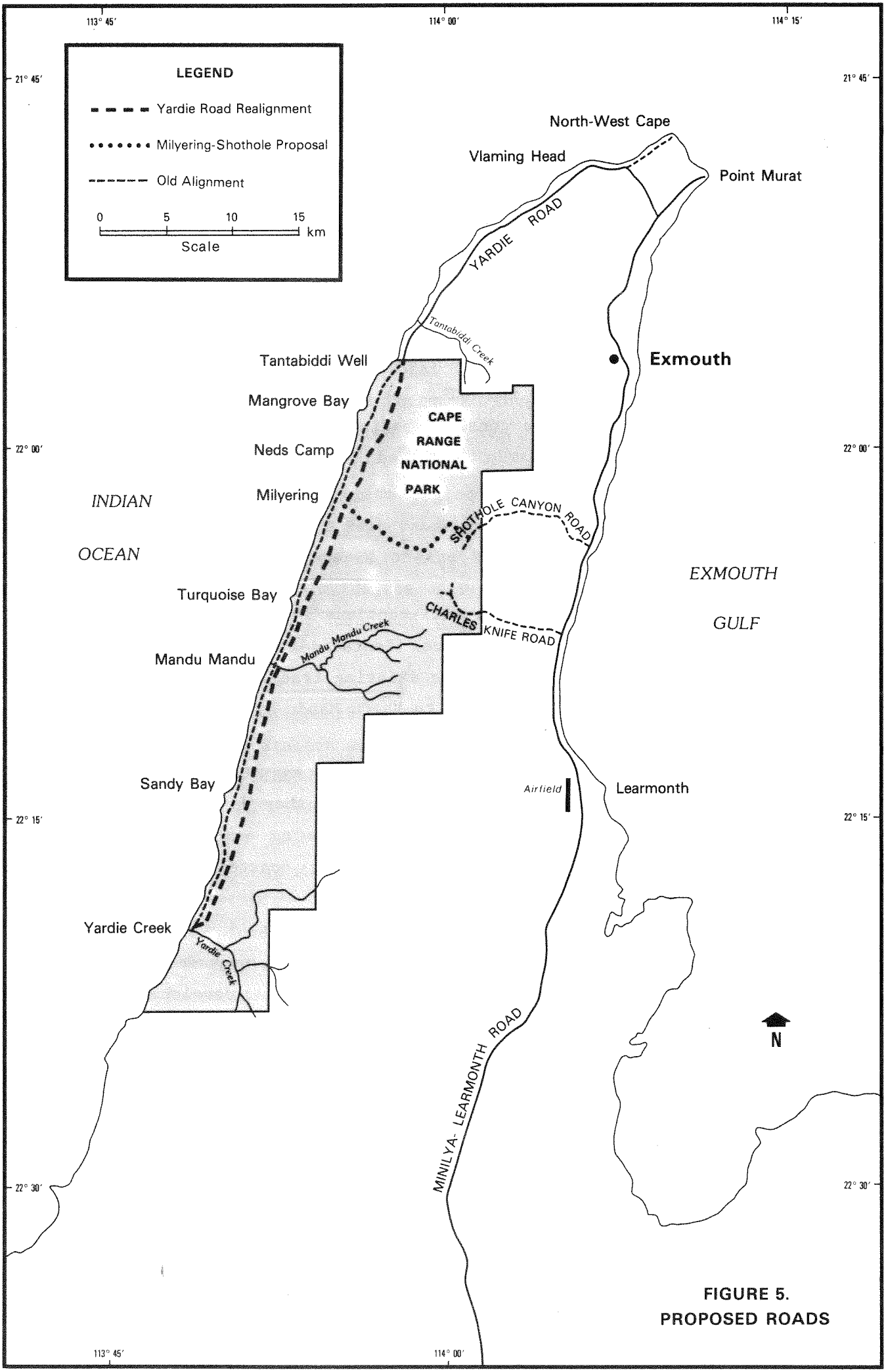

FIGURE 5.
PROPOSED ROADS

6.1.2 The Range

Two scenic roads (Shothole and Charles Knife) and a four-wheel-drive track (Learmonth to Sandy Bay) provide access to the Park from Murat Road on the eastern side of the Range (Fig. 5).

Shothole Road follows the bed of Shothole Canyon through richly coloured limestone formations. In sharp contrast, Charles Knife Road twists its way onto the plateau via narrow ridges towering over precipitous canyons. It has a spur road leading to the Thomas Carter Lookout, where a walk trail leads north to link up with the terminus of Shothole Road.

The Learmonth to Sandy Bay 4WD track is the only track traversing the Range and must be used with caution. It provides an important recreation opportunity with its relative isolation, offering visitors the experience of remoteness.

A new road over the Range, linking Milyering to Shothole Canyon, has been planned along a ridgeline (Fig. 5). Construction should follow completion of the Yardie Road realignment, possibly beginning around 1991. Should engineering or other difficulties be too great to link the road into Shothole Canyon, it could be linked to the end of Charles Knife Road, although the preferred link is to Shothole for the following reasons:

1. It gives widely contrasting perspectives by siting one section on the bottom of the canyon and the other on the ridge top.
2. It provides a closer link to Exmouth than via Charles Knife.
3. It prevents a substantial increase in traffic on the very narrow Charles Knife Road, which would create safety problems.

Prescriptions

1. Existing roads and tracks will be maintained as they are except for Charles Knife road, which will be sealed up to the plateau.

2. Detailed investigation and site location of proposed alignment over the Range will take place during the period of this plan.

