PARLIAMENT OF WESTERN AUSTRALIA

FIRST REPORT
OF THE

LEGISLATIVE COUNCIL SELECT COMMITTEE
ON
CAPE RANGE NATIONAL PARK AND NINGALOO MARINE PARK

Presented by the Hon Graham Edwards, M.L.C.
(Chairman)

DECEMBER 1995

MEMBERS OF THE COMMITTEE

Hon. Graham Edwards MLC (Chairman)
Hon. Ross Lightfoot MLC (Deputy Chairman)
Hon. Philip Lockyer MLC
Hon. Murray Criddle MLC
Hon. Tom Stephens MLC

STAFF TO THE COMMITTEE

Ms Romola Stewart (BSc. Hons) Advisory/Research Officer

CHAIRMAN'S ACKNOWLEDGMENTS

As Chairman I particularly want to acknowledge and thank my colleagues, the Hons Murray Criddle, Ross Lightfoot, Philip Lockyer and Tom Stephens, for their energetic contribution to the work of this Select Committee and for their personal support.

I thank our Research Officer, Romola Stewart, for her balanced advice to the Committee and for her professional commitment to our task.

Hansard's contribution was greatly appreciated, as was the work of various officers of the Legislative Council and Government Departments

The Committee thanks all witnesses for taking the time to put forward their views regarding this unique area of the State.

I also acknowledge the Information and Management Branch, Department of Conservation and Land Management (CALM), and thank in particular Roy Fieldgate, Ray Lawrie and Mark Lamming for their special assistance with the map accompanying this report.

The Committee acknowledges the contribution made to the work of this Committee by Dr Chris Simpson, Manager of the Marine Impacts Branch, Policy and Strategic Studies Division, Department of Environmental Protection, and Doug Myers, CALM District Manager from Exmouth, and thank them for their field work in support of the Committee's activities.

We extend that same thanks to Doug Bathgate from the Gascoyne Development Commission. We also thank the Shires of Exmouth and Carnarvon for their assistance.

Finally, the Committee thanks George King of Exmouth for that memorable experience with the whale sharks and coral reef of Ningaloo.

SELECT COMMITTEE ON CAPE RANGE NATIONAL PARK AND NINGALOO MARINE PARK FIRST REPORT

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Chapter One INTRODUCTION

1.1 Terms of Reference

The Select Committee on Cape Range National Park and Ningaloo Marine Park was appointed in the Legislative Council on 1 December 1994 with the following Terms of Reference:

(1) (a) examine and report on the importance of the Cape Range National Park and Ningaloo Marine Park to tourism, mining, petroleum, fishing and other industries in the Shires of Exmouth and Carnarvon;

(b) examine the legislative steps taken in Queensland and nationally to protect the Great Barrier Reef;

(c) examine policies and practices implemented to protect the Great Barrier Reef;

(d) investigate what further steps Western Australia should take to protect Cape Range National Park and Ningaloo Marine Park, and to satisfy the demands of competing land uses particularly in view of possible exploration and mining activity

(e) examine and report whether these parks should be extended;

(f) examine and report on the need to introduce a single authority to oversee the management of the Cape Range National Park and the Ningaloo Marine Park; and

(g) investigate possible changes to the existing legislative and administrative framework used to regulate and control these activities that would lessen any conflict which may arise into and better balance development and conservation objectives.

(2) The committee have power to -

(a) send for persons, papers and records;

(b) present interim reports; and

(c) move from place to place to gather evidence.

(3) The quorum for the committee be three members.

(4) The committee report finally to the House no later than November 30 1995.

On 29 November 1995 a motion was moved in the Legislative Council for an extension of time for its final report from 30 November 1995 to 23 May 1996.

1.2 Foreword

The Select Committee chose to draw together in this First Report, that aspect of its Term of Reference No. One, relating to tourism (examine and report on the importance of the Cape Range National Park and Ningaloo Marine Park to tourism, mining, petroleum, fishing and other industries in the Shires of Exmouth and Carnarvon). The Select Committee identified tourism as being an issue bearing particular significance at this time and has proceeded to address the potential impact of tourism on Cape Range National Park and the Ningaloo Marine Park. The Committee has discussed in part, management issues that relate to its first Term of Reference *1d* (investigate what further steps Western Australia should take to protect Cape Range National Park and Ningaloo Marine Park, and to satisfy the demands of competing land uses...) and *1e* (examine and report whether these parks should be extended).

The Committee's inception was in part, precipitated by increased interest in nature based tourism and the commercial prospects that they generate. Given that these opportunities are inextricably linked to management of Cape Range and Ningaloo Marine Park, it is necessary for a consolidated management framework to be developed, in order to achieve conservation objectives. The existing management plans for Cape Range National Park and Ningaloo Marine Park are extended in their capacity to provide a guideline for management issues.

In delivering its findings, the Committee has endeavoured to make recommendations that will provide for sustainable use and development of these parks.

1.3 Public Consultation

Advertisements appeared in *The West Australian* and *The Northern Guardian*[1], calling for written submissions and inviting interested persons to given evidence before the Committee. The submissions represented a wide cross section of the community with representation from the local community, interest groups, interstate and overseas visitors, local business and various government agencies of Local, State and Federal origin.

Tours of inspection to Carnarvon, Coral Bay and Exmouth ensured the local community was given an opportunity to appear before the Committee. The Committee wrote to Local, State and Federal Government to advise interested persons of the nature of the Committee's inquiry and to invite comment.

1.4 Study Area

Cape Range National Park and Ningaloo Marine Park are located approximately 1200 kilometres north of Perth, within the Gascoyne Regional Area. Ningaloo Reef Tract extends between latitudes 22° S and 24°S, for some 260 km's along the western side of the Cape Range peninsula.[2] The reef tract is a continuous, fringing barrier reef enclosing a lagoon varying in width, from 200 metres to just over 6 kilometres. Cape Range National Park encompasses over 50 000 ha of the Cape Range peninsula. The National Park's western extension is the High Water Mark, contiguous with Ningaloo Marine Park. Ningaloo Marine Park embodies State and Commonwealth waters, running north-south, adjacent to

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1 Appendix A

2 figure 1

the west coast of the peninsula and following the Cape's contours in an easterly direction as far as Bundegi in the Exmouth Gulf. In total, it encompasses an area approximately 224 000 kilometres[3].

Temperatures in the North West Cape region range from warm to hot, with maximum temperatures exceeding 40 degrees over the summer months. Most of the 200-300mm annual rain falls in association with cyclonic disturbances between February and March. Prevailing winds are southerly and can increase to a strong sea breeze by mid afternoon, causing discomfort in unprotected areas.

1.5 Strategic Direction

Whilst the initial impetus for the establishment of this Select Committee emerged from discussion relating to exploration for oil on Ningaloo Reef, other issues have since evolved. The most critical issue now being how to control tourist development and indeed, whether there should be any development on the west coast. In looking to the future of tourism development on North West Cape it is worth bearing these facts in mind:

> ***10% of the coral reefs of the world have already been degraded beyond recognition; 30% are in such a critical state that they will be lost in the next ten to twenty years; another 30% will disappear in twenty to forty years, leaving about 30% which will remain for hundreds to thousands of years***
>
> ***Many coral reefs around the world are under immediate threat of devastation. Other reefs are showing considerable signs of degradation, and virtually the only reefs which are still in excellent health are those which are remote from human activities or under active management.*** [4]

For Ningaloo Marine Park to fall into the last category we must ensure that its condition is protected by active management, since its remoteness is unlikely to protect it in the future as it has done in the past.

The Committee is mindful of evidence illustrating the fragile nature of this arid environment and is of the view that shore based resort development is not sustainable, nor advisable given our limited knowledge of the ecology of this region. Similarly, the nature of the coastal plains and range hinterland imply that development must proceed carefully according to environmental criteria established by experts of this kind. There are many considerations necessary to achieve a strategy that can be supported and implemented with assured success. The primary concern is in perpetuity of the environment, its pristine condition and integrating human use in a multitude of recreational and commercial activities.

The Committee has learnt of the dynamics of coastal management and scrutinised evidence pertaining to the mobile nature of the coastal zone. The Committee took what it considers to be expert evidence based on long standing research on the geomorphology of the area. In part, this evidence states that:

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[3] State Planning Commission, (1994) *Gascoyne Coast Regional Strategy* For Public Comment, Gascoyne Coast Strategic Planning Study Steering Committee, November 1994.

[4] Wilkinson, C.R. (1992) *Coral reefs of the world are facing widespread devastation" Can we prevent this through sustainable management practises?* Proceedings of the Seventh International Symposium, Guam, 1992, Vol. 1.

"shore based tourism facilities pose particular threats to the lagoon environment"

This evidence went on to point out that the most attractive shores are those with north-facing beaches (cuspate forelands), and stated that;

"they are geologically recent structures comprising unconsolidated sand and entirely unsuitable sites for buildings".

"They are unsuitable geological structures".

"I stress that these gem places along the Ningaloo coast are hazard zones. If there are to be buildings in those locations, they must, at all costs, be located back from the shore on hard limestone" [5].

The Committee is deeply concerned about the possibility of resort development occurring in the coastal zone for this evidence questions the capability of the shoreline to sustain change. It is therefore imperative that a strategy be developed to ensure management of resort development. The objective for developing criteria should be -

"Sustainability in perpetuity"

Recent reports put before Government have examined the opportunities for development on the west coast. This situation has been reaffirmed by the Jones Lang Wootton North West Cape Tourism Development Study 1993 and the Gascoyne Coast Regional Strategy Draft 1994. In addition, the Committee has made itself aware of the various resort development proposals which have been put before Government in recent times. It is certain that developers will continue to put pressure on the Government for resort development. They are aware of the potential return on investments that are founded on the unique beauty of this reef range area which becomes more widely promoted and appreciated with each year, not just within the West Australian community but amongst interstate and overseas visitors.

There is no doubt that Government will come under direct pressure from developers to give rapid planning approvals for resort development proposals. The Committee strongly recommends caution. There is no rush to make decisions and if one developer pulls out because of time delays and reasonable consideration, be assured that in due course, another will come forward. And yet;

There is no viable 'do nothing' policy as the growing tourism market will not be satisfied and the resource will be in danger of degradation' [6]

Given the evidence and opinion gathered, the Committee is of the view that the Government must propose a single strategy to allow sustainable and sensible resort development to occur within a consolidated manageable policy. This is in preference to the option of *ad hoc* development occurring in response to individually assessed, development proposals. Consideration must be given to the future of tourist development on NW Cape, and account for any impact that development may have on the Cape and its effect on the Marine Park, on the hydrological regime of the area and on the biological processes that are reliant on this delicately balanced region.

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5 Submission

6 Jones Lang Wootton (1993) *North West Cape Tourism Development Study*. Prepared by Jones Lang Wootton Special Projects, July 1993

In short, the Government must devise a strategy that establishes the criteria of resort development openly and fairly for all to see and abide by. It is the Committee's concern that, if the Government does not take the initiative, the intrinsic value of the area will be degraded by *ad hoc* resort development offering short term attractions, yet leading to long term degradation of the resource itself.

The Committee is not advocating a 'lock out' philosophy in its recommendation for a Government-initiated strategy. If Government develops a single strategy, it is more likely that a coordinated approach to management of multiple activities shall lead to a sustainable nature-based tourism industry. (as per Recommendation following)

Recommendation **3.**

The Minister for the Environment establish a Strategy Group to develop environmentally acceptable guidelines for accommodating facilities, depicting essential infrastructure, form and headworks which, as a bottom line, protect the integrity of Cape Range and Ningaloo Marine Park.

The Committee is of the view that this strategy will allow for planned development and tourist access which can be sustained into the future without degrading the unique environment of the Reef/Range area. In achieving this strategy for resort development guidelines, the working party should refer to the work of this Committee and other reports such as Gascoyne Coast Regional Strategy, The Jones Lang Wootton North-West Cape Tourism Development Study, and the CALM Management Plan for Cape Range National Park and Ningaloo Marine Park. Much work has been completed and your Committee is not suggesting that this work be replicated. There is however, a need for the Strategy Group to become familiar with the issues and those opportunities and constraints determined by environmental and logistical factors. Without rationalisation of acceptable limits of use or consideration for cumulative impacts of all industries (tourism, extractive mining, commercial fishing) a coherent policy will not be achieved.

The Committee was particularly impressed with the wilderness style of resort construction in the National Park areas of South Africa. These exist as small-scale accommodation with minimal environmental impacts yet are competitive economical performers with larger developments. The new technologies in power generation, desalination and waste management have made such small to medium scale developments more economically and environmentally viable. In the Drakensburg and Kruger National Parks, resorts were constructed of natural resources which blended with the surroundings in such a way as to complement the wilderness environment rather than compromise it. Also, their construction maximised contact between lodgers, thereby bringing people together in a friendly and sociable manner. These resorts are basic, non-intrusive, low impact lodges which are very popular with Park managers and tourists alike.

The number and siting of such wilderness style lodges adjacent to Ningaloo Marine Park should be a key task of the Strategy Group. A given set of criteria determining levels of quality assurance, development setbacks, carrying capacity and financial security will ensure perpetuity of the present environment. It should be a condition of development approvals that the developer provide ongoing resources to the management agency to a level commensurate with the management burden imposed by the development.

Development must have a clear understanding of the site's strengths and weaknesses. Views, wind, sun, dune stability, access etc, are factors to be considered in the creation of a successful development. It will be important for the group to set codes for construction and development and to ensure that defined limits are met. The Committee advises the Strategy Group to ensure development be consistent with the environmental management criteria, determined by factors such as the aridity of the

environment and the low scrub profile. Sites decided by the Strategy Group as being potentially suitable for development within the National Park, be reserved as 'resource reserve' until such time that they may be leased from the Crown.

The Committee does not support '5 Star' resort style development within Cape Range National Park. These types of developments are generally not in tune with a nature-based tourism experience, and the Committee believes they would impose upon the ambience of this park.

> ***"The nature-based segment is not about moving mass numbers of tourists but about providing a quality experience to a niche market"*** [7]

The Committee is not suggesting that nature based tourism develop exclusively, rather that the Strategy Group develop criteria in harmony with environment and social needs so that there is a regulatory policy to address location and scale of the development. The Committee accepts that there is a potential need for five star type of resort development but believes it would better suit the tourism profile if these establishments were to be confined to Exmouth township or adjacent areas.

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[7] Western Australia Tourism Commission, (1995). Draft, *Western Australian Tourism Infrastructure Strategy,* Prepared by Coopers & Lybrand for WA Tourism Commission October 1995.

1.6 Recommendations

Recommendation 1.

Any accommodation facilities in Cape Range National Park must be consistent with conservation management strategies for the terrestrial and marine environment, so that construction and operation activities do not impact adversely upon significant environmental features or the ambience of the surrounding topography.

Recommendation 2.

There be no shore based resort development on the western side of Cape Range, on coastal land abutting Ningaloo Marine Park.

Recommendation 3.

The Minister for the Environment establish a Strategy Group to develop environmentally acceptable guidelines for accommodating facilities, depicting essential infrastructure, form and headworks which, as a bottom line, protect the integrity of Cape Range and Ningaloo Marine Park.

Recommendation 4.

The Strategy Group be chaired by a nominee of the Minister for the Environment and should include representation from the Department of Conservation and Land Management, the State Planning Commission, West Australian Tourism Commission, Gascoyne Development Commission, Shire of Exmouth, National Parks and Nature Conservation Authority and with representation from the proposed Marine Park and Reserves Authority.

Recommendation 4a.

The Strategy Group should refer as a starting point to:

(i) Parliamentary Select Committee Report on Cape Range National Park and Ningaloo Marine Park (1995)
(ii) North West Cape, Jones Lang Wootton Tourism Development Study (1993)
(iii) Gascoyne Coast Regional Strategy (1994)
(iv) CALM Management Plans for Cape Range National Park (1987-1997) and Ningaloo Marine Park (1989-1999).
(v) Roads 2020 Regional Road Development Strategy Gascoyne (1994)
(vi) Coral Bay Planning Strategy, DOLA, (1992)

Recommendation 4b.

This Strategy Group should report to the Minster within six months of its formation.

Recommendation 4c.

The Minister should report to Cabinet within three months of receiving the above report, by way of a Cabinet submission.

Recommendation 4d.

Based on that Cabinet submission, the Government should, within three months, adopt development guidelines which must set out publicly, clearly defined parameters which inform of the rules and bounds within which development concepts will be approved.

Recommendation 5.

A coastal strip within the length of Ningaloo Marine Park be excised to the Department of CALM to enable CALM to properly manage and control camping, vehicular use and other people-related activities which may impact on the Ningaloo Marine Park and its adjacent land-based access areas.

Recommendation 5a.

This coastal strip may vary in width but should be negotiated by CALM with various land tenure groups currently controlling that land. The coastal strip should be wide enough to enable CALM to undertake proper control and management strategies.

Recommendation 5b.

There be no resort development within this coastal strip on the western side of Cape Range, with the exclusion of the Mauds Landing Townsite (gazetted 1915)

Recommendation 6.

The State Government should negotiate the extension of Cape Range National Park to include Ningaloo Pastoral Station. A fair and reasonable price should be offered for the lease.

Recommendation 6a.