6.2 Operations and Visitor Centre at Milyering

Although the Ningaloo Marine Park will extend north and south of the Cape Range National Park, many facilities will be shared and the management of both parks will be integrated to maximise efficiency. An evaluation of suitable sites for a combined operations and visitor centre has been made by CALM between Exmouth and Yardie Creek. Milyering has been chosen from this study as the most suitable site for both functions.

Prescriptions

1. A Visitor Resource Centre and associated facilities will be developed at Milyering (Fig. 6) with assistance from a 50% grant provided through the Australian Bicentennial Authority.

2. CALM will install facilities for staff and operations at Milyering, associated with the Visitor Centre.

6.3 Camping Areas

As a general rule most park visitors are accommodated in Exmouth. Camping facilities within the Park are low-key with only the most basic facilities provided.

The Ningaloo Reef is becoming such a popular recreational area, particularly in the peak of the winter season, that there may not be enough camping sites along the coast. This occurs along the coastline within the Cape Range National Park and further south. There are about eighteen camping areas along the coast within the National Park and these are mostly located in a narrow belt of coastal dunes or next to creek beds. The capacity of individual camping areas ranges from single sites to about 20 sites. The maximum camping capacity in existing areas at any one time is around 70 sites for the whole Park, though this is often exceeded under peak pressure.

Although all are serviced with rubbish bins, only four sites have toilet facilities. Furthermore, there is little or no potential to provide

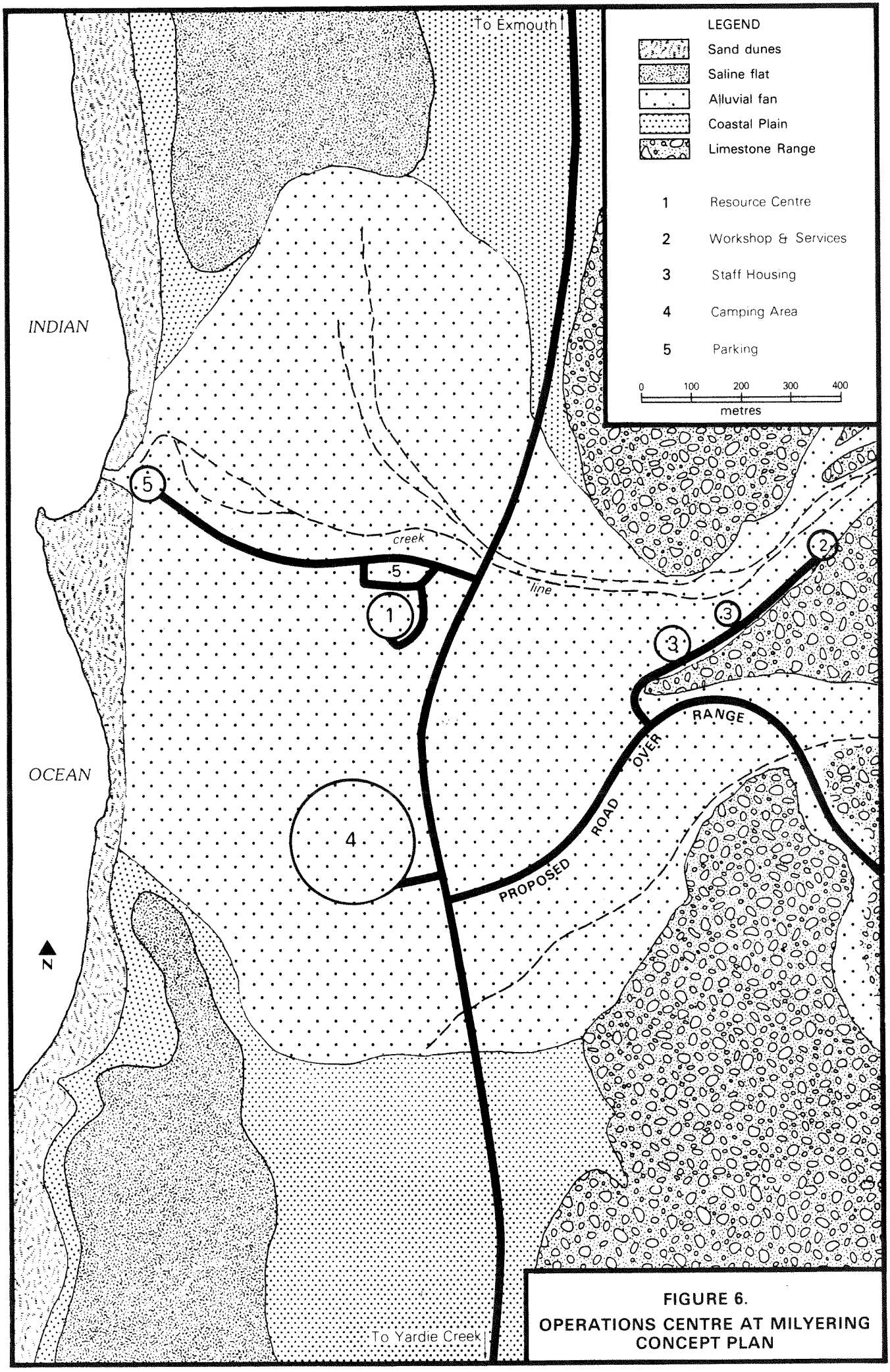

FIGURE 6.
OPERATIONS CENTRE AT MILYERING CONCEPT PLAN

shade and shelter at these sites as there is only rock and nutrient-poor sand. Many sites are visually obtrusive and some may be in close proximity to sites of archaeological importance.