As part of the negotiation, Mrs Billie Lefroy and her daughter Ms Jane Lefroy should be offered lifetime tenancy of the Ningaloo homestead and its immediate surrounds.

Recommendation 6b.

Ms Jane Lefroy be offered permanent employment with CALM, as a park employee, in a position commensurate with her accumulated local knowledge and long-term involvement in the area.

Recommendation 6c.

Negotiations with the Lefroy family should be carried out by a senior officer of CALM, appointed by the Minister or the Chief Executive Officer.

Recommendation 7.

The State Government should negotiate the excision of a strip of land adjacent to the Ningaloo Marine Park along the western side of Cardabia Station as per recommendation five.

Recommendation 8.

The Committee recommends an eastward extension of Cape Range National Park as proposed by CALM in its Management Plan No. 8, 1987-1997.

Recommendation 9.

The Committee recommends that the coastal road strategy proposal linking Coral Bay to Exmouth (as per figure 5, road development proposals, Gascoyne Regional Road Development Strategy 1994[8]) be further examined yet supports the concept in principle, providing the road is constructed primarily as a low impact tourist road suitable for 2 wheel drive vehicles, with a low maximum speed (tourist scenic road) which must be enforced.

Recommendation 10.

The Strategy Group, in deciding possible sites, should examine the potential of converting Milyering Visitor Centre to a wilderness/camping tourism area and applying monies derived from such venture to a similar centre relocated in the town of Exmouth.

Recommendation 11.

The Visitors Centre contain published and unpublished research material on the Cape Range National Park and Ningaloo Marine Park.

Recommendation 12.

State Government establish a Statewide program to achieve marine resource data bases, for use as critical tools in the decision making processes.

Recommendation 12a.

CALM design and implement a research and long term monitoring program for Cape Range National Park and Ningaloo in collaboration with Western Australian Museum, Australian Institute of Marine Science and Universities of this State.

Recommendation 12b.

Steps be taken to ensure researchers are identified with CALM while working in the parks and that they have an active role in promoting and interpreting their study programs.

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[8] Main Roads WA and WA Municipal Association, 1994, DRAFT. *Roads 2020 Regional Road Development Strategy Gascoyne*. Appendix F.

Recommendation 13.

CALM investigate the opportunity to acquire revenue from external sources to assist researchers with special grants and sponsorships.

Recommendation 14.

State Government obtain Federal Government support for the establishment of the Curtin University Indian Ocean Centre for Tropical Studies at the Naval Communication Station, Harold E. Holt.

Recommendation 15.

The Minister for the Environment initiate and actively support an international seminar to be held in Exmouth with the theme 'natural resource management'. Invitations be extended to those of appropriate disciplines in management and science.

Recommendation 16.

State Government must ensure the provision of adequate resources for proper management of Cape Range National Park and Ningaloo Marine Park.

Recommendation 17.

CALM review its staffing structure, to employ specialised management staff with tertiary education or appropriate qualifications commensurate with the marine and terrestrial environment.

Recommendation 18.

CALM encourage a high standard of commercial operations to ensure ecologically sustainable development of tourism based activities within Cape Range National Park and Ningaloo Marine Park.

Recommendation 19.

CALM construct basic seating and shade facilities at Tantabiddi boat ramp.

Recommendation 20.

That Government carefully examine the impact of the Coral Coast Maud's Landing Resort (CCMD) and ensure that any approval be based on the developer clearly demonstrating that the design, location and structure offers the high level of protection and management required to ensure that the integrity of this sensitive coastal environment is not compromised beyond reasonable risk assessment, particularly when considering any long term residential component.

Recommendation 21.

State Government take responsibility for the installation of adequate sewerage headworks for Coral Bay and that this be done without delay.

Recommendation 22.

A boat ramp be constructed south of Bills Bay in accordance with recommendations in the Coral Bay Planning Strategy 1992.

Recommendation 23.

CALM and the Department of Transport through Marine and Harbours initiate a joint operation to rationalise boat use and safety in Bills Bay.

Recommendation 24.

Minister of Local Government examine the potential for the Shire of Carnarvon to relinquish Coral Bay north, to the Shire of Exmouth.

1.7 A VISION FOR CAPE RANGE NATIONAL PARK AND NINGALOO MARINE PARK

The Committee in considering this section of the report, endeavoured to put forward a vision for the future of Cape Range National Park and Ningaloo Marine Park. This course of action is impeded by the severely limited base of scientific knowledge of the area. The Committee regrets that, without this foundation of scientific data, it is only possible to make recommendations on the basis of value judgements.

Dr. Chris Simpson who accompanied the Committee overseas, made the following observations in South Africa.

> *The main point to come out of the South African visit was that management of Kruger National Park was based on scientific research that targeted the development of key strategic information databases. The park's natural attributes have been thoroughly documented and mapped. Soil type, rainfall, vegetation, floral and faunal species composition and diversity and habitats have been used to identify the main biological units and hence determine conservation values of the various parts of the Park. These maps were on the wall of the Park headquarters. Not only does this allow park management to proceed along ecological lines, it also provides a strong technical basis for why developments are or are not permitted and where they can or can not go. Because these decisions are made on technical rather than on a 'value judgement' basis, the decisions are very difficult to argue against and, as such, provide an important buffer against expedient or short-term decision-making. The lesson for Ningaloo is that if this ecosystem is to be managed properly, a systematic, long-term data acquisition programme is required to ensure that resource management is based on a thorough understanding of the system in question.*

That level and degree of technical data has not been collected and tabulated here and common sense in decision making must prevail. A vision for Ningaloo is one where application of the best environmental practices, based on sound scientific knowledge, becomes the basis for integrated planning and management decision making processes. A guideline for the Selection and Management of Marine and Estuarine Protected Areas (MEPAs), according to the International Union for the Conservation of Nature and Natural Resources (IUCN)[9], illustrates the need for collection of baseline data on at least the resources present and usage levels, proper to, or concurrently with the development of a MEPA proposal.

[9] Appendix C

The Committee has come to realise that Ningaloo is a globally significant area that has yet to reach its potential for utilisation. The Committee also realises that this State, National and Global resource will not realise this potential unless a strategy is implemented to dictate the criteria for development and sustainable use. A better understanding of key scientific, analytical and biological processes will contribute immensely to public access, use and management.

There should be no negative impacts on the natural system, particularly no nutrient input into the marine environment and management decisions should be based on ecological criteria derived from scientific research.

Furthermore it is necessary to complement and support management policies with an appropriate level of funding. Negligence in providing for properly and adequately funded management will contribute to long term degradation. This area is too precious to compromise. It has the potential to offer significant economic and social gains providing active management occurs. The Committee sees this area as warranting the economic and resource support that will establish it as an internationally recognised example of sound environmental management ensuring sustainability in perpetuity.

Chapter Two CAPE RANGE NATIONAL PARK AND NINGALOO MARINE PARK

2.1 Administration of Cape Range National Park and Ningaloo Marine Park

In 1964, Reserve 28288 was gazetted a Class 'C' reserve for the purpose of National Park. In 1974, following additional extensions to the Park (1969), the status of the reserve was amended to Class 'A'. The current boundaries of the park are undergoing further review following the Department of Environmental Protection's (then EPA) 'Red Book' recommendations for conservation reserves in Western Australia. The primary objective of the recommendations is for protection of coastal land abutting Ningaloo Marine Park with further extensions to the northern and eastern boundaries of Cape Range National Park to enhance conservation of biological components of the estate.

The Marine Park was gazetted as Marine Reserve No. 2 in 1987. The marine component extends offshore from High Water Mark (HWM) for a distance of approximately 10 nautical miles. The exception in this case is the Commonwealth Defence land in the north of the Cape, at Point Murat, where the Park begins at LWM. The coastal strip of land that extends 40 metres above HWM between Winderabandi Point and Amherst Point on the west side of the peninsula was reserved under the Land Act 1933 and gazetted under the Marine Park. The recent Wilson Report[10] recommended that consideration be given to a southern extension of the State portion of the Ningaloo Marine Park encompassing the State Territorial Sea as far as Gnaraloo Bay, so as to include the full length of the Ningaloo Reef. This recommendation has yet to be implemented.

The Department of Conservation and Land Management (CALM) leads a number of Government agencies in coordinated land use planning and resource management. Cape Range National Park and the State component of Ningaloo Marine Park are vested under the National Parks and Nature Conservation Authority (NPNCA), a State Authority body, delegated under the Conservation and Land Management Act to coordinate policy development and monitor implementation of management plans. The Commonwealth component of the Ningaloo Marine Park is declared under the Commonwealth National Parks and Wildlife Conservation Act 1975 however integrated management is maintained.

The West Australian Government proposes a new Marine Parks and Reserves Authority (MPRA) which will be created as a Controlling Body under the Conservation and Land Management Act 1984. The MPRA will assume a role similar to the existing NPNCA.

2.2 Defence Land

A small area of the Marine Park in the vicinity of the naval jetty (Point Murat) and surrounding waters is currently a Prohibited Area under the Defence (Special Undertakings) Act. These waters are being declared Naval Waters, replacing the aforementioned Act. Two significant areas of land are held freehold by the Commonwealth (Defence), Location 44 (extends to Low Water Mark) and Location 97 (Extends to High Water Mark). [11]

The recent interest in surplus land and facilities within the Harold Holt Naval Communication Base Area (and Locs. 43, 78 79 & 96) is due to the transfer of the US Naval Communications to Australian command. This move has reduced support for local infrastructure and services. Minor communication sites, the Learmonth aerodrome and Location 42 remain outstanding as Defence Lands. Location 97 borders the southern portion of Cape Range National Park and abuts coastal land gazetted under the Marine Park.

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10 Department of Conservation and Land Management, A Representative Marine Reserve System For Western Australia. Report of the Marine Parks and Reserves Selection Working Group. Department of Conservation and Land Management, June 1994

11 Defence Boundaries represented in figure 1. Current to date.

2.3 Petroleum Permits and Mineral Leases

Two offshore permits exist under the Commonwealth Petroleum (Submerged Lands) Act 1967, affecting Commonwealth and State portions of the Marine Park. A Territorial Sea Exploration Permit in the eastern aspect of Exmouth Gulf and six mining leases that lie to the east of Cape Range do not impose on existing boundaries of Cape Range National Park.

2.4 The role of National and Marine Parks in Australia

In accordance with the Conservation and Land Management Act 1984, Section 13, the reservation of a marine park shall be for the purposes of fulfilling so much of the demand for recreation by members of the public as is consistent with

(1) the proper conservation and restoration of the natural environment

(2) the protection of indigenous flora and fauna and the preservation of any feature of archaeological, historic or scientific interest.

In the event of any conflict or inconsistency between any of the foregoing purposes and any provision of the Fisheries Act 1905 relating to commercial or recreational fishing, the Fisheries Act shall prevail.

The recent New Horizons policy for marine management[12] will consider the competitive activities of commercial and recreational fishing, tourism, passive recreation, scientific study, petroleum exploration and production to resolve multiple use through zoning of the marine park -

Sanctuary Zones	'look but don't take' areas managed solely for nature conservation and low-impact tourism.
Recreation Zones	provide for recreation including recreational fishing (subject to bag limits and other conservation measures).
Special Purpose Zones	are managed for a particular priority use or issue. This could be protection of habit, a seasonal event such as whale watching or a particular type of commercial fishing. Those uses compatible with the priority use or seasonal event will be allowed in these zones.
General Use Zones	make up the rest of Marine Parks not included in sanctuary, recreation or special purpose zones. Conservation of natural resources in General Use Zones remains the priority yet activities such as sustainable commercial fishing and petroleum exploration and productions are allowed where they will not affect sensitive marine habitats.

The CALM Act 1984 describes National Parks as land vested in the National Park and Nature Conservation Authority (NPNCA) for that purpose. The Land Act 1933 defines them by giving the title national park as a purpose of recreation.

2.5 An Overview

The Northwest Cape peninsula is a series of anticlinal structures in the northern part of the geological province known as the Carnarvon Basin[13]. Cape Range rises to an altitude of 311m with steep sided canyons up to 120m deep, dissecting the eastern face. The cliffs and slopes fall to narrow creek beds

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12 New Horizons in Marine Management. Government of Western Australia, November 1994

13 Wyrwoll K-H., Kendrick, G.W. and Long, J.A. (1993). The geomorphology and Late Cenozoic geomorphological evolution of the Cape Range-Exmouth Gulf region. Records of the Western Australian Museum Supplement No. 45, 1-23.

which flow intermittently following heavy rain. There is external drainage down the deeply dissected flanks of the range and internal drainage towards large sink holes. A well established karst system (gorge, sinkholes) is associated with the Tulki limestone and more than 400 karst features are recorded with caves up to 100m deep[14]. The Cape Range formation features a terraced limestone range and a fringing coastal plain which abuts Ningaloo Reef Tract on the west coast. The Cape Range structure is part of a wider morphotectonic province that has exerted an evolutionary control on the geomorphology of the area. Extensive regions of fossil coral reef underlay the coastal plains to the west of Cape Range. This system is represented by strongly developed coastal dunes with limestone plains, wave-cut platforms and beaches. The depositional pattern of coastal dune and beach deposits along the Ningaloo Reef Tract, is largely controlled by the circulation of the lagoon. The circulation of the lagoon is driven by wave pumping across the reef with wind and tidal forcing.[15] Because of the aridity of the adjacent hinterland and the low water runoff, the lagoon area between the reef and shore experiences clear water conditions that are conducive to coral growth.

Lagoon flushing times under 'typical' conditions are generally less than 24 hours[15]. Tidal channels are created by high current flows. The backreef is typically an energetic zone subject to prevailing south-westerly winds and varying swell conditions. Coral cover within the lagoon is patchy, ranging from extensive thickets of 'staghorn' *(Acroporidae)* species to isolated 'bommies' (Porites) to areas of sand and limestone substrate. Ningaloo Marine Park contains a range of coral reef habitats and a varied flora and fauna. Most coral species occurring in the Park are common to both North-Western and Indo-Pacific reef systems[16].

2.5.1 Social Profile

The natural resources of Cape Range peninsula have been utilised by Europeans since settlement in the late 1880's. Thomas Carter took up residence on the Cape after acquiring 54 600 ha on the northern and western aspects of the peninsula. This original holding known as Yardie Creek Station was later subdivided into several leases and later amalgamated to form a smaller Yardie Creek Station that was operational in pastoral activities until 1959.

In the southern region of the peninsula is the Rough Range formation; after discovery in 1953, further extensive oil exploration was undertaken in Cape Range. The oil and gas potential of the Park is not known, although it is understood to be low. There would appear to be better prospects in Ningaloo Marine Park[17].

Ningaloo Marine Park was established in response to off-shore petroleum and mineral exploration interest in marine areas of inherent conservation value. The gazettal was proceeded by the 1990 Resolution of Conflict Policy which acknowledged the need to sustain economic development with

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[14] Livesay N.J., Murdoch University, (1994) An Evaluation Of The National Estate Significance Of The Cape Range Peninsula, Western Australia. The Natural Environment Documentation Project, Murdoch University, Western Australia, May 1994.

[15] Simpson, C.J. and Masini, R.J. (1986) *Tide and seawater temperature data from the Ningaloo Reef tract, Western Australia, and the implications for coral mass spawnings.* Bulletin 253. Department of Conservation and Environment, Perth WA.

[16] Department of Conservation and Land Management, (1989). *Ningaloo Marine Park Management Plan 1989-1999*, Management Plan No. 12. Department of Conservation and Land Management, Western Australia, 1989.

[17] Department of Conservation and Land Management, (1987) *Cape Range National Park Management Plan 1987-1997*, Management Plan No.8. Department of Conservation and Land Management, Western Australia, 1987.

simultaneous protection for the environment and led to the 1992 ban of drilling for minerals and petroleum in Ningaloo Marine Park. This position has been confirmed by the current Government.

Ningaloo has an important role in todays society in representing a remote environment in relative pristine condition and in offering a wilderness experience that is becoming increasingly difficult to locate. There is an important social value in allowing people access to the reef to take the opportunity to have a recreational experience and interact with the natural environment. Fishing, snorkling, diving, whale watching and whale shark diving are all activities that fortify the feeling of inherent worth in a community. Ningaloo in particular, whilst only recently acknowledged as a significant public resource, is an emotive issue. Unsustainable management decisions will contribute to the public perception that our natural resources are being compromised for short term economic gain. Previous experience in the development approvals process has demonstrated community response to be quite reactionary in condemning any form of development. Resolution of these issues will be critical if improvement in community consultation is to be sought.

Archaeological evidence from Cape Range peninsula suggests long term use and adaption to the changing Quaternary coastline by Aboriginal people. The Aboriginal Sites Department of the Museum of Western Australia has documented a number of rockshelters in the limestone caves yet many more are likely to be present. Further sites have yielded archaeological evidence of intermittent human occupation for at least 30,000 years[18]. Excavation of three rockshelters in the western foothills of the Range revealed evidence of human responses to arid conditions during the last glacial period. This establishes that coastal resources were an integral part of subsistence strategies. Mandu Mandu Creek rockshelter is currently the oldest reliably dated archaeological site in the area[18].

2.6 Ecology of Ningaloo Marine Park

Marine fauna of Ningaloo Reef mark an abrupt change in the fauna of northern Western Australia. The continental shelf at this point maintains a connection with southwards flowing oceanic currents (eg. Leeuwin Current). These currents predispose the marine fauna of Ningaloo Reef to an 'oceanic' type, similar to that found on Queensland offshore coral reefs. Ningaloo Marine Park can be considered as an outlier of the Indo West Pacific 'oceanic' coral reef group.

Ningaloo Marine Park marks a transition between the aquatic environment's of the tropical Northern Australian Region (a subunit of the Indo-West Pacific Region) and the temperate Southern Australian Region. Ningaloo Reef harbours a composition of fauna and flora that are at the limit of their geographical range within the Park.

2.6.1 Corals

The coral reef system is an integrated system comprised of individual colonies and associated species interacting to form a complex and dynamic ecosystem. Over 217 species of corals[19] are presently documented on Ningaloo Reef Tract with previously uncommon morphologies (growth forms) occurring for some species (eg. *Echinopora lamellosa).* A luxuriant 3 dimensional coral reef structure provides a protective habitat for a diverse range of tropical flora and fauna.

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[18] Morse K (1993) Who can see the sea? Prehistoric Aboriginal occupation of the Cape Range Peninsula *Records of the Western Australian Museum. Supplement 45:* 227-242

[19] appendix E

Coral species range from the scleractinian (reef building) corals which include the broadcast (mass) spawning species and brooding (internal fertilisation and development of planulae) species to the soft coral species (lack a hard skeleton). A large proportion of coral populations have been documented to coordinate timing of gamete release to occur over distinct periods, leading to an annual major spawning event following the full moon in April and March[20]. This event has received much attention from both public and scientific groups.

The danger of human disturbances on coral reefs is the effect on the larval and juvenile components on the community, for sub-lethal disturbances can disrupt the community structure of the coral ecosystem. Studies on sewerage stress on the marine environment indicate how effects are transmitted along the system, with corals ultimately competing with algae for light and space as a result of the increased nutrients. A model that regulates the effects of human disturbance would assist in understanding the structure and functions of coral communities. This could be achieved by contrasting the magnitude and frequency of events implicated in sub-lethal stress, with natural recovery rates[21].

2.6.2 Fish

The lagoon area of Ningaloo Marine Park acts as an important nursery ground for the replenishment of fish breeding populations. Surveys providing census data on fish populations have shown there to be over 500 species within the Park[22]. In addition to the fish residing within the lagoon and reef, there are wide ranging pelagic species such as the spanish mackerel wahoo, cobia and tuna which are commonly found behind the reef front at Ningaloo Marine Park. Inshore waters commonly expose popular angling species such as dart, queenfish, golden and other trevally. Resident species generally comprise of the north-west snappers, coral and coronation trout, baldchin groper and a variety of cods.

Recreational fishers extract around 100,000 kilos of fish from the Marine Park and associated waters every year. With this level of pressure, the ability of certain species to maintain previous levels of populations is reduced. Anecdotal evidence from long-time Exmouth residents and other Park visitors indicates this is already happening, and there are clear signs that not only has the average size of fish caught dropped, but also the overall catch[23].

2.6.3 Molluscs

The mollusc fauna of the Park is diverse and includes species which are endemic to the region (approximately 5%)[24]. Most molluscs have a pelagic (free swimming) larval stage enabling wide dispersal and propagation so extinction due to loss of habitat or over-collecting would be unlikely. However those species without a pelagic larval stage are vulnerable to long term local extinction. For example the baler shell (*Melo amphorus*), the giant conch (*Syrinx aruanus*), and the volute (*Aulicina oblita*). Shell collecting is prohibited within the Park.

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20 Stewart R (1993) *Mass Spawning in the Acroporidae on the Ningaloo Reef Tract.* Unpublished

21 Grigg RW and Dollar SJ (1990). Natural and Anthropogenic Disturbance on Coral Reefs. In; Dubinsky Z (ed) *Coral Reef Ecosystems.* Elsevier, Amsterdam pp439-452

22 Department of Conservation and Land Management, (1989). *Ningaloo Marine Park Management Plan 1989-1999*, Management Plan No. 12. Department of Conservation and Land Management, Western Australia, 1989.

23 Fisheries Department , Department of Conservation and Land Management (994). Ningaloo Marine Park Fishing Guide June 1994.

24 Slack-Smith S.M.(1993) The non-marine molluscs of the Cape Range peninsula, Western Australia *Records of the Western Australian Museum. Supplement 45:* 87-107.

Prolific numbers of the marine mollusc *Drupella cornus*, a coral eating gastropod has been identified within the park. It would appear to be a major predator which persistently threatens the current well being of the reef.

2.6.4 Whale Shark

The whale shark (*Rhincodon typus*) congregates in large numbers on the outer reef slope of Ningaloo Marine Park for several months during Autumn each year. Its presence is thought to be associated with the mass coral spawning that occurs during March and April. At present scientific information on this fish is limited, as is an understanding of its behavioural pattern.

The regularity with which the Whale Shark frequents Ningaloo has prompted the largely popular whale shark experience. This is a significant contributor to Ningaloo's increased profile in recent years, reflected also in the growth of nature based tourism. The number of people-boat-days has increased from some 1000 in 1993 to 1500 in 1994, and current numbers indicate 2500 in 1995. At this rate the industry grossed nearly $750,000 in 1995[25]. The impact of Ningaloo's whale shark industry on the whale shark is poorly understood and caution in its management is recommended.

The whale shark is fully protected under the Wildlife and Conservation Act 1950.

2.6.5 Other

Four species of rare and threatened marine mammals are found in the Ningaloo Reef area. These are the humpback whale (*Megaptera novaeangliae*) (protected under the Whale Protection Act 1980), now regularly observed passing through the Ningaloo Marine Park on its migratory route, the endangered Blue Whale (*Balaeonoptera musculus*), the Fin Whale (*B. Physalis*) and a breeding population of the dugong (*Dugon dugong*).

Conservation value is inherent in the region, with the green turtle (*Chelonia mydas*) and the hawksbill turtle (*Eretmochelys imbricata*). A diverse number of feeding and nesting sites are found within the park, including seagrass and algal beds, lagoonal coral habitats, breeding rookeries and undisturbed beaches for turtle nesting. Tidal flats are also important habitats for international migratory wading birds during summer. The Commonwealth Government participates in the Japan-Australia Migratory Birds Agreement, the China-Australia Migratory Birds Agreement and The Convention on International Trade in Endangered Species.

Furthermore, the area is a mixing ground for temperate and tropical seagrass species which are most prolific in species richness at Exmouth Gulf[26].

2.7 Ecology of Cape Range National Park

Flora of Cape Range is composed of widespread desert-like elements with a tropical and to a lesser degree temperate coastal overlay. The Range is an important transition zone between the tropical and temperate flora of Western Australia[27]. Many species affiliated with the tropical environment approach the end of the geographical distribution.

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25 Submission

26 Walker and Prince (1987) *Distribution and biogoegraphy if seagrasss species on the northwest coast of Australia.* Aquatic Botany 29:19-32.

27 Keighery, G. and Gibson, N. (1993)Biogeography and composition of the Flora of the Cape Range peninsula, *Western Australia Records of the Western Australian Museum, Supplement 45:* 51-85

2.7.1 Flora

Unlike its arid counterparts of limestone soils (eg The Nullarbor) that typically have a low number of species, Cape Range peninsula supports a relatively rich flora with six hundred and thirty groups of vascular plants recorded for the peninsula. This includes twelve forms endemic to the Cape Range peninsula[27]. The higher species richness is attributed the ameliorating effect of the sea around the peninsula, the sharp climatic gradient across the Range and the summer and winter rainfall.

The western side of Cape Range is the limit of mangrove *Rhizophora stylosa*, a species declining locally[27]. A group (50) of southern temperate affinities persist here at the northern end of their ranges, occurring on the western coastal dunes, the red sandplains between the ranges at the northern end of the peninsula and in the valleys on the western side of the range. The peninsula has a number of unusual plants associated with the semi-permanent wetlands of Yardie Creek including several taxa of emergent aquatic species. Particular species are disjunct from their main ranges by many hundreds of kilometres. Other flora are observed at the margins of their ranges, notably the Millstream Palm (*Livistonia alfredii*), located at the top of the Yardie Creek system.

2.7.2. Molluscs

The molluscan fauna of Cape Range peninsula are seen to be increasingly isolated from their ancestral populations due to the progressively arid environment. A number of species seem inclined to adapt themselves to a cave habitat as juveniles. Presumably this arises from their inability to cope with harsh environments during this less stress-tolerant stage. The fauna contains a high proportion of endemic taxa with 10 species being endemic to the peninsula[24]. Twenty-two percent of all species are at the southern limit of the species range.

2.7.3. Vertebrates

Cape Range peninsula has a mammal fauna typical of that originally distributed across the arid zone[28]. There is a representation of northern species at their western limit, and a few north-western endemic species. A number of the original Cape Range peninsula mammalian fauna have become extinct since European colonisation.

In addition approximately 200 bird species and 84 reptiles have been recorded in the area.[29] The variety of sandy habitats, the dissected limestone range, extensive inter-tidal habitats and a coastally ameliorated climate is suited to some southern and northern species and combine to maintain a diverse and concentrated suite of vertebrates[29].

2.7.4. Troglobites

Cape Range peninsula is inhabited by a terrestrial (troglobites) and aquatic (stygofauna) subterranean fauna of great richness and international significance. Within the groundwaters of the area entire major groups of living animals represent an ancient fauna associated with the Tethys Sea (which separated

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28 Baynes, A. and Jones, B (1993). The mammals of Cape Range peninsula, north-western Australia. *Records of the Western Australian Museum, Supplement 45:* 207-225.

29 Kendrick, P.G. (1993) Biogeography of the terrestrial vertebrates of the Cape Range peninsula Western Australia. *Records of the Western Australian Museum, Supplement 45:* 193-206.

Gondwana and Laurasia). Their morphology (pale, eyeless, with enhanced non-optic sense organs, inability to control water loss) indicates a life phase adapted to subterranean existence[30].

This subterranean fauna contribute to the biodiversity of the region and are of high national estate and scientific significance. Their significance is further enhanced by their association, over time, with local events, climatic change, and evidence of their former affiliation with closed forests environs, both temperate and tropical, since the Miocene.

Troglobitic animals occur in a number of discreet zones over Cape Range with higher speciation occurring in the northern region and becoming progressively less isolated towards the south yet much of the fauna lies outside Cape Range National Park. The caves and subterranean waterways (and the associated hydrological system) of Cape Range and surrounding coastal plain are an important refuge for species with humid tropical affinities in a harsh semi-arid tropical environment.[30]

Species protected under Schedule One of the Wildlife and Conservation Act 1950, include two species of fish (the only vertebrate troglobites known in Australasia), two atyid shrimps, two species of terrestrial fauna, a micro-whip scorpion and a cockroach [30].

[30] Humphreys, W.F. (1993). The significance of the subterranean faun in biogeographical reconstruction: examples from Cape Range peninsula Western Australia. *Records of the Western Australian Museum. Supplement 45:* 165-192.

Chapter Three SETTLEMENT

3.1 Carnarvon

Carnarvon is located close to the Gascoyne River delta and is the regional administration centre in the Gascoyne. It is also the largest settlement within the Gascoyne, with a current population of 6580.[31] Groundwater flow beneath the river sediments is heavily reliant on direct recharge from rainfall and provides the main water resource for the Carnarvon townsite and nearby horticultural industries.[32]

The inter-tidal mangroves in proximity to Carnarvon are recognised as areas of high biological productivity contributing to the overall productivity of the region's fishery. Not only supporting a commercial industry, its biological role in supporting large numbers of habitat specific waterbirds is also significant. The horticulture industry also represents a significant economic resource to the region and supports additional industries such as transport, irrigation and refrigeration services.

Commercial interest in the community is dominated by commercial fishing, contributing $96.7 million for 1992/93. This includes prawn, scallop, wetline snapper and beach seine fishing in the area. The Gascoyne region contributes significantly to the State's total fish export market and accounts for over 90% of all prawns, scallop and snapper caught in WA. [32]

Community facilities in Carnarvon include a range of Government administrative offices, a Police Station, Court House, Tourist Bureau, Civic Centre, recreational facilities, emergency services, child care centres, high school and primary schools, hospital, community and child care services, shops, hotels, motels and shire offices. The commercial and light industrial areas also contribute to the role of the town as the regional centre. The Royal Flying Doctor Service operates a base from Carnarvon that provides medical transfer from remote regions to hospital care at Carnarvon.

Skywest provides regular passenger transport services to Carnarvon airport. Air arrivals for 1993/1994 were recorded as 16,698[33].

3.2 Coral Bay

Coral Bay is a tourist village located in the Carnarvon Shire, on the southern portion of the Maud's Landing townsite, 160 kilometres south of Exmouth[34]. With a permanent population between 40 and 60 and a peak visitor population in excess of 2000 persons, it provides low key tourist facilities including accommodation and associated retail services with no health, education or emergency services. Access to Coral Bay is via the sealed access road between Learmonth- Minilya.

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31 Australian Bureau of Statistics (1994) Preliminary Catalogue. no 3204.5. Estimated Resident Populations in Statistical Local Areas, WA. 30 June 1994.

32 State Planning Commission, (1994) *Gascoyne Coast Regional Strategy* For Public Comment, Gascoyne Coast Strategic Planning Study Steering Committee, November 1994.

33 Western Australia Tourism Commission (1993/94). Research Division. Carnarvon Tourism Research Overview. Shire of Carnavon

34 Department of Planning and Urban Development (1992) Draft, *Coral Bay Planning Strategy*, WA Department of Planning and Urban Development, 1992.

Coral Bay has severe servicing limitations. Diesel generators supply local power at Coral Bay and are privately operated. Effluent disposal is achieved by on-site measures that could potentially lead to long term nutrient enrichment problems for Bills Bay.[34] Growth potential for Coral Bay is restrained by a number of factors including lack of essential services, land release and adequate formal planning.

3.3 Exmouth

Exmouth is the second largest settlement in the Gascoyne Region with a population of 2419.[31] Estimated residential population (ERP) for the Shire of Exmouth declined between 1991 and 1993 following the transfer of Naval Communications Station Harold E. Holt from the United States Navy to an Australian control. Exmouth is once again experiencing population growth, in part attributed to expanding tourism industries in the region.

Access to Exmouth is restricted to a single sealed road extending from North West Coastal Road (Minilya) to Exmouth (Learmonth). A number of unsealed roads are accessible at times of the year and there is a 4WD track which provides conditional access between Coral Bay and Exmouth via Yardie Creek.

Learmonth airport is located 40 kilometres south of Exmouth and provides a domestic facility operated by the Shire of Exmouth. Skywest provide daily flights between Learmonth and Perth. Furthermore there is an additional twice weekly service between Learmonth to Karratha and Broome, with subsequent northern connections. The airport has the capacity to carry international flights into the region.

The State Energy Commission of Western Australia (SECWA) operates a diesel generating plant for electric power from Exmouth's light industrial area. Water supply is extracted from a borefield situated in the Cape Range. Exmouth is a well serviced district area with a Police Station, Court House, several Government administrative offices, recreational facilities, tourist bureau, civic centre, primary and high schools and emergency services.

Chapter Four EXISTING LAND USES

The following land use categories currently exist for the Shire of Exmouth.

4.1. Pastoral

Pastoral activities in the Shires Exmouth/Carnarvon include the production of cattle, sheep and wool. Pastoral operators have observed the increased tourist activities in the region and contribute on a small scale in servicing the tourism industry. Pastoral leases implicated in management for Ningaloo Marine Park and Cape Range National Park are Ningaloo Station, Cardabia Station and Warroora Station[35]. All three of these Pastoral Leases are in Carnarvon Shire Council.

Pastoral involvement with the region dates back to 1889 when Ningaloo Station pastoral lease was taken up by Thomas Carter.

4.2. Coastal Use

Preferred camping sites with coastal access have become fully utilised, and people are now resorting to less attractive and accessible places to camp. This has led to a proliferation of tracks, erosion and conflict with pastoral operations. Many campsites extend the boundary between the 40m wide coastal reserve of the Marine Park and land adjacent to the Marine Park creating many problems for management. The Commonwealth Defence land (RAAF Location 97) and the coastal portion of the Ningaloo pastoral lease have been subject to uncontrolled camping and associated activities contributing to degradation of the mobile coastal strip.[36]

The coastal regions can accommodate public use given that environmental criteria are met. It was anticipated in the Gascoyne Regional Strategy that the coastal section between Yardie Creek and Ningaloo homestead be best suited to accommodate future tourism potential.

4..3. Tourism

The North West Cape offers a distinct opportunity for visitors to interact with a variety of environmental settings. Each year an increasing number of visitors are attracted to Cape Range National Park and Ningaloo Marine Park. A concentration of activities within the coastal zone has been observed in recent years with increased public use of the Park.

Unlike the Great Barrier Reef where visitation is predominantly on a day or short term basis, the average length of stay in the Gascoyne is 13.4 days.[37] Access to the Marine Park is unrestricted for those campers equipped with 4WD's, yet the present condition of the road prevents more general use by 2WD vehicles.