Existing camp-sites are popular with those visitors seeking relative isolation and solitude, as well as direct access to the resources of the adjacent reef and waters. It is important that these sites are maintained as far as possible, but competition for them will intensify as visitor numbers increase. Additional sites will be developed and limits placed on available sites. Advance booking may be required in the longer term.

Prescriptions

1. Camping facilities within the Park will continue to be low-key and basic. It is assumed that most visitors to the Park will be accommodated in Exmouth.

2. Some visually obtrusive or poorly located sites will be phased out, re-located or converted to day-use areas and only the better sites will be retained. Facilities will be provided in keeping with the low-key nature of each camping area.

3. Additional camping areas will be created on sites which have the capability to sustain use and are suitable for providing facilities and site amenity (including the use of native shade trees). These sites may be provided with toilets, ablution blocks and potable water subject to the availability of resources.

4. Where necessary, management procedures requiring advance booking of campsites will be brought into place. The fees set should reflect the nature of the site, facilities provided and equity of use.

5. During the term of this plan all sites will be evaluated and planned in accordance with an approved Recreation Development Plan.

6.4 Launching Ramps

Other than at Tantabiddi Creek, where a concrete ramp exists, launching and retrieval of boats takes place across beaches. This method is generally suitable for boats up to 5 m in length, although low tides together with nearshore rock platforms can affect the times that this can be done.

A number of beaches are suitable for launching boats without ramps, particularly dinghies and other small craft suitable for use inside the lagoon. Launching ramps for larger craft require a greater commitment of funds and consideration of other factors, eg. safety.

Prescriptions

1. Existing and potential beach launching sites suitable for various craft will be evaluated and where appropriate improvements will be made and ramps installed.

2. Fixed concrete ramps are expensive and give rise to problems of sand accretion, so cost-effective ramps designed to suit changing beach conditions will be investigated.

6.5 Interpretation Sites and other Day-use Facilities

6.5.1 Interpretation

At present, some information on park resources is provided at the joint CALM - Tourist Bureau office in Exmouth and at an information shelter at Tantabiddi Well.

There is great scope for the provision of improved information facilities within the Park, including modern interpretation displays and programs dealing with aspects of the natural history of the terrestrial and marine environments of the area. Such facilities will greatly enhance the enjoyment visitors obtain from the parks. In many other parks, resource materials, guided tours and other activities are very important and acclaimed features of management. Given the range of

natural resources in the Cape Range area there is enormous potential for this type of facility.

Prescriptions

1. There will be an information-education resource centre at Milyering with displays following coral reef and terrestrial ecology themes; resource materials for identification of, and information about, marine and terrestrial wildlife, facilities for natural history and Aboriginal pre-history studies, information about the features of the parks, and visitor facilities.

2. At Yardie Creek, interpretation programs will be developed dealing with a range of features including the estuary, the gorge, fauna, Aboriginal pre-history and fossil coral reefs. A number of walk-trails will be developed here to provide access to these features.

3. At Mangrove Bay a bird-observation hide will be constructed on the southern lagoon. A board-walk through the mangal (i.e. mangrove habitat) will be installed, with interpretation programs on mangal ecology, water-birds, Aboriginal pre-history and the fossil coral reef.

4. Interpretation programs will be developed at other points of interest between Tantabiddi and Yardie Creek as funds permit.

5. Subject to adequate funding, trained staff will be at the Milyering Visitor Centre, and the secondary centres at arranged times, to conduct interpretation programs and to assist visitors to use the interpretive facilities.

6.5.2 Fauna Observation Sites

Wildlife is a feature of the Park, especially kangaroos, rock-wallabies, emus, reptiles and a variety of parrots, finches and other birds. These peculiarly Australian creatures are a great attraction for city and overseas visitors. Viewing wildlife is a major alternative activity for people using the resources of the adjacent Marine Park.

Prescriptions

1. Special observation points will be established where visitors, including tour groups, can expect to see wildlife. These may include artifically constructed wildlife watering places.

2. Siting and design of facilities will be carefully planned to ensure that the animals and habitats are not disturbed, and that ecological balances between competing species are not upset. Interpretive programs will be developed at these sites.

6.5.3 Other Day-Use

Few facilities have been provided in the Park due to staff and financial constraints, although day-use facilities such as parking areas, picnic tables, information (including signposting), toilets and walk trails have been provided at some locations.

Day-use is likely to increase markedly as tourist accommodation facilities in Exmouth expand. It follows that the provision of day-use facilities in the Park will need to be expanded.

A primary aim of management is to encourage visitors to leave their vehicles to experience, as fully as possible, the features of the Park.

Prescriptions

1. All facilities and development including signs and parking areas will be planned in accordance with an approved Recreation Development Plan.

2. Entrance fees for day-use may be introduced to provide for partial cost-recovery of providing and maintaining facilities.

3. Parking and picnic areas will be upgraded at selected points along the coast, especially at boat-launching points and interpretive sites. Day-use of camping sites will be discouraged.

6.6 Rehabilitation

Both management staff and park visitors need to be mindful that the Cape Range peninsula is one of the most arid environments in Australia; rainfall is low and variable, land forms are highly susceptible to degradation and erosion, and plant growth is slow. This means that destabilization of coastal dunes with visual impairment of the landscape can occur easily, resulting in a serious loss of amenity and loss of use of resources, particularly on the coast. Rehabilitation in such areas is a protracted, difficult and costly exercise.