Whale shark operations, fishing charters, SCUBA dive charters, safari tours, canoeing, nature trails and a number of passive recreational sports such as snorkling, swimming and coral viewing all exist to facilitate and enhance the tourism experience. The industry has the opportunity to be self-sustaining and to manage and integrate tourism development and conservation. It offers the local community employment prospects, returns from merchandise sales and opens the local markets directly and indirectly by increased expenditure. The seasonality of the tourism industry is mainly restricted to

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35 Pastoral lease boundaries represented in figure 1

36 Submission

37 Western Australia Tourism Commission (1993/94) Gascoyne Tourism Statistical Trends, WA Tourism Commission.

between June and September. However shoulder periods are improving with increased focus on events such as whale shark watching, turtle nesting/hatching and fishing tournaments.

4.4. Developments/Tourism Facilities

Tourist accommodation in the Shire of Exmouth is in excess of 500 hotel/motel bedspaces, over 600 chalets and vans, and 1400 caravan and camping sites.[6] Existing facilities within Exmouth meet the present demand though are extended during peak use periods. Only one settlement provides a direct access point to Ningaloo Marine Park, being Coral Bay. Since the inception of Maud's Landing townsite reserve in 1896, and the subsequent development of Coral Bay in the 1960's, no planning framework has been formulated to guide development. Consequently effluent disposal and the restricted supply of water and power are issues constantly facing residents and visitors. A motel development, backpackers accommodation, two caravan parks, chalets and camping grounds currently provide accommodation for visitors to Coral Bay. Overcrowding is a common occurrence within the town, placing pressure on all existing facilities, particularly during school holidays. An estimated 260 legal accommodation units catering for 1016 people is compared with actual peak usage estimated at 476 units accommodating nearly 2000 people.[34]

4.5. Marine Park

Use of the marine park is designated to fulfil "so much of the demand for recreation by members of the public as is consistent with the proper conservation 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;..."(CALM Act 1984).

The Marine Park is a highly valued recreational and commercial resource. Fishing and boating activities occasionally compete with the more passive activities such as snorkling and swimming. Damage resulting from recreational boaters dropping anchors on the coral reef is quite substantial in some areas. A zoning strategy is implemented to consider demands on the Marine Park from a multitude of activities. Whilst zoning of the Marine Park endeavours to restrict fishing and boat speeds in some regions, these limitations designated by boarders on signs erected near the boat ramps become arbitrary when boaters are active within the Marine Park. Anecdotal evidence would indicate the ease of recreational fishing to have deteriorated with constant pressure of the years and resources should be provided to enable management of fish stocks by appropriate monitoring and implementation of regulations. The establishment of Fish Habitat Protection Areas may provide nursery grounds for stock replenishment, yet the appropriateness of these sites needs to be scientifically examined.

CALM's implementation of licenses for Whale Shark operators has received commendation by the general public and the licensees. There is potential to expand the charter and game fishing further yet provision must be made for adequate boat launching and mooring, and safe passage through the reef.

The proposal to establish a Marine Parks and Reserves Authority (MPRA) was presented in the New Horizons Marine Parks policy 1994. A difficulty this Committee has encountered in advocating for or against a single authority reflects back on the integrated nature of these parks, and the need for coordinated management. Segregation of the marine and terrestrial environment will become an issue with the new MPRA as a marine authority and NPNCA as the terrestrial authority, particularly in the development of strategy plans that shall be knowingly challenged by cross-jurisdicational boundaries. The two authorities, in the development of policies, must have effective communication processes established to ensure complementary management practices are implemented.

4.6. Defence Land

The invitation for expressions of interest for facilities at the Harold R. Holt Commonwealth Defence Base, and for the Naval Pier remains open at the time of compiling this report. The proposal for utilisation of the facilities as a research base, with a strategy to expand the centre to an internationally recognised scientific and research institution is coordinated by Curtin University. Expressions of interest have also been received from the private sector. Learmonth airport similarly represents a potential opportunity as an international airport.

4.7. Mining

The Carnarvon Basin in which Cape Range National Park and Ningaloo Marine Park are located has high hydrocarbon prospectivity, presently accounting for 98% of the State's total oil production and more than 99% of gas and condensate production[38]. The history of the petroleum industry in the region is extensive, beginning with the first oil find at Rough Range in 1953. Today the petroleum industry comprises 40% of economic activity within the Pilbara and Gascoyne regions[39]. Recently a Government ban on exploration and petroleum activity in Ningaloo Marine Park was endorsed.

Deposits of high grade metallurgical limestone have been surveyed on the peninsula. A temporary limestone reserve granted before the National Park gazettal, is currently located on the eastern half of Cape Range. The area includes approx. 80% of the caves known to contain terrestrial troglobites and quarrying could potentially disturb the ground water table containing this ancient fauna[40]

4.8 Fishing

Exmouth hosts the second largest prawn fishery in Western Australia with 16 commercial vessels operating in Exmouth Gulf. CALM distributes 15 Whale Shark licenses which includes 13 operators in the vicinity of Tantabiddi and 2 operators from Coral Bay. The majority of these licensees are also permitted to run fish and dive charters within the Marine Park and one permit is issued for diving and fishing charters from Exmouth. Most licences have an endorsement that prohibits boats to be used for fishing between Tantabiddi Creek and Point Maud. A further three boats are permitted to exclusively run dive charters from Exmouth and two dive charters from Coral Bay. One coral viewing permit is issued for the Exmouth region, whilst there are two permits operating in Coral Bay. A single permit is provided for yacht cruises. Commercial fishing operators within Ningaloo Marine Park are fairly restricted with only two licensees operating. The first is an experimental deep trawler which targets benthic fauna, whilst the second permit allows fish trapping (which in principle resembles pot-lobster fishing). Legislation prevents the use of trapping in less than 60 metres of water.

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38 Submission

39 Submission

40 Submission

Chapter Five COMMITTEE ACTIVITIES

The Committee set out from its inception to learn directly and quickly about the region included in our Terms of Reference. We resolved to travel along the coast, inside the reef area, in order to become familiar with the various locations of major tourist interest and to familiarise itself with those Bays identified in the Jones Lang Wootton Report as potential sites for development and conservation.

The Committee felt it important to be able to relate to the most favoured development sites and sites of high conservation interest to ensure that as we read the various submissions and listened to oral evidence we could picture them and fit them into the overall environment of the marine and terrestrial parks.

As a consequence of this need for a first hand introduction to the Ningaloo Coast, the Committee flew to Learmonth on the Cape Range peninsula and travelled to Coral Bay where we stayed in local accommodation. During the afternoon, opportunities to familiarise ourselves with Coral Bay and the proposed development site at Maud's Landing were taken.

The following morning a tour of Bills Bay in a glass bottom boat was arranged with a local tour operator. The Committee were made aware of the coral viewing areas, the small boat areas and the general swimming area. Whilst the time of year was not a busy one in terms of tourist activity it was sufficient for the Committee to visualise the conflict that occurs in this popular site when the area is populated by many thousands of tourists using up to one hundred and sixty boats in what is a popular snorkling bay. This opportunity and experience assisted the Committee with listening to and digesting of arguments on proposed developments at Maud's Landing at a more formal stage of our hearings.

That inspection complete, the Committee headed north in a small boat under the captaincy of Doug Myers, CALM's District Manager. The first inspection site was the bay at Maud's Landing, the location of the proposed Coral Coast Marina Development. From there we travelled north staying close inshore. The small boat was supported on land by a backup vehicle driven by Chris Davis, a part time CALM employer.

Weather conditions, though extremely hot were good and the party made reasonable time to Ningaloo Station Shearing Quarters situated on Ningaloo Beach just to the south of Lefroy Bay.

The Committee met that afternoon with Ms Jane Lefroy and Mrs Billie Lefroy and were treated to some warm hospitality and a welcome afternoon tea. The Lefroy family have run the Ningaloo Pastoral Lease since 1934. Ningaloo is a station of some 49,000 hectares running approximately 5000 head of sheep. It is also a popular camping site during the tourist season. The particular interest from the point of view of the Committee is that this station has been the subject of a buy back proposal from CALM. That is a matter more fully dealt with at a latter stage of this report.

After camping the night in the Ningaloo Shearing Shed, the Committee set off toward Exmouth into the teeth of a howling north west wind which whipped up a choppy and uncomfortable sea. Indeed the weather deteriorated to such a degree as to cause the trip to be shortened and the Committee was forced to abandon plans to camp out that night and revised plans necessitated us to cut short our inspection time and head for Exmouth.

Despite this setback the Committee managed to view most Bays of tourist and conservation significance including a good look at Winderabandi, Norwegian Bay, Excellent Bay and Yardie Creek,

where the Committee, with the help of CALM personnel, managed to more closely examine Yardie Creek proper and the gorge.

The Committee arrived at Exmouth late in the day. Part of the following day was spent examining the CALM education centre at Milyering. Milyering Bicentennial Visitor Centre serves as a focus for a wide range of activity programs. The dry, desert environment was considered with the building including structural design features which facilitate natural cooling including solar panels, thick rammed earth walls and roof vents allowing continuous air flow. Furthermore the installation of an alternative toilet system has negated the need for large quantities of water for flushing and breaks down the waste material to form a compost which can be used for fertiliser.

The Committee visited Turquoise Bay to examine the site where a Kailis development is proposed. An opportunity was also taken to examine the terrestrial park via the Charles Knife Road and a visit into the Canyon areas of that Park.

This familiarisation trip was proposed as an information gathering exercise free of formal meetings and was to prove of enormous value to the Committee when considering submissions. A similar trip was undertaken by the Committee at a later stage of its proceedings to learn the importance of the whale sharks to this region and the associated tourist activity.

This trip and the later familiarisation of the whale shark exercise gave the Committee a brief, but important introduction to the natural beauty of the area and helped us to understand the value of nature based tourism. It gave us an understanding of why it is that tourists visit this region from faraway places such as America, Japan, Holland and Germany. Demonstrating why they and so many West Australians feel so passionately for this magnificent stretch of unique coastline.

In addition to inspections along the North West Cape the Committee was fortunate enough to visit several overseas locations relevant to our Terms of Reference.

Although the trip was rushed- 4 countries in 15 days, an appreciation of coastal areas under direct tourism pressure similar to Ningaloo was gained. In addition the management of two inland parks and reserves of National significance in South Africa were visited where tourist numbers are closely monitored and managed. This trip was of great benefit and certainly broadened the knowledge of the Committee Members and left a strong impression of some strengths and weaknesses on the international scene and those impressions have contributed in no small part to the making of this report.

The countries visited were; Mauritius, South Africa, Israel and Egypt. In Mauritius the Committee inspected several areas of coastal development and was hosted by the Minister for Tourism, the Minister for Fisheries and Mr John Cornwall, Acting Australian High Commissioner. The Committee was largely directed by Mr Dhaneshwar Goorah, Divisional Scientific Officer with the Ministry of Fisheries and Marine Resources. Mr Goorah and other officers were extremely helpful during our stay and organised many learning opportunities for the Committee. His Department was also very interested in the work being done by Environmental Protection Authority, Conservation and Land Management and Fisheries Departments in this State. It would, in the Committee's view be advantageous to this State to host the Divisional Scientific Officer to Western Australia for an appropriate period so that he be given an opportunity to examine the activities of those organisations and see first hand the work they are doing.

On leaving Mauritius the Committee travelled to South Africa and were hosted by the Natal Parks Board. Dr George Hughes, Chief Executive at Queens Elizabeth Park met the Committee and

organised a thorough briefing of the activities and structure and responsibilities of that organisation. Despite limited time constraints the Committee managed an inspection of sections of the Natal Drakensberg Park under the guidance of Greg Laws, Conservator of the Northern Zone, and Mr Tim Dale, warden of Giants Castle Drakensberg Park.

The Committee departed Durban and travelled to Satara Camp in Kruger National Park via Skukuza. The Committee was fortunate to spend time with Dr. W.P.D. Gertenbach, General Manager Nature Conservation, Kruger Park, Mr H. Braach, Park Warden and Mr Piet du Plessis, General Manager Visitor Services, Kruger Park and learn first hand of the issues confronting Kruger and its management challenges in the face of increased tourism pressure from developers with constant development concepts designed to cater for increased tourists numbers.

The Committee examined tourist roads built within the park for access and game viewing purposes. Once again the Committee was alerted to similar tourist and development issues now being encountered in relation to the North-West Cape.

The Committee departed South Africa and travelled to Israel. In Israel the Committee was met with an extensive, interesting and relevant program largely organised by Mr. Eric Zimmerman, the Research Grants Co-ordinator at the Bar Ilan University in Tel Aviv. The Committee met with Professor Grossman, Vice President for Research, Professor Gedanken, Professor Dubinsky, Professor Kizner, Professor Skoshany and Dr Ben-Zion of the inter-university Institute of Marine Sciences and attended several meetings with them. All of whom displayed a personal and professional appreciation of the problems confronting coral reefs around the world and an understanding of the associated tourist and resort development issues. However, it was of some concern to the Committee that much international knowledge and interest exists about the Great Barrier Reef but little international interest at the academic level is directed towards or known about the Ningaloo Reef or its unique qualities.

The Committee travelled to Eilat, situated in southern Israel, at the apex of the Red Sea on the Gulf of Aqaba, bordering Egypt on one side and facing Jordan across the Gulf.

Eilat is an extremely popular tourist resort for diving and snorkelling given its proximity to fringing coral reefs. In Eilat the Committee was hosted by Mr Eric Zimmerman with a meticulously organised itinerary which included significant time spent with Mr Dov Amrami of the Bar Ilan University. Other meetings included time with Ms Nurit Popper of the Coral Reef Nature Reserve, Dr Anton Post and Dr Boaz Lazar of the Inter-University Institute of Marine Sciences, Dr Eli Varbourg of the Pollution Control Station, Dr Yiftach Sinai, Hai Bar Nature Reserves and Dr Roni King, Director of the Nature Reserves Authority Eilat District. The Committee also crossed into Egypt and into the Sinai accompanied by Mr Zimmerman and Mr Amrami where we inspected various coastal developments including the major development at Sharm el Sheik and the adjacent Ras Mohammed National Park.

There is much that the Committee learnt on this trip and the benefits were many. The salutary message that stands out above all others however is this:

Most fringing reefs around the world have few options left for survival and would appear devastated due to human activity. At Ningaloo we have all of the options left open to us. To ensure sustainability of Ningaloo in perpetuity, we should consider those options carefully, and use them wisely.

The glitter and shine of tourism developments often present an unseen danger to long term sustainability of natural tourist attractions.

The potential power of the attraction of tourist dollars to override sensible development guidelines and procedures has become very evident to the Committee.

In Mauritius we looked at ribbon development constructed right on the shoreline. The Committee was appalled to witness coral reef being dredged in order to make access through the reef for speedboats to tow water skiers. Sludge from the dredging operations was drifting with changing currents along the coast, settling on coral formations, smothering them and robbing them of light and oxygen. Who will want to visit that coastal resort if most of the coral is dead, severely degraded or denuded of marine life?

It was very evident to the Committee that those charged with tourism development in Mauritius were oblivious to the concerns of others charged with trying to manage the fishery and the impact of such developments. The 'dig it up and ship it out' philosophy that is endeavouring to capitalise on the so called tourist boom is very powerful in that country. It overrides those who can see the detrimental impact of such policies on the coastal region and who foresee the destruction of the nature based tourist attraction as having a long term negative impact on the tourism industry.

Similar observations were made on the coast along the Red Sea. While Israeli conservation authorities are fighting back from a tourist 'develop at all costs' philosophy and putting in place protocols to protect the reef environment, these marine scientists openly admit they are fighting the battle from behind. The number of tourists visiting these resorts has put tremendous pressure on the reef environment and has made the management of tourist impacts extremely difficult.

Judging by the numbers of ribbon hotel developments going ahead on that same coastline in the Egyptian territories it is evident the tourism dollar is as much sought after there as anywhere else.

A particularly pleasing aspect of our investigations in South Africa, in both Natal and the Kruger National Park is that those who have direct responsibilities for maintaining the integrity of the parks also dictate the terms of any tourism resort development. In this way tourist development has remained, whilst very important, secondary to the preservation of the park environment.

The Committee was made aware that this situation is under pressure and the tourism lobby is working hard to achieve greater access to park areas for development purposes. It will be of interest to monitor that situation in future.

Chapter Six REASONS FOR RECOMMENDATIONS

Recommendation 1.

Any accommodation facilities in Cape Range must be consistent with conservation management strategies for the terrestrial and marine environment, so that construction and operation activities do not impact adversely upon significant environmental features or the ambience of the surrounding topography.

The Ningaloo Reef Tract is Australia's only fringing barrier reef system contiguous with an arid coastline. The fragile nature of the arid region is associated with migratory rather than stationary forelands, a delicate hydrological regime, Holocene dune beach fringe and a sparsely vegetated coastal foreshore with vegetation communities that possess dune stabilisation properties. When combined, these become contributing factors that reduce the coastal environment's capacity to withstand or sustain rapid or large-scale disruptions.

The arid nature of the region imposes a low carrying capacity, with soil type characterised by low nutrient retention. The porosity of limestone make conditions particularly conducive to contamination of ground water, presenting a potential threat to the troglobitic fauna and the coral reef system. The respective groundwater and lagoonal circulation patterns are capable of dispatching contaminants over extensive distances [41].

Comparable reefs in the world, such as the Red Sea have been severely degraded due to *ad hoc* development imposing on the natural biological processes. Development must be carefully coordinated and considered terms of their cumulative impact on these processes. An understanding of these processes is essential if economic and conservation objectives are to be met.

Recommendation 2.

There be no shore based resort development on the western side of Cape Range on coastal land abutting Ningaloo Marine Park.

Consideration for the dynamic nature of the shore (land/sea interface) is imperative.

The cuspate forelands in particular, may be superficially suitable as sites for tourist development and yet scientific techniques accentuate the volatile nature of these forelands[42].

The Committee has carefully considered implications of remote shore based resort development, in particular, to the infrastructure required for capital works. This involves provision of potable water, waste treatment, power generation, engineered structures (breakwaters) and refuse disposal. Furthermore, the peripheral services which complement internationally competitive markets can require extensive planning and management strategies. The concept of 'remote' involves logistics of staff housing, transport of goods and services along the coastal road, general servicing, and their cumulative impact on the fragile coastal plain and hinterland.

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41 Humphreys, W.F. (1993)The significance of the subterranean fauna in biogeographical reconstruction: examples from Cape Range peninsula Western Australia. *Records of the Western Australian Museum. Supplement 45:* 165-192.

42 Submission

As there are few opportunities for accommodating resorts to be developed on the west coast of Cape Range it is important for these sites to cater for wider community needs. Appropriate siting and setback distances will protect beaches and resort property from beach erosion and property damage. Ningaloo is a fringing barrier reef and unlike the Great Barrier Reef where there is a sufficient buffer zone between the reef and people, we must remember that controlled access is a key management tool. Setting back all resort development behind the mobile coastal zone will create a terrestrial buffer and provide a degree of protection for the reef processes.

The Committee received evidence supported by two expert witnesses who state;

> *'...the forelands within the Ningaloo reef area are more likely to be migratory than stable forms.....the evidence on processes and morphology on the cuspate forelands in the Ningaloo area indicates that they are travelling forms.*
>
> *' There is evidence that parts of the coast have been subject to high levels of storm surge and, perhaps, inundation by tsunami...The dunes of this arid coast are highly susceptible to destabilisation and constitute a potentially major management problem where coastal access is not rigorously controlled'*[43]

It is understood by the Committee that sites identified in the JLW report as having a tourism development potential, warrant protection until such time that development be appropriate. A degree of protection can be accommodated under the IUCN category VI[44] whereby areas can be given restricted access as a 'resource reserve'.

The management objective of the reserve is to

> *'...contain development activities that could affect the resource pending the establishment of more defined objectives which are based upon appropriate knowledge and planning.'*

It is envisaged that future management plans can utilize carrying capacities as deterrents, to avoid exploitation, and ultimately degradation of the resource.

Recommendation 3.

The Minister for the Environment establish a Strategy Group to develop environmentally acceptable guidelines for accommodation facilities, depicting essential infrastructure, form and headworks which, as a bottom line, protect the integrity, and ambience of Cape Range and Ningaloo Marine Park.

Current issues facing tourism development and land use strategies are difficult to resolve as the existing framework attempts to accommodate a variety of local, regional and State mechanisms. Avenues for approvals and procedures for assessment of major developments are complex. This is reflected by extensive Government representation in its various departmental capacities and results in duplication of effort. There is a need for coordination on a State and regional level so that the strategy proposed by this Committee once approved, will negate the need for developers to "do the rounds"

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[43] Submission

[44] Appendix C

of various government departments seeking development approvals. This Strategy Group should recommend the "one stop" approval mechanism to complement its development guidelines.

The Committee has examined the strategies developed in the Western Australian Tourism Infrastructure Strategy,[45] and supports the recommendation to;

'Develop a 'whole of state government' approach to tourism development and achieve a greater coordination between the private sector industry and government at Local, State and Federal levels.'

> ***'From a tourism planning perspective however there has been a lack of integration between marketing, planning and development planning in the regions... It is critical to the future development of tourism that infrastructure requirements are identified across the State to facilitate development in a strategic manner which maximised the benefits of government expenditure and support'*** [45]

This statement illustrates the critical need to develop Government mechanisms to achieve coherent policy decisions. Clearly defined administrative procedures providing development guidelines and documenting the processes of assessing permit applications need be established, backed by legislative authority if necessary. The guidelines should set directions for design concepts and hence avoid any unnecessary expenditure in developing a project which may never be approved. The recent 'Western Australian Tourism Infrastructure Strategy, October 1995' is cited as stating:

> ***'One of the major impacts is through the development approvals system, which has in the past hampered the development of the (tourism) industry by requiring multiple approvals for development projects. Up to thirteen separate approvals may be needed from different agencies in developing a tourism project.'***

This process should instead instill public confidence in the decision making process and facilitate tourism development through established environmental guidelines and approval procedures. In Coral Bay we have witnessed the outcome of spontaneous development that has neglected strategic planning principles.

> ***'It is considered costly to require individual private developers to resolve broad regional planning strategies as part of obtaining project approvals.***

> ***Forward regional planning and tourism strategies provide a greater level of certainty to both developers and the community and; avoids long running community conflicts over specific development proposals'***[46]

Furthermore it is essential that the proponent establish project economic viability and guarantee sufficient funds for site rehabilitation given the event where the project collapses. Assurance in suitable forms of security should be mandatory to enable site rehabilitation, should the need arise.

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[45] Western Australia Tourism Commission (1995) Draft, *Western Australian Tourism Infrastructure Strategy*, Prepared by Coopers & Lybrand for Western Australian Tourism Commission. October 1995.

[46] Whitehouse JF (1992). *Review of the Magnetic Island Marina Development.* Department of the Arts, Sport, the Environment and Territories.

WA Tourism Commission's Nature Based Tourism Strategy (1995) proposes three key objectives relating to the sustainability of tourism activities and developments. These are:-

* They need to be planned and integrated into specific reserve, local and regional planning frameworks;

* minimum environmental standards need to be defined, publicised and translated into controls; and

* models of "sustainable tourism developments" need to be created as examples of how nature based tourism can be made both environmentally and economically sustainable.

> ***"The models need to consider the mechanism for funding the management, maintenance and protection of tourism resources and should include instruments such as "user pays", entry fees, resource rents, license fees, differential rating, taxes, levies, funding and grant funding. If these actions fail, the cost of maintaining the integrity of the nature based tourism resource will be borne by the taxpayer."*** [47]

Small scale accommodation which minimises environmental impact can potentially match the economic performance of larger developments. However the benefits gained from encouraging small-scale wilderness type lodging can easily be negated if these low impact developments assume an incremental ribbon establishment along the coastline. Small intermittent developments must be congregated in nodal formations, appearing discreet. Thoughtful planning is required to determine the degree of service and support infrastructure necessary, to avoid a proliferation of independent villages. The accumulated impact of such a scenario would undoubtable exceed that of a singular localised larger-scale development.

> ***Tourism development on the Cape can deliver significant economic benefits to the State of Western Australia if pursued patiently and with care. Our analysis suggests that ad hocism or large scale adventurous development is likely to be unsustainable economically and environmentally. It is preferable that ill conceived tourism be avoided even if this means that the Cape be maintained as a wilderness lodge setting.*** [48]

Given the event where the developer has obtained all requisite statutory planning and environmental approvals and proceeds to develop a resort/lodging on land managed by CALM, the Committee feels it is imperative that land be subject to a Crown lease and not sold as freehold. There will be a continuing administrative cost in retaining the land and in the CALM's role as leasor, however these will be offset by the benefits gained in establishing a coordinated framework for development that can be revised at a later date.

This will ensure development within the National Park to proceed within a strategic context and not as a series of individual, unrelated projects. No region can be considered a separate entity, or one persons responsibility. It is a public resource that needs to be managed with consideration for the open nature of the marine environment.

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[47] Western Australia Tourism Commission, Department of Conservation and Land Management (1995) Draft, For Public Comment, *A nature based tourism strategy*, Department of Conservation and Land Management, Western Australian Tourism Commission

[48] Jones Lang Wootton Report 1983. Northwest Cape Tourism Development Study.

Because of the relatively few sites that may be suited for development, consideration of the broader wants of the market is necessary to ensure the provision of sites catering for day visitation, sites allocated for low key camping and those catering for specific recreation purposes (fishing, boating, parasailing, snorkling). Development of these sites will induce a social and economic impact on the landscape and will require forward planning to accommodate an acceptable level of change.

Cape Range Peninsula and Ningaloo Marine Park already have clearly defined choke points that limit access and restrict the scale of use. Its remoteness, road infrastructure and the siting of existing facilities are in effect, these limiting factors. In planning for increased use of the Parks, managers must ensure infrastructure is in place to accommodate an increased carrying load. Alternatively the inbuilt management tool of the tourism industry forces people to use an organised tour operator, which facilitates coordinated management and prescribes patterns of use.

To maintain the quality experience enjoyed by users of Ningaloo and Cape Range, Main Roads, Department of Transport, Marine and Harbours, State Planning Commission Department of Tourism, Department of Land Administration, Department of Conservation of Land Management and the Water Authority, must cooperate to sustain levels of visitation with adequate infrastructure.

The Committee acknowledges the multitude of reports and management strategies produced in recent years that make comment on management and the varying patterns of use. The Committee in addressing these recommendations, would be hesitant in putting them forward if they led to undue procrastination in achieving an integrated policy. The Committee urges immediate action on this recommendation, hence the suggested timeframe.

Recommendation 4.

This Strategy Group be chaired by a nominee of the Minister for the Environment and should include representation from the Department of Conservation and Land Management, the State Planning Commission, WA Tourism Commission, Gascoyne Development Commission, Shire of Exmouth, National Parks and Nature Conservation Authority and with representation from the proposed Marine Park Reserves Authority.

Recommendation 4a.

The Strategy Group should refer as a starting point to;

(i) **Parliamentary Select Committee Report on Cape Range National Park and Ningaloo Marine Park (1995)**

(ii) **North West Cape, Jones Land Wootton Tourism Development Study (1993)**

(iii) **Gascoyne Coast Regional Strategy (1994)**

(iv) **CALM Management Plans for Cape Range National Park and Ningaloo Marine Park)**

(v) **Roads 2020 Regional Road Development Strategy, Gascoyne (1994)**

(vi) **Coral Bay Planning Strategy, DOLA, 1992**

Recommendation 4b.

This Strategy Group should report to the Minister within six months of its formation.

Recommendation 4c.

The Minister should report to Cabinet within three months of receiving the above report, by way of a Cabinet submission.

Recommendation 4d.

Based on that Cabinet submission, the Government should, within three months, adopt development guidelines which must set out, publicly, clearly defined parameters which inform of the rules and bounds within which development concepts will be improved.

Recommendation 5.

A coastal strip within the length of Ningaloo Marine Park be excised to the Department of Conservation and Land Management to enable CALM to properly manage and control camping, vehicular use and other people-related activities which may impact on the Ningaloo Marine Park and its adjacent land-based access areas.

Recommendation 5a.

This coastal strip may vary in width but should be negotiated by CALM with various land tenure groups currently controlling that land. The coastal strip should be wide enough to enable CALM to undertake proper control and management strategies.

Recommendation 5b.

There be no resort development within this coastal strip, on the western side of Cape Range, with the exclusion of the Mauds Landing Townsite (gazetted 1915).

Interactive Government management of the coastal zone and Marine park is critical and can be partially achieved through administrative reform. This strip is the most intensely used area and is also subjected to the dynamic forces of nature. It is not an inexhaustible resource. The coastal zone abutting Ningaloo Marine Park and the west coast are particularly susceptible to degradation. If these lands are not better protected, occupation and use are likely to occur on an unplanned, single use and short-term economic exploitation. This can then compromise future opportunities in an area that requires rationalisation of resource utilisation.

CALM has the infrastructure and legislative authority to provide a framework for coherent management with the capacity to meet its responsibilities. This coastal zone should be managed under a structured plan, to achieve multiple and sustainable use. This will require control of the way in which people access the park. Much of the management in human use can be averted by education and enforcement of policy. Proven methods to manage people are in the presence of information boards and a public profile of the managing officers (in preference to a proliferation of signage).

In areas where the marine park does not adjoin Cape Range National Park, Jurabi or Bundegi Coastal Parks, the marine park should be extended inland beyond 40 metres from high water mark, to include those areas where people camp and recreate, and on land subject to geological movement. This will enable marine park regulations to be applied to the intertidal zone. Inclusion of the coastal strip in the

Marine Park may be as a Special Purpose Zone, to ensure controlled day based visitation occurs, until such time that sufficient knowledge can warrant rezoning for sustainable use.

The 1983 Report produced by the National Parks Authority formulated guidelines for Marine Park boundaries[49]. The Report recommendationed obtaining the area of land extending 2 kilomteres inland from the western boundaries of Cardabia and Warroora partoral leases for gazettal as Class 'A' reserve for the purpose of the National Park. Mechanisms to achieve this include land acquisition or formal agreement, under section 16 CALM Act 1984, with the pastoral landholder.

In relation to the RAAF Bombing Range (location 97)[50], the Gascoyne Development Commission stated that this land should be placed in a management regime. This Committee agrees. There are signs of overgrazing due to the presence of feral goats and this has denuded the land of vegetation. Furthermore sand dune erosion and litter are common sights indicative of destructive human activity.

This region also contains areas of high conservation value. There exists the only known locality of the crustacean class *Remipedia* in the southern hemisphere and a large colony of rock wallabies[51].

The Committee has formed the view that CALM should work with the RAAF to establish a management regime for the range at the same time that it negotiates management of the coastal reserve.

With management under CALM's jurisdiction, coherent policies can be implemented to manage recreational use of the coastal zone and resolve conflicting priorities of use. The Committee understands that with the one strategy for coastal management, it is easier for the public to adhere to regulations and easier for managers to implement them.

Recommendation 6.

The State Government should negotiate the extension of Cape Range National Park to include Ningaloo Pastoral Station. A fair and reasonable price should be offered for the lease.

Recommendation 6a.

As part of the negotiation, Mrs Billie Lefroy and her daughter Ms Jane Lefroy should be offered lifetime tenancy of the Ningaloo homestead and its immediate surrounds.

Recommendation 6b.

Ms Jane Lefroy be offered permanent employment with CALM, as a park employee, in a position commensurate with her accumulated local knowledge and long term involvement in the area.

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49 National Parks Authority Report 1 (June 1983). *Ningaloo Marine Park, Report and Recommendations* by the Marine Park Working Group.

50 figure 1

51 Submission

Recommendation 6c.

Negotiations with the Lefroy family should be carried out by a senior officer of CALM, appointed by the Minister or the Chief Executive Officer.

Various tenures in proximity to Ningaloo Marine Park, compromise the management objectives because of difficulties in applying a management regime. As unresolved issues they become further complicated by emotive and historical associations between people and the land, so with care, the Committee has endeavoured to avoid alienating this association.

> ***...you can reserve the sites because they*** (the pastoral holders) ***will not be there forever, and on sites which clearly have no impact whatsoever of any substance on their economic operations.*** [52]

This coastal portion of Ningaloo Pastoral Station is susceptible to increased tourist activity that is not formally controlled and incurs a maintenance expense (fences, dune stabilisation, rubbish removal) that in the present arrangement is imposed on the pastoral holder. Stress placed on soil from salinity, grazing, and particularly in the proliferation of tracks, is further aggravated by tourism pressure on Ningaloo Station. The coastal land contiguous with the lease requires a structured management plan.

Given the primary objective of conservation, the Committee acknowledges the preferential option is in CALM obtaining the Ningaloo Pastoral Station and implementing the best environmental management practices. The Committee wishes to see the Lefroy family have a continuing role in managing the area around Ningaloo Station, with lifetime occupation of the station homestead and immediate surrounds. This should be determined through negotiations between CALM and the Lefroy family.

Recommendation 7.

The State Government should negotiate the excision of a strip of land adjacent to the Ningaloo Marine Park along the western side of Cardabia Station as per recommendation five.

Prohibition of camping within 16 kilometres of any settlement has driven campers onto the coastal strips away from managed camping grounds and onto Cardabia and Ningaloo Pastoral Stations. The Committee understands that the lessee of Cardabia has, over time witnessed negotiations between Ningaloo Station and CALM. As a result of the nature of negotiations, they have expressed several reservations for the security of their holding. Presently the lessee has no control over coastal campsites located on their property, nor have they expressed interest in developing facilities or grounds to cater for tourists. Their prime concern is with the pastoral interests of their property, and for the homestead that could be included in the two kilometre coastal strip that would be revoked from their lease and managed by CALM. It is likely that a management agreement be sought by Cardabia Pastoral Station with CALM in the interests of conservation of Ningaloo Marine Park.

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[52] Transcript 24.5.95 pp72

Recommendation 8.

The Committee recommends an eastward extension of Cape Range National Park as proposed by CALM in its Management Plan No. 8, 1987-1997.

In 1974 proposed extensions were recommended to the Environmental Protection Authority to expand the existing Park to include features that would incorporate a more representative cross-section of the northern, western and eastern coastal areas adjacent to the Park. There is a definite need to rationalise the park boundaries in view of the recent pressures on its resources, particularly in view of the recently identified troglobites found in the karst landscape. Recent documentation of the troglobites and further research into other systems of the region, will present findings that may impact future management decisions. As this information is being accumulated it would be inadvisable to apply complicated zonation strategies pending more informed management judgements.