Several tracks to the coast have already been closed, many of these are very visible more than 10 years after closure. Petroleum exploration tracks established in the 1950s are also still visible in many areas.

The existing track to Yardie Creek poses the largest single problem for management. It transgresses low-lying samphire flats, is the origin of many unplanned tracks and provides little amenity to visitors.

Prescriptions

1. Vehicles will only be permitted to travel on approved roads and tracks, and camping will be permitted only at approved sites.

2. Unused tracks, damaged dunes, road material pits, or other disturbed areas will be rehabilitated according to the Department's policies and procedures. Where possible, the disturbed areas will be treated to encourage natural regeneration. Where this is not possible and vegetation must be re-introduced, only plants naturally occurring in the area will be used. Exotic trees will be progressively removed.

6.7 Fire

Arid environments are particularly sensitive to fire. The post-fire recovery time for vegetation and fauna can be very long. Sometimes many years are needed before the full species diversity and abundance are

restored. Any increase in the frequency of fires (which can be brought about by deliberate lighting) usually brings about vegetation changes which can mean loss of specific habitats, together with associated specialized fauna.

On the coastal plain, previous burning by pastoralists has changed the grassland in some areas of the Park from one dominated by spinifex to one dominated by buffel, an introduced species. The application of fire regimes which favour introduced plants and alter or destroy natural vegetation is inappropriate in a national park.

Vegetation is generally sparse in the Park, and fires on the coastal plain are not readily sustained. Fires occur naturally in the Range from time to time but do not easily spread to the plain as they are inhibited by the sea breeze and by the steep slopes of the Range. Nevertheless, camp fires have been banned in the Park for many years, to discourage campers from using the native vegetation as fuel.

Prescriptions

1. In the Range, where deep canyons and narrow ridges make access difficult and where fires pose no threat to life and property, no action will be taken to extinguish wildfires, to reduce fuel loads by burning, or to construct firebreaks.

2. On the coastal plain no fuel reduction burning will be undertaken, and no firebreaks will be constructed. The new coastal road and associated spur roads will be used as lines of containment in the event of a fire. Two slip-on fire fighting units will be stationed at Milyering for use by rangers to ensure that vegetation damage is kept to a minimum. Campfires will not be allowed.

6.8 Safety

With respect to climate, the Cape Range area is cooler in winter, however, in summer temperatures sometimes exceed 50°C and dehydration can quickly overcome the unprepared or unwary, with fatal results. Other hazards to visitors include unstable rock formations in the canyons, fires, cyclones, snakes and biting insects and getting lost. These potential problems apply in particular to the rugged Range.

Use of motor vehicles is always hazardous unless drivers exercise proper care. Although the new Yardie Creek road will enable speed to be attained in an emergency, it has been designed using visual impact criteria and is being constructed in a series of alternating curves through the scrub and grassland. Consequently, the length of road visible to occupants of vehicles will be limited, reducing the tendency to drive fast.

This is important as the Park is renowned for its abundance of kangaroos which is a major attraction for many visitors. These animals quite often remain on the roadway, or jump from roadside vegetation across the path of vehicles.

That visitors can so closely approach these wonderful animals from the road is a precious asset, with a demonstrated tourist potential. It is appropriate, therefore, that speed restrictions reinforce the road design objectives and control speeds at levels which will protect both people and animals.

Prescriptions

1. Emergency and evacuation plans will be prepared and integrated with regional community plans.

2. Literature and direct advice will be provided to the public concerning safety, emergency and search procedures and protocols in the Park.

3. Use of walk-trails and cross-country hiking in the Range will be discouraged in summer. Hikers and back-packers will be expected to check in at the Visitor Centre before, and after, their trip.

4. Vehicle speeds in the Park will be limited as follows:

Yardie Road	60 km/h
Spur Roads to the Coast	40 km/h
Shothole Road in the Range	40 km/h
Charles Knife Road	40 km/h
Other tracks	40 km/h

6.8 Defence Land

The Department of Defence holds two areas of freehold land adjacent to the Ningaloo Marine Park. They are located at the head of the Cape (location 44) and between Cape Range National Park and Ningaloo Station (location 97) (Fig. 7).

Recreational use of the coast in both areas has increased over the past years as it has elsewhere in the region. This has resulted in severe degradation of many dune systems with a proliferation of vehicle tracks and camping areas. Whilst there is no active management of the coast, misuse will unfortunately continue.

In location 44, the Shire of Exmouth has established a boat ramp and shore-based facilities south of Cape Murat at Bundegi to service the anchorage for charter and other boats. Use of the land is the subject of an agreement with the Shire and the Defence establishment.

Southward from North West Cape, the Shire with the assistance of State funds, has installed several roads to the coast and parking areas.

In location 97 no land management is practiced other than closing off the coastal plain by signs and occasional aerial surveillance when the weapons range further inland is declared active.

6.9 Feral Animal Control

Goats, foxes and cats have created sufficient management problems in the protection of wildlife populations to warrant control programs. Goats probably constitute the major feral animal problem in the Park due to their vigorous grazing habits and through erosion from their tracks. Large groups can be seen in the Range and sometimes on the coastal plain, especially in summer. Their numerous tracks disfigure the landscape and are evident throughout most of the Range. Some goats are trapped each year at Yardie Creek and trucked out.

Agricultural Protection Board officers have laid '1080' baits in the coastal dunes each year during the turtle nesting season, which has

reduced fox numbers, but it is not known whether this program has been effective in reducing feral cat numbers.

Foxes have resulted in the extinction of rock wallabies (*Petrogale lateralis*) from the Range except in refuges in some gorges.

The effectiveness of current and future feral animal control programs is constrained by the ruggedness of the Cape Range which makes access extremely difficult.

Prescriptions

1. The baiting program for foxes will continue, as it is essential for the protection of turtles and rock wallabies. This will be expanded to include feral cats. It will be monitored to determine changes to baiting techniques and schedules.

2. The goat trapping program will continue, and be expanded and modified to take advantage of favourable conditions such as drought.

3. Other techniques for control including helicopter mustering and shooting will be investigated and employed where effective and appropriate.

4. Feral cats, goats and foxes will be shot as and when opportunities arise.

6.10 Archaeological and Palaeontological Sites

The Cape Range peninsula has a number of sites containing evidence of earlier Aboriginal occupation. Most known sites are on the coastal margins where the open terrain would have been easier to traverse than the Range, and where sources of food and water would also have been more accessible.

There are many shell middens in coastal dunes, and there is evidence of occupation beneath rock overhangs and in caves in the foothills and in the Range.

Western Australian Museum staff have undertaken a number of surveys in the Park, however, though limited in extent, it is obvious from their preliminary work that further investigation is needed.

Radio carbon dating of shell material in coastal dunes has indicated dates of 6-7 000 years Before Present (B.P.). The most significant dating has been that of 25 200 (±250) years B.P. for material excavated from an escarpment rock shelter. The age of this Aboriginal site makes it the oldest known of a community based on a marine economy in Australia.

The fossil record of Cape Range is important for its fossil links between Australian and Indonesian marine faunas in both macro and micro palaeontology. The Late Pleistocene and Miocene echinoids are particularly significant. Younger marine fossil material includes extensive deposits of corals and molluscs. Range top caves contain valuable terrestrial fossil material from species such as the Tasmanian tiger).

Prescriptions

1. Locations considered for the development of new roads, camping areas, walk trails and interpretation sites will be investigated in the planning stages for the presence of Aboriginal sites or fossil material. The significance of any sites found will be evaluated and, if necessary, development proposals will be modified.

2. Further research will be encouraged and funds will be sought for this purpose.

6.11 Research

Individuals and groups from various institutions have undertaken research in the fields of geology, geomorphology, palaeontology, archaeology and hydrology. Recreation, biological and botanical surveys have also been made.

Research fulfils an extremely important function by increasing our understanding of the past and present processes in the area, determining

the extent of natural resources and assessing their value. An immediate research requirement is the determination of the impacts of visitor use and management proposals on natural resources. Research is needed so that particularly valuable resources are not degraded or lost unintentionally and to ensure informed management judgements.

Research is also needed on the impact that development of the Park may have on the regional economy.

The proposed facilities at Milyering will undoubtedly provide more incentive for researchers with interests in the Park.

Prescriptions

1. Research by other agencies and individuals in the Park will be encouraged, provided that it conforms with management objectives.

2. Support may be given to projects which increase the knowledge of Park resources and their management requirements, provide guidelines to management for limiting its impacts and are not disruptive to Park use.

3. Monitoring of management activities will take place to determine the impact of proposals.

7. PARK EXTENSIONS

Past proposals for extending the Park are outlined in Section 3.3 and illustrated in Figure 3. The proposals have been based on:

a) Incorporation of representative landform and conservation units of the Cape Range Peninsula.

b) Rationalisation of management related to recreation and tourism.