Recommendations to extend the boundary of Cape Range National Park eastwards to achieve a more comprehensive reserve representing geographical formations of the eastern escarpment are maintained by the Committee. There may be negotiations with Department Of Minerals and Energy WA (DOMEWA) to allow an exchange of mining tenements to allow for limestone extraction as well as retaining the conservation value of the Cape Range. The Committee will comment on this issue when the balance of the report is presented.

The north west extension of the Cape Range peninsula represents land that is strongly associated with the community of Exmouth. The Committee is hesitant to recommend inclusion of this land into the National Park and supports joint management by CALM and Shire of Exmouth. The Committee feels there may be a potential opportunity for low profile development on the vacant Crown Land, north of Cape Range National Park and suggests the Strategy Group examine these areas also. There are however, areas north of Cape Range National Park that incorporate regions of conservation significance. The presence of the troglobites and stylofauna demonstrate the need for protection of groundwater and cave fauna.

Recommendation 9.

The Committee recommends that the coastal road strategy proposal, linking Coral Bay to Exmouth (as per figure 5, road development proposals, Gascoyne Regional Road Development Strategy 1994 Draft, 1994[53]) be further examined yet supports the concept in principle, provided the road is constructed primarily as a low impact tourist road suitable for 2 wheel drive vehicles, with a low maximum speed (tourist scenic road) which must be enforced.

The provision of an upgraded public road between Coral Bay and Exmouth will expose the coastal area to high visitation and significantly increase level of impact. The travel distances involved with accessing tourist sites are implicated by the demands and needs of its visitors. Rest and recreation facilities will be in greater demand and shall consequently require further policing and regulating by managers within the Parks.

[53] Appenidx F

Given the existing management tools, there would be no gain in subjecting the coastal zone to increased use prior to development of supportive infrastructure. Furthermore the quality of recreational experiences offered to the public would be substandard at this point in time. It is imperative that development be coordinated so that when access to the park accommodates a larger user group, services are available to ensure their experience is catered for. The vision is to create an environment providing the opportunity to relax, enjoy and share unique experiences as they interact with the spectacular flora and fauna of these two parks.

The existing track between Ningaloo and Yardie Creek provides coastal access for the high volume of seasonal traffic, mostly 4WD's. The road is severely degraded in regions and urgently requires upgrading. The timing of road improvements needs to be carefully examined against the capacity of the coastal strip to support increased use. The road will have social and economic benefits to the region in its impact on tourism. It is important to recognise that the first priority of the road is as a tourist access point to the reef, not as a direct means of getting from Coral Bay to Exmouth.

'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.'[54]

Recommendation 10.

The Strategy Group, in deciding possible sites should examine the potential of converting Milyering Visitor Centre to a wilderness/camping tourism area and applying monies derived from such venture to a similar centre relocated in the town of Exmouth.

There is a logical argument to be put in favour of converting Milyering Visitors Centre to wilderness style accommodation catering for lodgers, campers and caravaners. The site currently houses the only marine park visitors centre. This centre has the potential to be significantly expanded and play a far greater role in education of tourists, local residents and students visiting or working out of Exmouth. The Visitors Centre should also become a focal point for tertiary studies in acting as an interpretative centre with a more central location. Objectives would be to establish effective communication processes and education programs to avert environmental damage caused by lack of understanding. This can be complemented over time with the intention of Universities of this State to expand activities in Exmouth. A tourism venture at Milyering would also, as was noted in the JLW Report enable the rehabilitation of adjacent beach camp sites as day use areas.

The relocation of Milyering to Exmouth town centre will provide a more accessible introduction to both Cape Range National Park and Ningaloo Marine Park.

Recommendation 11.

The Visitors Centre contain published and unpublished research material on the Cape Range National Park and Ningaloo Marine Park.

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[54] Department of Conservation and Land Management, (1987) Cape Range National Park Management Plan 1987-1997, Management Plan No.8. Department of Conservation and Land Management, Western Australia, 1987.

Recommendation 12.

State Government establish a Statewide program to achieve a marine resource database, for application as a critical tool in the decision making process.

Recommendation 12a

CALM design and implement a research and long term monitoring program for Cape Range National Park and Ningaloo, in consultation with the Western Australian Museum, Australian Institute of Marine Science and Universities of this State.

Recommendation 12b.

Steps be taken to ensure researchers are identified with CALM while working in the parks and that they have an active role in promoting and interpreting their study programs.

One of the major difficulties in trying to establish a coherent management plan for Ningaloo Marine Park and Cape Range National Park is in determining acceptable levels of use. It is inadvisable at this stage to engage in long term decisions without the option for review. Conditions of development that may seem stringent now could have little impact as a management tool once multiple use and human pressure reaches a maximum scenario.

To successfully implement the recommendations in this report and conserve the natural and cultural assets, it is imperative that a technical basis be provided to facilitate informed decision making. This will entail a considerable amount of research work into biological, physical and social aspects that are implicated by human use, and subjected to change.

> *If we do not know what are the natural causes of the disturbances and the frequency and recovery rates, how can we assess the impact of our own activities? We have no baseline. The fundamental research needed in a situation like the Ningaloo marine park is for long term monitoring...in order to monitor what is happening in one place over a long period of time, not three year research grants but forward looking 50 year monitoring programs.*[55]

> *If this ecosystem (Ningaloo) is to be managed properly, a systematic, long-term data acquisition program is required to ensure that resource management is based on a thorough understanding of the system in question*

> *In the case of Ningaloo the key information bases for strategic planning do not exist, a management plan does, but there are currently insufficient resources for policing and monitoring*[56]

With limited resources available to initiate this program, coordination between research institutions and government agencies will be needed, to structure an effective system that can disseminate and exchange information. Interpretation of the technical data to management agencies will consolidate

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[55] Transcript 16.6.95. pp267

[56] Dr Chris Simpson, Manager Marine Impacts Branch, Department of Environmental Protection

their decision making processes. The program's objective should be to document key ecological and physical processes in Cape Range National Park and Ningaloo Marine Park. This will include an inventory of flora and fauna of this system.

CALM staff do not have sufficient human resources to take on this additional aspect, so the opportunity to collaborate with the Tertiary Institutions to enable students to undertake post-graduate work in areas of study, will enhance CALM's understanding of these systems and facilitate implementation of proper management strategies.

Research projects should be targeted on the needs of the resource manager, to ensure that there is no duplication of research efforts and that they contibute to long term management goals. Closer collaboration between researchers and resource managers will encourage the development of holistic, multidisciplinary approaches to coastal resource management, involving both the social and natural sciences[57].

Recommendation 13.

CALM investigate the opportunity to acquire revenue from external sources to assist researchers with special grants and sponsorships.

Recommendation 14.

State Government obtain Federal Government support for the establishment of the Curtin University Indian Ocean Centre for Tropical Studies at the Naval Communication Station; Harold E. Holt.

Establishing an Indian Ocean Centre for Tropical Studies in Exmouth will generate an international focus on marine science research at Ningaloo. In addition, the Centre will provide facilities for research into the physical and biological sciences, and will allow for interdisciplinary and multidisciplinary research activities (renewable energy, hydrocarbon chemistry, maritime archeology, astronomy).

> ***The establishment of such a Centre is strongly supported by the Exmouth community, by State and National educators, researchers, natural scientists, as well as local and regional government agencies. In addition the Australian Science and Technology Council in August 1993, in its report on Research and Technology in Tropical Australia to the Prime Minister of Australia, supported the development of a research centre at Exmouth drawing on the expertise of the Western Australian Universities and the Department of Training.***[58]

The uniqueness of the region warrants quality assessment. An opportunity has presented itself here whereby interdisciplinary activities within the academic institution can be extended an opportunity for

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[57] Auyong, J. (1995) *Tourism and Conservation* (pp95-116). Hotta, K. and Dutton, I.M. (eds) Coastal Management in the Asia-Pacific Region: Issues and Approaches, Japan International Marine Science and Technology Federation, Tokyo, 1995.

[58] Expressions of Interest for Surplus Facilities and Land at the Naval Communications Station: Harold E Holt at Exmouth, WA For the Establishment of the Curtin University Indian Ocean Centre for Tropical Studies.

practical implementation. The assembly of such expertise in field activities can have immense benefits in raising the conservation value of the region and in raising the public profile of 'honorary' managers who, as researchers, assume an active role in contributing towards developing sound management practices.

It is important however, if these activities are to contribute to long term management objectives, that they be coordinated to achieve such goals.

Recommendation 15.

The Minister for the Environment initate and actively support an international seminar to be held in Exmouth with the theme 'natural resource management'. Invitations be extended to those of appropriate disciplines in management and science.

The Committee is of the impression that Ningaloo Marine Park and Cape Range National Park do not have an international profile commensurate with the inherent worth of these combined resources. It is important for the wider community, including those trained in management of related systems, to appreciate the significance of this region. Such an event will have important benefits in coordinating a much needed focus on the attributes of the area, and in bringing together a diverse field of backgrounds.

Recommendation 16.

State Government must ensure the provision of adequate resources for proper management of Cape Range National Park and Ningaloo Marine Park.

A number of submissions representing a wide field of view supported CALM as managing agency. There seems much sense in utilising existing adminstrative and technical infrastructure with a whole of state approach, rather that a single vision authority. This perception holds true in terrestrial management, in which CALM has had long standing experience. The Fisheries Department has projected a more active role in harbouring commerical gains from the marine resource and more recently, in managing sustainable use for commerical and recreational interests.

The Committee feels that the presence of both Fisheries and CALM has contributed to the perception that marine and terrestrial environments are independent entities. Fisheries are resourced to achieve their strategies, which do not consider their impact on marine management, or specifically on management of recreation and tourism. CALM has been resourced according to its role in terrestrial management, with a majority of resources and human effort contributing towards essential services, emptying bins, collecting camp fees and general maintainence. Field activities by CALM officers need to include more active marine management activities.

The Cape Range and Ningaloo areas require appropriate resourcing that will provide for specialised technical skills and consultation processes in management. There is no gain in implementing recommendations without sufficient staffing and resourcing.

Recommendation 17.

CALM review its staffing structure, to employ specialised management staff with tertiary education or appropriate qualifications commensurate with the marine and terrestrial environment.

> ***It is essential also that there be some centralised expertise, for both research and management purposes. One of the problems in managing areas like this is that the kind of expertise required is highly diverse. In this case you require a fish biologist; a coral reef biologist; people involved in fisheries management..people involved in vegetation, fire burning practices, education and people control. An enormous range of expertise is required to manage these places effectively. It is for this reason that it is unrealistic to expect each local body to have that range of expertise at the required standard. There must be a centralised resource which is applied to each of the reserves throughout the State.***[59]

The Exmouth Regional Division of CALM has limited resources for a small staff body, that is generally over-extended. The penalty of such a situation is the delay in establishing defendable management strategies, which, due to the logistics of collecting and interpreting technical information, will take an extended period to rectify. Staff resources are limited to priority operations. This limits the time in which they can spend talking with users of the park, inquiring as to the effectiveness of new management decisions, or being involved in research programmes. Furthermore, submissions made comment on the extent of daily travel required by CALM officers to cover the conservation estate, significantly reducing their productivity.

Park staff have an important role in facilitating interactive communication between industry and management. When complemented with the technical foundation, this process can effectively implement good environmental practices which are understood by users and administrators. A public profile is crucial in gaining public cooperation in management by pertaining to catch limits, speed limits, boating safety...etc.

The management agencies of the Great Barrier Reef have structured their organisation to accommodate the various tiers of management, with specialized staff appointed in roles for planning and management, education and information, environmental impact management, administration, education and aquarium. To complement this arrangement a strong association between GBRMPA, James Cook University and AIMS brings together research organisations. The recent creation of the Cooperative Research Centre for Ecologically Sustainable Development of the Great Barrier Reef fortifies effective management principles, by introducing industry and acknowledging the economic role of GBR .

Recommendation 18.

CALM encourage a high standard of commercial operations to ensure ecologically sustainable development of tourism based activities within Cape Range National Park and Ningaloo Marine Park.

Commercial operators holding Whale Shark permits have played a significant role in cooperating with CALM to help coordinate a sustainable tourism industry. A fifteen dollar levy per paying passenger is imposed on the operator, and contributes to management of their industry, and of Ningaloo Marine Park. A portion of the funding raised by this levy contributes to the research work of a Murdoch

[59] Transcript 16.6.95 pp268

University Masters student who is examining the impact of human activity on the Whale Sharks, and conducting a behavioural study of this fish.

It would appear however that whilst the existing environment satisfies the majority of tourism, infrastructure could be better developed. As a result of the Committee's inspection of operations at Exmouth, it was evident that basic facilities such as shading structures and seating at Tantabiddi boat ramp, from which most most whale shark operations commence, are urgently required. It is the Committee's view that funds raised from the levy contribute to establishing such services.

Charter boat operations may need to be formalised in accordance with regulatory requirements and standards of quality assurance. Operations within the industry are highly variable and will be subject to further expansion once Exmouth boat harbour and Mauds Landing Marina are completed. CALM must enforce control over charter boat activities and all commercial operations within the Park.

As a coordinated industry, operators can create a superior and competitive market.

Recommendation 19.

CALM construct basic seating and shade facilities at Tantabiddi boat ramp.

Recommendation 20.

That Government carefully examine the impact of the Coral Coast Maud's Landing Resort (CCMD) and ensure that any approval be based on the developer clearly demonstrating that the design, location and structure offers the high level of protection and management required to ensure that the integrity of this sensitive coastal environment is not compromised beyond reasonable risk assessment, particularly when considering any long term residential proposal.

Recommendation 21.

State Government take responsibility for the installation of adequate sewerage headworks for Coral Bay and that this be done without delay.

Recommendation 22.

A boat ramp be constructed south of Bills Bay in accordance with recommendations in the Coral Bay Planning Strategy.

Recommendation 23.

CALM and the Department of Transport through Marine and Harbours initiate a joint operation to rationalise boat use and safety in Bills Bay.

Recommendation 24.

Minister of Local Government examine the potential for the Shire of Carnarvon to relinquish Coral Bay north, to the Shire of Exmouth.

Maud's Landing is a gazetted townsite adjacent to but excised from the Ningaloo Marine Park. It is situated three kilometres north of Coral Bay and two hundred and fifty kilometres south of Exmouth.The townsite is vested in the Shire of Carnavon. Expressions of Interest by proponents were called for in 1988. In 1989 the Government gave endorsement to a marina resort development at the townsite and the current government has confirmed that in principle endorsement.

The Marina Resort Development has been submitted by Coral Coast Marina Development Pty. Ltd. (CCMD). A private company formed in 1987. The proposal will cover some two hundred and seventy seven hectares and includes:
A Club Resort of 400 rooms
Resort Hotel/ Convention Centre of 250 Rooms
Caravan Park comprising of 175 Bays with an additional 75 Chalets.
Backpacking hostel of 120 beds
105 Serviced Apartments/Townhouses
955 Single Resiential Lots
360 Strata titled townhouses/Ground Units

In total it is envisaged that the master plan would provide 1125 short stay accommodation units with a further 1315 residential units.

The Gascoyne Coast Regional Strategy (Draft), identified the site as being highly sensitive. The report states:

> ***Any development within highly sensitive zones would need to demonstrate how the limitations would be overcome through careful design and location of structures. In addition this would have to be supported by a high level of protection and management in accordance with site specific investigation of environment conditions.***

The report identified those limitations to sustainable development in highly sensitive zones as corresponding to the following characteristics:

> unstable land forms
> high degree of exposure
> high risk of inundation
> minimal resistance to damage and difficulty to rehabilitate

The Committee trusts that these matters were considered by the EPA and ultimately Government, and notes this process is current. The Committee does not oppose development at Maud's Landing given recommendations and discussions of this report are taken into account.

The Committee as a result of of evidence received is unanimous in its concern at the sheer volume of this resort and residential proposal. In part the developer defends the inclusion of the residential components as a means of offsetting the cost of sewerage headworks to which the town of Coral Bay will have access. It is suggested by CCMD that leakage of nutrients into Bills Bay is causing severe degradation to the coral and marine systems. It is further argued that this pollution will cease once the Coral Bay settlement is connected to sewerage headworks.

Whilst the Committee has expressed concern over the inclusion of residential allotments in the CCMD proposal, it recognised that potential benefits to be derived from development approval include the provision of a structured power and water supply and waste disposal system, available for connection to Coral Bay. It is fair to comment that the proponent included the residential component for a revenue raising purpose to offset the cost of sewerage headworks that will enable the Coral Bay community to plug into.

There is an urgent requirement to reduce damage to Bills Bay from human activity. For instance in the Coral Bay Planning Strategy [34], recommendations include:

> ***Removal of recreational boating and vehicle use from Bills Bay is integral to these plans***

This has led to the inclusion of a safe boat harbouring facility and infrastructure works as a component of the CCMD proposal. The Committee also suggests that a boat launching ramp south of Bills Bay be constructed as per the recommendation of the Coral Bay Strategy.