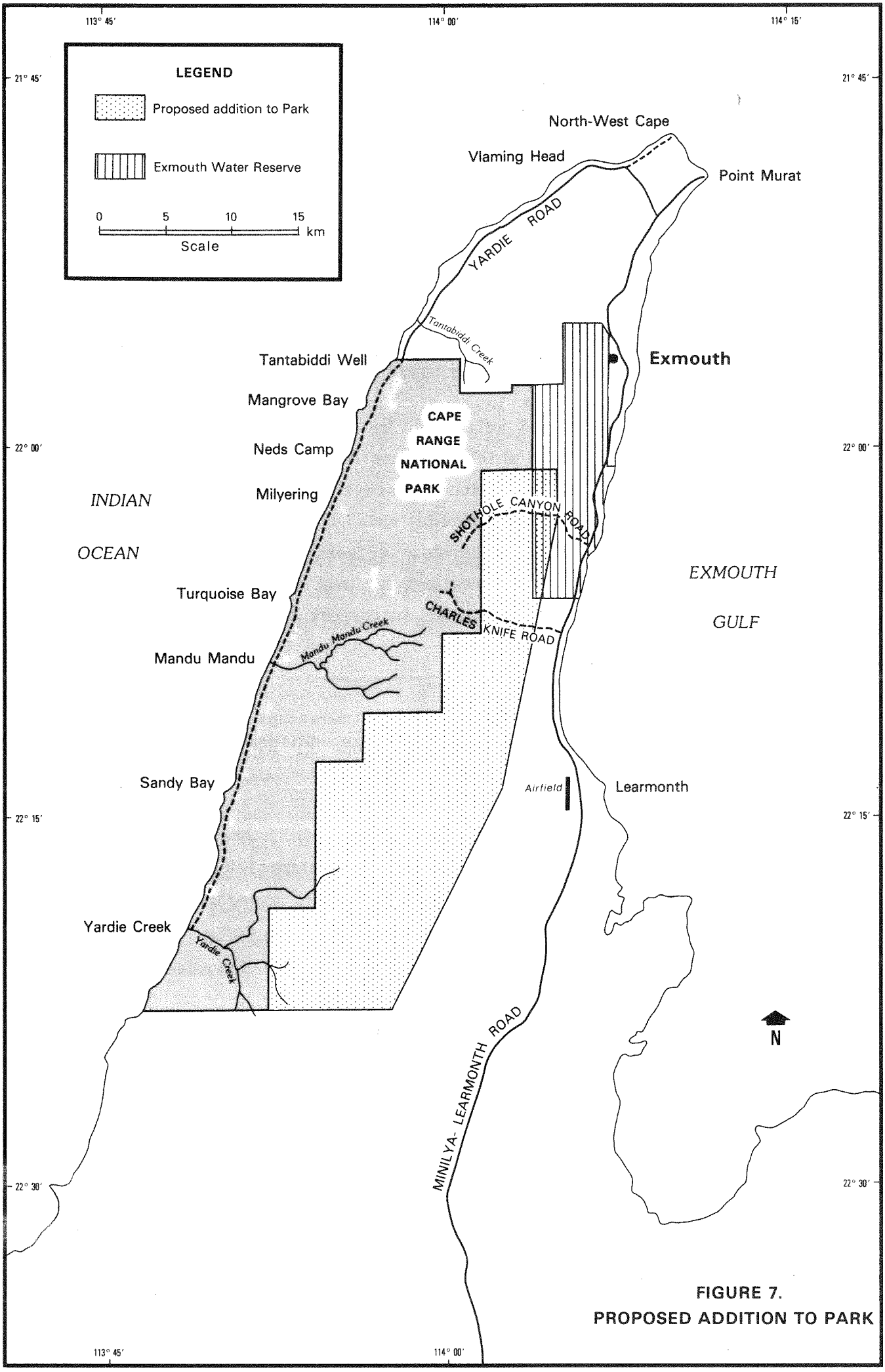

FIGURE 7.
PROPOSED ADDITION TO PARK

c) Protection of the variety of scenic attractions to ensure the commercial viability of tourist development in Exmouth and the region.

The original pastoral lease boundaries, which largely dictated the National Park boundaries, often enclosed areas of no pastoral value, such as the north-west portion of the Exmouth Gulf pastoral lease which comprises extremely rugged terrain. Conservation and recreation values of the area are now being recognised. The discovery of fossil material within the proposed extension area is one such example.

The addition of the land delineated in Figure 7 would incorporate some of the most scenic areas which visitors to the peninsula assume are part of the Park. It would also incorporate the complete catchments of most watercourses, and a physiographic unit in the Park which is highly fossiliferous and of considerable scientific importance. Moreover, recreational use could be provided for and managed in a positive and complete way to ensure that values and opportunities are retained.

Prescriptions

1. The Park be extended eastwards as delineated in Figure 7 to include:

   a. That western portion of Exmouth Gulf station in the Range which is not used nor viable for pastoral use.
   b. Vacant Crown land encompassing the heavily dissected, and, therefore most scenic areas along the Range-top and eastern escarpment.

2. Water resources be provided for on the basis that the visual impact of development needed to extract water be minimised.

8. MANAGEMENT STRATEGY

8.1 Administration

Cape Range National Park, Ningaloo Marine Park and the coastal reserves are to be managed and administered as a unit.

The administrative centre for the Parks will be located in Exmouth, where an office combined with an information centre will provide the first contact information for prospective Park users. The visitor centre at Milyering will function as the meeting place for both Cape Range and Ningaloo, from where visitors will orientate themselves and proceed to points of interest. Management operations for all Parks will be based predominantly at Milyering and some staff will reside there.

The District Manager will work from the office in Exmouth and will be responsible for day-to-day administration of, and operations for, CALM lands in the Gascoyne Region. In turn, the District Manager will be responsible to the Regional Manager located in Geraldton.

8.2 Staff

The current deployment of staff for Cape Range and Ningaloo provides one district manager and one park ranger based in Exmouth, and two mobile park rangers located on the west coast during the winter season (April-October).

Minimum staff requirements to service Cape Range, Ningaloo and associated reserves in addition to the present District Manager and Resident Ranger are:

One Marine Park Officer
One Marine Technical Officer
One seasonal employee, for staffing of the Milyering Visitor Centre
Three seasonal employees (Mobile Rangers)
One seasonal interpretive officer.

8.3 Budget

Much of the Park development will rely on the initial boost provided by the Bicentennial grant for Ningaloo. This funding will enable the establishment of the Milyering Visitor Centre, incorporating interpretive information and field study facilities. On the other hand, this will place even greater demand on CALM to provide appropriate facilities in the Park, particularly day-use areas, campsites, information, walk trails, etc. There is also a requirement for on-going

funds for management and servicing of facilities, employment and training of staff and provision of support facilities.

Camping fees and fees for day-use will be set at realistic levels in order to offset on-going management costs (see 8.5).

Well-directed education and information programs generated from the Milyering centre should assist management of all the Parks, and the costs of these programs should be offset by reduced management costs.

The expansion of visitor numbers will be monitored and successive budgets framed accordingly to ensure management objectives are met.

8.4 Implementation

Implementation of the plan and development of facilities will occur on several levels.

1. Current programs of management and development will be continued.

2. An operational planning review will be conducted and a Recreation Development Plan approved for implementation. New proposals will be progressively implemented and modifications incorporated as management capability and availability of funds permit. Of priority is operation of the Milyering complex, particularly the Visitor Centre and associated facilities.

3. Staff acquisition and training will take place in accordance with priorities established by CALM, however, the critical dependence on staff for the successful management of Cape Range and Ningaloo is recognised.

4. Annual reviews of operations will be an on-going requirement of management as the Parks develop.

8.5 Strategy for Funding Park Management

Fees for camping in the Park will be continued; a fee for day-use will be considered and implemented as required.

Charges will be levied for conducted interpretive activities provided for commercial tours.

Agreements will be entered into with outside institutions, organisations and commercial tour operators that seek use of the information centre, staff services and camping facilities on a regular basis. These agreements should specify frequency of usage, charges for usage and levels of service required. The normal requirements of prior approval, supported by permit(s) where appropriate, will apply.

9. MANAGEMENT INTEGRATION OF CAPE RANGE AND NINGALOO

The establishment of the proposed Ningaloo Marine Park is expected to affect Cape Range National Park considerably. As more of the International and Australian public become aware that Western Australia has a rich, diverse and accessible coral reef on the north-west coast, visitor numbers, pressure for development of facilities and hence management pressures will increase significantly.

The two Parks complement each other by providing alternative recreational opportunities. When land temperatures are uncomfortably high, it is possible to cool off in the sea and when the weather is too rough for boating, it is usually because of strong cool sea breezes which make it possible to pursue activities on the land. Many of the pressures will, however, fall on the land, for it is there that people eat, sleep, clean-up, seek information and obtain access to the sea.

The two Parks will be managed integrally to increase efficiency of management operations. Although the Marine Park is some 260 km long, stretching both north and south of the Cape Range National Park, most of the facilities provided will be located between Tantabiddi Well and Yardie Creek, where many attractive natural features are found. This area is relatively close to Exmouth, where the majority of visitors will stay, and it is adjacent to some of the most accessible parts of the Ningaloo Marine Park.

10. IMPLICATIONS FOR NATURAL RESOURCES ARISING FROM MANAGEMENT PROPOSALS

10.1 Water Resources

Potable water resources on the western side of the Cape Range are very limited. There is only a thin lens of groundwater of varying quality over lying brackish water. Old pastoral wells and bores are used to exploit this fragile aquifer which varies in salinity between 1200 p.p.m. and 6000 p.p.m. (which is generally too salty for human consumption).

Apart from being important to terrestrial animals and birds of the area, the aquifer is known to be the habitat of endemic species of aquatic fauna such as the blind gudgeon) and the blind cave eel). It is important, therefore, that the integrity of the aquifer is maintained. Waste disposal and groundwater abstraction will have to be carefully managed.

The land which is proposed as an extension to the Park has potential for development of water for Exmouth. This will be provided for on the basis that access and facilities will have minimum effect on natural values, including scenic values.

A water harvesting program will be developed to meet visitor demands. Because of the complexities and limitations outlined, however, the provision of potable water and water of lesser quality will be costly and a policy of minimum water usage will be adopted throughout the Park. Wherever possible, alternative technologies will be utilized for servicing visitor needs, eg. composting toilets rather than septic tanks for effluent disposal.

10.2 Vegetation and Flora

Vegetation in the Cape Range peninsula is mostly a shrub steppe (Beard, 1975), dominated by wattles and eucalypts with a lower storey of small shrubs and spinifex. In many areas there are spinifex grasslands, which are extremely important to wildlife, particularly on the coastal plain where there is a mixed association with the introduced buffel grass.

Floristically, the Park is of high conservation value and contains many range-end populations of flora at the limit of their distribution. The peninsula is a zone of biogeographic overlap, containing species from temperate, arid and tropical provinces, and although no gazetted rare species have yet been discovered, some species are not well represented. The importance of the Range in a biogeographic sense cannot be overstated.

To maintain species diversity in this fragile area, it is important to adopt an appropriate fire management policy (see 6.7) and to carefully site developments. While it is acknowledged that proposed roads, carparks, camping areas and the Visitor Centre will have a localized impact, they will be sited on well-represented land systems and will not have any impact on the integrity of the Park.

10.3 Fauna

With the exception of avifauna, no fauna in the park has been studied on a systematic basis. More work is needed to describe both vertebrates and invertebrates.

To contend with the gaps in knowledge, the key mechanism for fauna protection is habitat management. In this regard, the fire management policy is the most important component.

Unusual or restricted habitats, such as the margal at Mangrove Bay and the aquifer in which the blind aquatic fauna live, will require careful management, as will the areas which shelter the small colonies of rock wallabies).

Another important implication for fauna management (as mentioned in Section 6.8), is vehicle traffic. The speed restrictions proposed in that section should not only protect the fauna but ensure that park visitors may continue to enjoy native fauna at close proximity. Furthermore, the amenity of the Park will benefit from not having smelly and unsightly carcasses along the road.

Special wildlife observation points (see 6.5) must be sited and designed to ensure that the animals are not disturbed. It is also important to

ensure that any artificial watering points do not allow animal populations to increase beyond the carrying capacity of the land to the extent that habitat is damaged, or to upset the balance between competing species.

10.4 Landscape

One of the most appealing attractions of the Park is the dramatic visual contrast between the starkly coloured, rugged Cape Range and the flat and subtly coloured narrow coastal plain, with the turquoise sea beyond.

The vibrancy of colours which change hourly with the light, and seasonally in response to rainfall events, enchant most people who visit the area. These visual experiences should not be devalued.

Roads, tracks, campgrounds and built structures (including signs), must be harmonised with the natural environment, by following natural contours and lines. The colours of materials used should blend in with natural tones. Where structures unavoidably breach natural lines and contours every effort should be made to break-up the intrusion by screen planting with native vegetation from the area.