What has been clearly evidenced is the dangerous conflict between swimmers and snorkellers competing with boats in Bills Bay. An argument in favour of a safe boat anchorage and launching site at the proposed resort development is that it will take boats out of Bills Bay and thereby reduce the danger arising from competing uses between swimmer and boater. The Committee believes that CALM will need to implement controls to restrict boat use in Bills Bay. A marina at Maud's Landing will enhance boating safety in the area. In the Department of Environmental Protection 'Survey or water quality, groundwater, sediments and benthic habitats at Coral Bay, Ningaloo Reef, Western Australia, a report to the Department of Conservation and Land Management', released in November 1995[60], the Executive Summary states;

> ***The presence of elevated concentrations of inorganic nitrogen and faecal coliforms in the groundwater along the shoreline of Coral Bay and adjacent marine waters of the inner southeastern corner of Bills Bay indicate that groundwater, contaminated by sewerage, is entering Bills Bay. The groundwater contamination is highest at sites adjacent to the Coral Bay Hotel/Ningaloo Reef Resort complex and the Peoples Caravan Park suggesting the leach drain sewerage disposal systems of these two facilities are the sources of the contaimination. Phytoplankton biomass, light attenuation through the water column and algal growth are significantly higher at sites in the inner part of Bills Bay suggesting that the input of nutrients to these waters is causing a measurable biological response. These effects are mostly confined to an area within 100-200 m of the Coral Bay shoreline.***

> ***Juvenile corals are colonising the substratum and surviving in the inner part of Bills Bay and, together with the evenness of juvenile coral density at four sites throughout the bay and the general increase in live cover since the major natural coral 'kill' in 1989, indicate that the input of nutrients is not preventing the settlement and survival of corals in these waters.***

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60 Department of Environmental Protection Perth, WA. Technical Series 80, November 1995. C.J. Simpson and S.Field *Survey of water quality, groundwater, sediments and benthic habitats at Coral Bay, Ningaloo Reef, Western Australia.* A report to the Department of Conservation and Land Management.

The increase in algal biomass in the inner part of Bills Bay was significantly higher than at the current commercial fish-feeding site and is probably due to the higher nutrient availability, as a result of the influx of contaminated groundwater, and the restricted movement of the waters adjacent to the Coral Bay foreshore. Dissolved nutrients at the fish-feeding site are likely to be removed rapidly northward by the relatively strong currents at this site and possibly into the southeastern part of Bills Bay.

The results of the microbiological survey of Bills Bay suggest that the conclusion from the Shire of Carnarvon's monitoring program, that there is no significant risk to public health in Bills Bay from faecal pollution via contaminated groundwater inflow, may be premature.

The reults of the heavy metal and organic contaminant surveys indicate that, in relation to these substances, the sediments of Bills Bay and surrounds are generally 'pristine'. Two sites off Mauds Landing had concentrations of arsenic, chromium, iron, manganese and zinc that were considerably higher than most other sites and may represent residual contamination from the historical commercial activities that occurred at Maud's Landing.

Organotin contamination of the sediments was extremely high at several of the sites in the study area. In particular, tributlytin (TBT) the active ingredient of organotin anti-fouling paints applied to the hulls of vessels, was extremely high at sites close to the mooring locations of large boats using Bills Bay. Significant contamination occurred at several other sites indicating a significant level of contamination exists throughout much of the study area. The relatively low concentration of breakdown products of TBT to a range of marine flora and fauna make this an issue of significant concern.

This survey clearly demonstrates the need for an alternative sewerage disposal system to attend to the contamination arising from the current leach drain systems. The Committee has also formed the view that Government should take financial responsibility for the provision of sewerage disposal headworks at Coral Bay. Whilst this would be a cost to tax payers initially, the cost can be recovered over a period of time by a rating system directed at local business, residents and tourists.

There are additional risks that must be addressed, for they also, can impose marked consequences on the environment. The proposed CCMD is on a scale that could potentially compete with Exmouth as the sub-regional centre of the Cape Range peninsula with the inclusion of a school, service and light industrial centre and administrative centre. There are implications with the inclusion of a residential component, particularly in the provision of freehold land in an area of State and National significance.

Maud's Landing must be considered in a regional context, not as an isolated issue, simlarly any approval must form part of an overall strategy rather than as an isolated development.

APPENDIX A

Legislative Council Western Australia

Select Committee on
Cape Range National Park and Ningaloo Marine Park

The Committee has been appointed to examine and report on the importance of the Cape Range National Park and Ningaloo Marine Park to tourism, mining, petroleum, fishing and other industries in the Shires of Exmouth and Carnarvon; and to examine and report on the need to introduce a single authority to oversee the management of the area.

The Committee members are Hons Graham Edwards (Chairman), Ross Lightfoot, Tom Stephens, Philip Lockyer and Murray Criddle.

Interested persons should provide a written submission on some, or all, of the Committee's Terms of Reference and state whether they wish to give supporting oral evidence at public hearings to be held on Friday June 16 and Monday June 19, 1995.

Copies of the Terms of Reference are available from, and written submissions should be addressed to:

Mr Alan Evans
Committee Clerk
Select Committee on Cape Range National Park and Ningaloo Marine Park
Legislative Council Committee Office
Parliament House, PERTH WA 6000

Telephone: (09) 222 7400 Fax: (09) 321 9470

APPENDIX B

SCHEDULE OF WRITTEN SUBMISSIONS RECEIVED BY THE COMMITTEE:

Ms R. ATKINSON
Ms. E BANFIELD
Ms M. BARWELL
Ms S. BELL
Mr & Mrs D. BURKE
Ms B. COAD
Ms A. CREMER-WILKE & Mr B. WILKE
Mr C.H. DAVIS
Mr J. FORDHAM
E.W.N. FRENCH
G.H. GREET
Dr C. HENDERSON
R.A. HEWITT
Ms L. HORAK
J. LEFROY and B. LEFROY
Mr & Mrs McCANN
G.G. MACAULAY
Ms C. McLEOD
Mr N. McLEOD
Mr G. NORTH
Mr. G.A. OXNAM
R. RAYNER
Mr. D. RICHARDS
Mr W. SCHNECKENBURGER
Ms. L SPENCER-HOGBIN
Ms S. TAYLOR
Ms R. WARD
Mr. C. WHITEMAN
Mr S. WILLS & Ms A. LIGHTOWLER
Mr J. WISE
Mr N. SCOTT

GOVERNMENT

Australian Institute of Marine Science

CALM (Conservation and Land Management)
Mr S. SHEA, Executive Director
Mr D MYERS, CALM District Manager, Exmouth

ANCA (Australian Nature Conservation Agency)
Mr A.J. PRESS, Executive Director

NPNCA (National Parks and Nature Conservation Authority)
Mrs M. BLACKWELL

NPNCA (National Parks and Nature Conservation Authority)
Mr T. Day, Chairman

GASCOYNE DEVELOPMENT COMMISSION
Mr D.G. Bathgate, Senior Regional Officer

WA Museum
Dr W.F. Humphreys, Senior Curator

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INDUSTRY

AMPOLEX LTD.
Mr K.J. FITZPATRICK, General Manager

AMPOLEX LTD.
Mr R.M. NUNN

APACHE Energy Ltd.
Mr D. HAYES

APPEA
Mr D. WELLS, Executive Director

Discovery Petroleum N.L.
E.C. STRETBERG

Coral Bay Lodge, Bayview Holiday Village
Mr. C.M. FOULNER

INTEREST

Australian Heritage Commission
Ms S. SULLIVAN, Executive Director

AMSA (Australian Marine Sciences Association)
Dr I. STEJSKAL

Australian Coral Reef Society Inc.
Prof. C CROSSLAND, President

Australasian Cave and Karst Management Association
Mr M. CHALKER, President

Cape Conservation Group
Ms E. Banfield

Coastal Heritage Association of Western Australia Inc
D.M. EDWARDS

CARE (Conservation, Animal Rescue, Research and Education)

Conservation Council of Western Australia Inc.
Ms R. SIEWART, Co-ordinator

EXMOUTH CAPE TOURIST VILLAGE

DIVE SKI & SURF
Mr H. WELMINK

EXMOUTH DISTRICT HIGH SCHOOL

GREENPEACE Australia LTD.

National Threatened Species Network
Mr J.P. ORSINI

NAUI WA Chapter Leader
Ms. A SCORER

Murex Consultants Pty. Ltd.
Dr B.R. WILSON

Dr R. DOWLING
Consultant

Mr G.F. TOTTERDELL
Price Waterhouse for MG KAILIS

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Murdoch University
Mr N. EVANS
Ms S. FAHEY
Mr B. NORMAN

U.W.A.
Dr I. ELIOT, Dept Geography
Dr. K. WYRWOLL, Dept Geography
Mr M. MACKIE, Dept Zoology
Ms K. WHITAKER, Dept Zoology

University of Notre Dame
Dr R.K. DOWLING

SCHEDULE OF WITNESSES APPEARING BEFORE THE COMMITTEE

Mr. K. MALCOM	Director, Trade Centre Pty. Ltd	pp1-11
Mr. Mr Alan INGHAM	Director, Trade Centre Pty. Ltd	
Mr. J. REIDY-CROFTS	Director, Trade Centre Pty. Ltd.	
Mr. B. BOELEN	Consultant, WA Tourism Commission	pp12-22
Mr. J. R. SHARP	Acting Director, Parks Recreation Planning and Tourism Department of Conservation and Land Management	pp23-30
Mr. K. J. McNAMARA	Director, Nature Conservation, Department of Conservation and Land Management	
Dr. C. SIMPSON	Manager, Marine Impacts Branch, Department of Environmental Protection	pp31-41
Mr. A. G. SMITH	General Manager/Director, Coral Coast Marina Development Pty. Ltd.	pp42-59
Mr. L. P. SMITH	Senior Partner and Director, Koctasz Smith and Partners.	
Mr. M. P. BOWMAN	Principal/Director, Bowman Bishaw Gorham	
Mr. D. MILLS	Director, Special Projects-Asia Pacific Region JLW Advisory	pp60-75
Ms. J. LEFROY	Pastoralist, Ningaloo Station	pp76-80
Mrs. C. FRENCH	Pastoralist, Cardabia Station	
Mr. E. W. FRENCH	Pastoralist, Cardabia Station	pp81-86
Mr. J. N. WISE	Resident, Coral Bay	pp87-90
Mr. W. NEWBY	Partner, Supermarket and Outdoor Centre Business, Bayview Holiday Village	pp91-93
Mr. N. L. SCOTT	National Park Ranger	pp94-103
Mr. D. I. F. RICHARDS	Resident, Exmouth	pp104-106
Mrs. G. ADAMS	Resident, Exmouth	
Mr. R. J. BAILEY	Resident, Exmouth	pp107-112
Mr. L. BURKETT	Real Estate Sales Representative	pp113-119
Mr. A. J. MEDCRAFT	Resident, Exmouth	pp120-126

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Mr. G. PASSMORE	Manager, M.G. Kailis Fisheries	pp126-133
Mr. S. HALL	Assistant Manager, M.G. Kailis Fisheries	
Mr. G. R. KING	Resident, Exmouth	pp134-144
Mr. S. B. R. O'DONOGHUE	Senior Fisheries Officer, Department of Fisheries, Exmouth	pp145-150
Mr. E. R. BACKER	Tourist Bureau Manager, Exmouth	pp151-156
Mr. P. H. GREEN	Resident, Exmouth	pp157-161
Mr. B. M. NORMAN	Student, Murdoch University	pp162-169
Mr J. S. C. FORDHAM	Resident, Exmouth	pp170-178
Mr. H. R. JONES	Resident, Exmouth	
Mr. C. H. DAVIS	Resident, Employee CALM, Exmouth	
Mr. D. J. MYERS	Environmental Manager, CALM Exmouth	pp179-188
Mr. P. J. TURNER	Director, Exmouth Cape Tourist Village	pp189-197
Mrs. S. L. HARRIS	Tourist Officer/ CARE Secretary Exmouth Resident	
Mrs. A. O'BRIEN	CALM Volunteer, Member of CARE Exmouth Resident	pp198-209
Mrs. D. A. PREEST	CARE and CALM Member, Youth Worker Exmouth Resident	
Mr. N. McLEOD	Proprietor Ningaloo Safari Tours	pp210-216
Mrs. C. McLEOD	Proprietor Ningaloo Safari Tours	
Mr. K. G. KINSELLA	Director, Gascoyne Development Commission	pp217-229
Mr. D. G. BATHGATE	Acting Assistant Director, Gascoyne Development Commission	
Dr. Colin BRANCH	Assistant Director General, Department of Minerals and Energy	pp230-241
Mr. M. J. FREEMAN	Geologist, Department of Minerals and Energy	
Mr. I. FRASER	Director, Petroleum Operations Division Department of Minerals and Energy	
Mr. N. EVANS	Environmental Science, Murdoch University	pp242-247
Mr. G. J. ROBERTSON	Managing Director, Sun Land Pty. Ltd.	pp248-263
Mr. G. F. TOTTERDELL	Principal, Price Waterhouse	
Mr. M. G. KAILIS	Chairman, M.G. Kailis Group of Companies	
Ms. K. CARTWRIGHT	Assistant to Mr. M. G. KAILIS	
Dr. B. R. WILSON	Director, Murex Consultants Pty. Ltd	pp264-270
Mr. M. BOARDMAN	Exploration Manager, Ampolex Ltd.	
Mr. R. M. NUNN	Environmental Adviser, Ampolex Ltd.	
Dr. S. SHEA	Executive Director, Department of Conservation and Land Management	pp281-291
Mr. K. J. McNAMARA	Director of Nature Conservation, Department of Conservation and Land Management	
Mr. D. J. MYERS	District Manager, Department of Conservation and Land Management, Exmouth	
Mr. A. J. WILLIAMSON	Manager, Planning and Visitor Services Branch Department of Conservation and Land Management	
Mr. A. J. FORBES	General Manager, Swan Portland Cement	pp292-302
Mr. J. G. LEWIS	Principal, Whitecrest Enterprises Pty. Ltd.	
Hon. A. A. LEWIS	Business Consultant	pp303-307
Dr. W. F. HUMPHREYS	Senior Curator, Western Australian Museum	pp308-315

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Mr. F. PROKOP	Recreational Fisheries Policy Officer, Fisheries Department	pp316-323
Mr. N. L. SARTI	Acting Operations Manager, North Fisheries Department	
Mr. N. J. GRAZIA	Assistant Director (WA) APEA	pp324-334
Mr. R. C. WELLS	Executive Director APEA	
Mr T. A. DAY	Chairman, NPNCA	pp335-344
Mrs. M. I. BLACKWELL	Director, MI Blackwell and Associates	
Ms. N. SEGAL	Greenpeace	pp345-348
Mr. R. FULLER	Greenpeace	
Ms. R. SIEWART	Coordinator, Conservation Council of WA	pp349-355
Ms. E. M. WATSON	WA Coordinator, Marine and Coastal Community Network	
Mr. D. HAYES	Managing Director, Apache Energy Ltd	pp356-363
Dr. I. STEJSKAL	Environmental Coordinator, Apache Energy Ltd.	
Dr. K. M. WYRWOLL	University of Western Australia	pp364-372
Dr. I. ELIOT	University of Western Australia	

ACRONYMS

AAA	AUSTRALIAN AUTOMOBILE ASSOCIATION
ABS	AUSTRALIAN BUREAU OF STATISTICS
AIMS	AUSTRALIAN INSTITUTE OF MARINE SCIENCE
CALM	DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT
CCMD	CORAL COAST MARINA DEVELOPMENT PTY LTD
CONCOM	AUSTRALIAN COUNCIL OF NATURE CONSERVATION MINISTERS
EPA	ENVIRONMENTAL PROTECTION AUTHORITY
DEP	DEPARTMENT OF ENVIRONMENTAL PROTECTION
DEH	QUEENSLAND DEPARTMENT OF ENVIRONMENT AND HERITAGE
DOLA	DEPARTMENT OF LAND ADMINISTRATION
DPUD	DEPARTMENT OF PLANNING AND URBAN DEVELOPMENT
DOMEWA	DEPARTMENT OF MINERALS AND ENERGY WA.
GBRMPA	GREAT BARRIER REEF MARINE PARK AUTHORITY
HWM	HIGH WATER MARK
IUCN	INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE AND NATURAL RESOURCES
JLW	JONES LANG WOOTON
LWM	LOW WATER MARK
NPNCA	NATIONAL PARKS AND NATURE CONSERVATION AUTHORITY
RAAF	ROYAL AUSTRALIAN AIRFORCE
RFDS	ROYAL AUSTRALIAN FLYING DOCTORS SERVICE
SECWA	STATE ENERGY COMMISSION OF WESTERN AUSTRALIA

APPENDIX C

IUCN Category VI
Resource Reserve
Introduction

Despite the rapidly increasing utilization of the natural resources in the world, there still remain land and water areas for which the most appropriate utilization has yet to be determined. If these lands are not protected, occupation and use are likely to occur on an unplanned, single use and short-term economic exploitation basis. This in turn, may cause problems and compromises and limit future options where remaining resources need to be rationally utilized. This utilization without sufficient knowledge may result in resource deterioration and loss of longer-term economic and social benefits.

Management Objectives

One possibility is to restrict use of these areas until adequate studies have been completed as how to best utilize these remaining resources. In such a case, the management objective is to protect the natural resources of the area for future use, and prevent or contain development activities that could affect the resource pending the establishment of more defined objectives which are based upon appropriate knowledge and planning.