10.5 Landform Stability

The area most vulnerable to visitor pressure is the coast, particularly where camping sites are presently located. Holocene dune systems tend to be inherently unstable, and along this coastline high winds and low rainfall exacerbate fragility and make revegetation of degraded areas extremely difficult.

Some erosion is already occurring adjacent to most camp sites, and, with the expected increase in visitor use in the next few years, this situation could quickly become unmanageable.

It is proposed to phase out some existing campsites where they have no capability for sustained use and compensate for this by providing new sites on stable soils, further inland.

11. SOCIO-ECONOMIC IMPLICATIONS ARISING FROM MANAGEMENT PROPOSALS

The importance of national parks to the general community has been examined and reinforced over many years. The values that national parks represent are usually considered to be predominantly of a biological, geological, cultural, scenic and recreational nature. National parks are established because they exhibit and protect those qualities. The social and economic values of parks, however, should not be overlooked.

Various studies have shown that national parks contribute significantly to the economics of tourism. They are a primary part of the resource on which the tourism industry is based. Unless the attractions which bring tourists to an area are sustained, however, the value of tourism as a generator of regional income is diminished. It is important, therefore, to foster the management of national parks and the development of their facilities, as much as to promote and market the resources of parks for tourism.

In a social sense, parks are a component of the local environment having a number of special qualities and attractions, and they are very important to the community as places to relax and unwind from the pressures of normal life. Although the economic value of parks to the social and mental health of the community is difficult to quantify, they nevertheless, make an important contribution to the economy.

The socio-economic implications of management proposals for the Exmouth area on a broader regional level are considered below .

11.1 Exmouth

The provision of a 'ceiling' on camping facilities, and the basic nature of the facilities provided in the Cape Range National Park will mean that the majority of tourists will look to Exmouth for accommodation and services. Increasing use of the Parks will certainly help to increase commercial developments in Exmouth. Park management will facilitate use of park facilities by local tourist operators, thus making a direct contribution to the local economy.

11.2 Regional

As publicity fosters awareness of the quality of natural resources within Cape Range National Park and Ningaloo Marine Park their popularity as tourist destinations is likely to rise, increasing the overall viability of the region as a tourist 'zone'.

Roadside businesses (including garages, restaurants, etc) will benefit, as will those providing food and accommodation along the way.

In addition, those people living within the Gascoyne and western Pilbara regions will have use of the Park, and benefit from the new facilities provided. It is already evident that citizens of the inland districts are making increasing use of the coastal recreational facilities of the area.

12. REVIEW PROCESS

The revised plan will be current for up to ten years from the date of adoption.

Reviews will be carried out where there is a demonstrated need for modifications. Research and monitoring programs should provide information to assist a review at any time within the period of this plan. A monitoring program will be developed by the District.

13. SELECTED READING

Allen, G.R. (1982), *A Field Guide to Inland Fishes of Western Australia.* Western Australian Museum, Perth.

Beard, J.S. (1975), *Vegetation Survey of Western Australia: Pilbara, Explanatory notes to Sheet 5.* University of Western Australia Press, Perth.

Cogger, H.G. (1979), *Reptiles and Amphibians of Australia*, Reed, Sydney.

Condon, M.A., Johnstone, D. and Perry, W.J. (1955), Part 1. Stratigraphy and Structure, *In: 'The Cape Range Structure, Western Australia'.* Bulletin 21, Department of National Development, Canberra.

Conservation Through Reserves Committee (1974) Conservation Reserves in Western Australia, Report to the Environmental Protection Authority, Department of Conservation and Environment, Perth.

Environmental Protection Authority (1975), *Conservation Reserves for Western Australia, Systems 4, 8, 9, 10, 11, 12.* Department of Conservation and Environment, Perth.

Erickson, Rica, George, A.S., Marchant, N.G. and Morcombe, M.K. (1973), *Flowers and Plants of Western Australia.* Reed, Sydney.

Krutilla, J.V. and Fisher, A.C. (1975), *The Economics of Natural Environments.* John Hopkins University Press. Baltimore.

May, R.F., Lenanton, R.E.J. and Berry, P.F. (1983), Ningaloo Marine Park, Report and Recommendations of the Marine Park Working Group. *Report 1,* National Parks Authority. Perth

Organisation for Economic Co-operation and Development (1980), The Impact of Tourism on the Environment, *General Report.* Organisation for Economic Co-operation Development, Paris.

Playford, P.E., Cope, R.N., Cockbain, A.E. Low, G.H. and Lowry, D.C. (1975), Phanerozoic, *In: The Geology of Western Australia, Western Australia Geological Survey, Memoir. 2,* p.223-432.

Semeniuk, V., Kenneally, K.F. and Wilson, P.G. (1978), *Mangroves of Western Australia.* Western Australian Naturalists' Club, Perth.

Van de Graff, W.J.E., Denham, P.D. and Hocking, R.M. (1975) Emerged Pleistocene Marine Terrace on Cape Range Western Australia. *Annual Report,* Geological Society of Western Australia.

Van de Graff, W.F.E., Denham, P.D., Hocking R.M. and Baxter, J.L. (1980), *Explanatory Notes on the Yanrey-Ningaloo Geological Sheets,* Geological Survey of Western Australia.

Walter, R.D. (1975), *The Impact of Tourism on the Environment.* Australian Recreation Research Association, Melbourne.

Williams, M.A.J. (1984), *Cenozoic evolution of Arid Australia,* in Cogger, H.G., and Cameron, E.E. (eds) *Arid Australia.* New South Wales Museum, New South Wales.

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