Criteria for Selection and Management

Category VI areas will normally comprise an extensive and relatively isolated and uninhabited area having difficult access, or regions that are lightly populated yet may be under considerable pressure for colonization and greater utilization. In many cases, there has been little study or evaluation of these areas, and the consequence of converting these lands to agriculture, mineral or timber extraction, or the construction of roads, etc, is unclear. Similarly, use of the resources may not be appropriate because of the lack of technology, human, or financial resource restrictions or alternate national priorities.

Consequently, natural, social and economic values are not sufficiently identified to permit the area to be managed for specific objectives or to justify its conversion to other land uses. Restricted access is implied so areas will normally require control, depending upon the pressures to enter and utilize the area. Lands may be government-owned or administered by public corporations.

Maintenance of existing condition, to allow for studies as to the potential use for the designated areas is a pre-requisite. Protection, studies, and planning are envisioned as the major activities while under this short-term designation. No exploitation should occur with the exceptions of use of resources by indigenous inhabitants. There is an acceptance of ongoing ecosensitive activites.

APPENDIX D

Selection and management of Marine and Estuarine Protected Areas (MEPAs), according to the International Union for the Conservation of Nature and Natural Resources (IUCN), should include the following steps[61]:

(a) collection of baseline data on at least the resources present and usage levels, proper to, or concurrently with the development of a MEPA proposal;

(b) preparation of a management plan which has, as a paramount consideration, the maintenance of the ecosystem'

(c) close collaboration among agencies with responsibilities within and adjacent to MEPA boundaries;

(d) subsequent to declaration, wherever possible, a regular monitoring programme should be undertaken which would include:

(i) assessment of the extent to which the objectives identified for each MEPA are being achieved

(ii) assessment of possible impacts on the ecosystem from human activity;

(iii) refinement of and adjustments to the management plan;

(iv) any necessary subsequent adjustments to legislation;

(e) development of an effective enforcement programme which would include penalties for gross or persistent infringement of regulations:

(f) the use of regular surveillance to monitor activities and usage in MEPAs. Such surveillance will contribute to safety, aquisition of resource data and act as an effective deterrent. Aerial surveillance offers a most appropriate and cost effective, multi-purpose management tool, especially for larger or widely-dispersed, relatively inaccessible MEPAs;

(g) development of comprehensive and well planned education and information programmes to increase public awareness of MEPAs;

(h) regular review of management plans on the basis of monitoring and research data.

[61] CONCOM. Technical Conference Program Summary Report of the Second Technical Workshop on Selection and Management of Marine and Esturarine Protected Areas. Jervis Bay, 15-21 February, 1985

APPENDIX E

CORAL SPECIES IDENTIFIED AT NINGALOO REEF TRACT

L. MARSH, JEN VEREN, 1988, WA MUSEUM, SUPP. NO. 29

Acanthastrea echinata
Acanthastrea hillae
Acropora abrolhosensis
Acropora aculeus
Acropora anthocercis
Acropora aspera
Acropora austera
Acropora cerealis
Acropora clathrata
Acropora cytherea
Acropora danai
Acropora digitifera
Acropora divaricata
Acropora florida
Acropora formosa
Acropora grandis
Acropora granulosa
Acropora horrida
Acropora hyacinthus
Acropora latistella
Acropora longicyathus
Acropora loripes
Acropora microclados
Acropora
Acropora millepora
Acropora nana
Acropora nasuta
Acropora nobilis
Acropora pulchra

Acropora robusta
Acropora sarmentosa
Acropora selago
Acropora spicifera
Acropora subulata
Acropora tenuis
Acropora valenciennesi
Acropora valida
Acropora vaughani
Acropora verweyi
Acropora willisae
Acropora yongei
Alveopora allingi
Alveopora fenestrata
Alveopora spongiosa
Alveopora verrilliana
Astreopora explanata
Astreopora
Astreopora ocellata
Barabattoia amicorum
Coscinaraea columna
Coscinaraea exesa
Cyphastrea chalcidicum
Cyphastrea chalcidicum
Cyphastrea
Cyphastrea serailia
Cyphastrea sp.1
Diploastrea heliopora
Duncanopsammia

APPENDIX E

Echinophyllia aspera
Echinophyllia aspera
Echinophyllia
Echinopora horrida
Echinopora lamellosa
Euphyllia ancora
Euphyllia glabrescens
Favia favus
Favia helianthoides
Favia matthaii
Favia maxima
Favia pallida
Favia rotundata
Favia speciosa
Favia stelligera
Favites abdita
Favites chinesis
Favites complanata
Favites flexuosa
Favites halicora
Favites pentagona
Favites russelli
Favites sp.1
Fungia concinna
Fungia echinata
Fungia fungites
Fungia repanda
Fungia scutaria
Fungia simplex
Galaxea astreata
Galaxea fascicularis
Gardineroseris
Goniastrea aspera
Goniastrea australensis

Goniastrea edwardsi
Goniastrea favulus
Goniastrea palauensis
Goniastrea pectinata
Goniastrea retiformis
Goniopora columna
Goniopora minor
Goniopora sp. 3
Goniopora tenuidens
Gonipora lobata
Herpolitha limax
Heteropsammia cochlea
Hydnophora exesa
Hydnophora microconos
Hydnophora pilosa
Hydnophora rigida
Leptastrea bottae
Leptastrea pruinosa
Leptastrea purpurea
Leptastrea transversa
Leptoria phrygia
Leptoseris explanata
Leptoseris foliosa
Leptoseris hawaiiensis
Leptoseris
Leptoseris scabra
Leptoseris yabei
Lithophyllon edwardsi
Lobophyllia corymbosa
Lobophyllia diminuta
Lobophyllia hataii
Lobophyllia hemprichii
Merulina ampliata
Merulina scabricula

APPENDIX E

Montastrea curta
Montastrea
Montastrea
Montipora
Montipora angulata
Montipora calcarea
Montipora capricornis
Montipora
Montipora danae
Montipora digitata
Montipora efflorescens
Montipora floweri
Montipora foliosa
Montipora foveolata
Montipora grisea
Montipora hispida
Montipora hoffmeisteri
Montipora informis
Montipora millepora
Montipora mollis
Montipora monasteriata
Montipora peltiformis
Montipora sp. 2
Montipora spumosa
Montipora stellata
Montipora tuberculosa
Montipora turgescens
Montipora turtlensis
Montipora undata
Montipora venosa
Montipora verrucosa
Moseleya latistellata
Mycedium elephantotus
Oulophyllia crispa

Oxypora glabra
Oxypora lacera
Pachyseris rugosa
Pachyseris speciosa
Pavona decussata
Pavona explanulata
Pavona maldivensis
Pavona minuta
Pavona varians
Pavona venosa
Pectinia lactuca
Pectinia paeonia
Physogyra lichtensteini
Platygyra daedalea
Platygyra lamellina
Platygyra pini
Platygyra ryukyuensis
Platygyra sinesis
Platygyra verweyi
Plerogyra sinuosa
Plesiastrea verispora
Pocillopora damicornis
Pocillopora eydouxi
Pocillopora meandrina
Pocillopora verrucosa
Pocillopora woodjoinesi
Podabacia crustacea
Polyphillia talpina
Porites cylindrica
Porites lichen
Porites lobata
Porites lutea
Porites nigrescens
Porites solida

APPENDIX E

Porites sp. 3
Porites sp. 2
Psammocora contigua
Psammocora digitata
Psammocora
Psammocora haimeana
Psammocora
Psammocora sp. 1
Psammocora
Pseudosiderastrea
Sandalolitha robusta
Scapophyllia cylindrica
Seriatopora caliendrum
Seriatopora hystrix
Stylocoeniella guentheri
Stylophora pistillata
Symphyllia agaricia
Symphyllia radians
Turbinaria bifrons
Turbinaria conspicua
Turbinaria frondens
Turbinaria mesenterina
Turbinaria peltata
Turbinaria reniformis
Turbinaria stellulata

APPENDIX F

Main Roads WA and Western Australian Municipal Association. Roads 2020 Regional Road Development Strategy 1994, Gascoyne. DRAFT

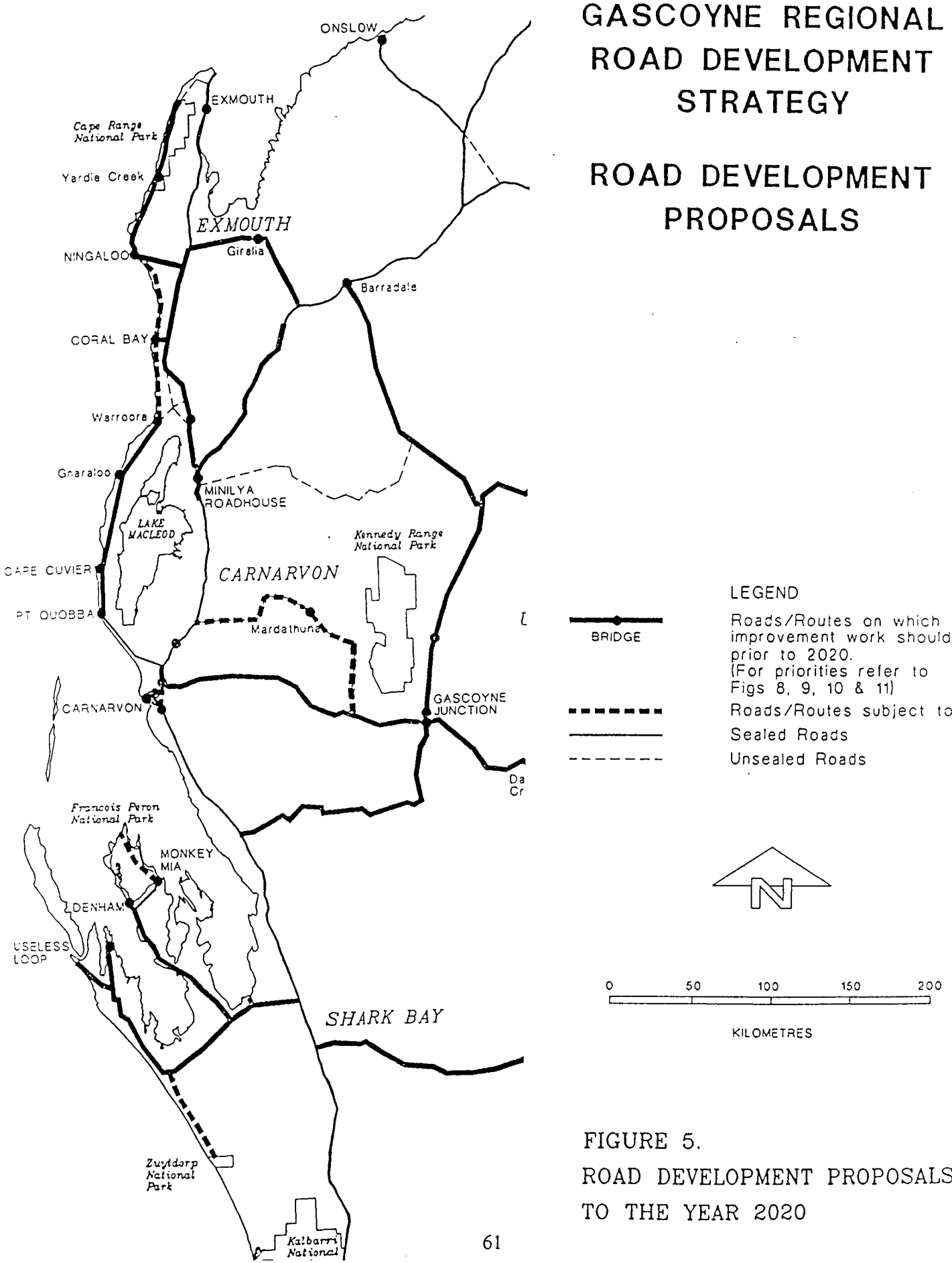

FIGURE 5.
ROAD DEVELOPMENT PROPOSALS TO THE YEAR 2020

In putting together this report the Committee has closely examined various land tenures within Cape Range and Ningaloo Marine Park.

Figure 1: Cape Range and Ningaloo Reef Tract, representing tourism, mineral, petroleum and conservation interests to date.

Pastoral land abutting Ningaloo Marine Park was recommended for inclusion in the conservation estate, by the 1983 Working Group,[62] which sought to provide protection and management of the coast line without compromising existing pastoral use of the hinterland. While the Committee endorses the recommendation for a coastal reserve, the width of the reserve shall require negotiation according to existing land tenures (as per Recommendation 5, this report).

Similarly, potential sites considered suitable for tourism potential, according to the JLW Report (Figure 1, this report), shall require further examination on the basis of conservation value and scientific baselines. Coastal land use within the National Park must consider the provision of access and service facilities for tourism use. Facilities should not be sited in linear formations.

It is evident that in implementing a cohesive management strategy for the conservation estate, multiple use within the region will require resolution. It is the Committee's view that tourism, mineral, petroleum and conservation interests are not mutually exclusive. In the case of mineral deposits, where a location is fixed; social, environmental and economic aspects are contributing factors to the evaluation process in the same way as they contibute to tourism development proposals. Uniform conditions of use should be determined and adhered to.

Rationalisation of priority uses, following consideration for such social, economic and conservation gains can achieve long term balance in use. This will largely involve administrative reform and integrated management to coordinate various industries in a coherent approach. Government agencies will assume a key role in the success of this strategy, as will close consultation with local government authorities and the community.

62 R.F. May, R. C. J. Lenanton, P. F. Berry 1983. National Parks Authority Report No. 1. *Ningaloo Marine Park Report and Recommendations by the Marine Park Working Group.*

CAPE RANGE - NINGALOO AREA

TOURISM, MINERAL, PETROLEUM and CONSERVATION INTERESTS

Legend

- Cape Range National Park
- Red Book recommendation for extension to National Park
- Proposed National Park-Leased for Pastoral
- Ningaloo Marine Park (State Jurisdiction)
- Miscellaneous Reserves (vested in CALM & Shire)
- Nature Reserves (CALM)
- Areas for consideration for Marine Reserve (Wilson Report)
- Ningaloo Marine Park (Commonwealth jurisdiction)
- Department of Defence Lands (Commonwealth jurisdiction)
- Sanctuary Zones
- Boundary, Temporary Reserves for limestone
- Boundary, Mining Act tenements and applications
- Boundary, Petroleum tenements
- Pastoral Boundarys
- Sites recommended for tourism potential by Jones Langwootton

113°30' 114°00' 114°30'

-21°30' -22°00' -22°30'

WA-213-P

WA-155-P Part 2

WA-155-P Part 1

WA-247-P

TP/6

Serrurier Island

TP/9

Murion Islands

EP342

Wobiri/Jantz

Vlaming Head

NORTH WEST CAPE

Point Murat

"Bundegi" Boat Ramp

BUNDEGI SANCTUARY ZONE

EP 359

False Island Point

Jurabi Point

Tantabiddi Creek

YARDIE CREEK RD

MURAT RD

RANGE

DARCY RIDGE

Exmouth

Qualing Pool

WA-24-P Pt2

Low Point

Mesa Camp

Milyering

Milyering Visitor Centre

CAPE RANGE

SHOTHOLE CANYON RD

EP 41 Pt1

CHARLES KNIFE RD

Cape Range National Park

Mandu Mandu North

Learmonth Jetty

Learmonth

Osprey Bay

WA-24-P Pt3

Heron Point

Point Lefroy

Yardie Creek

TP/3 Pt2

Ningaloo Marine Park

Sandy Point

loc 97 RAAF Bombing Range

EP 41 Pt2

EXMOUTH GULF STATION

EP 41 Pt3

KING RD

ROUGH RANGE

Point Maxwell

SANDALWOOD PENINSULA

Winderabandi Point

Winderabandi Point

Lefroy Bay

Point Billie

EP325

EP 110

MAPPED AREA

Australia

Exmouth

Western Australia

Perth

-23°00'

Scale

0 10 20 30 40 km

N

CALM

Caveat

The data sets used have been assumed to be correct as received from the data custodians.

Ningaloo Reef-Southern Extension

Point Edgar

NINGALOO STATION

Beacon Point

CLOATES SANCTUARY ZONE

Ningaloo Beach

EP 359

BULLARA STATION

NINGALOO ROAD

DUGONG SANCTUARY ZONE

Bruboodioo Point

CARDABIA STATION

Mauds Landing

Point Maud

MAUD SANCTUARY ZONE

Coral Bay Settlement

Point Anderson

Pelican Point

PELICAN SANCTUARY ZONE

WARROORA NORTH RD

WARROORA STATION

WARROORA EAST ROAD

Bulbarli Point

Amherst Point

CAPE FARQUHAR

Lake McLeod

GNARGOO RANGE

GNARLOO STATION

113°30'

114°00'

Inset

Cape Range National Park

Tantabiddi Creek

YARDIE CREEK RD

DARCY RIDGE

MANGROVE SANCTUARY ZONE

Low Point

Neds Camp

Mesa Camp

Milyering Visitor Centre

T-Bone Bay

Lakeside

Camp 13

Camp 14

Tulki Beach

RANGE

SHOTHOLE CANYON RD

MANDU SANCTUARY ZONE

Cape Range National Park

CHARLES KNIFE RD

Mandu Mandu North

Mandu Mandu South

Pilgonaman

Osprey Bay

CAPE

Learmonth

OSPREY SANCTUARY ZONE

Yardie Creek

KING RD

Sandy Point

-23°00'

-23°30'

EP 369

114°30'