

**MARINE MANAGEMENT SUPPORT  
PILBARA**

**HUMAN USAGE IN NINGALOO MARINE PARK**

**DATA REPORT 05/04/2000: MMS/PI/NMP – 20/2000**

A collaborative project between CALM Marine Conservation Branch, CALM Karratha Regional Office and  
CALM Exmouth District Office.

**DRAFT**

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## 1 INTRODUCTION

Ningaloo Marine Park (NMP) was gazetted on 3 April 1987, encompassing around 4300 square kilometres of State and Commonwealth waters. The Ningaloo Marine Park (NMP) includes the Ningaloo Reef which is a fringing barrier coral reef enclosing a shallow lagoon on the western side of the Cape Range Peninsula some 1200 km north of Perth. The 'Ningaloo Marine Park Management Plan 1989-1999' was developed to protect the high conservation values of this coral reef system, and to enhance recreation and commercial use of its resources. This management plan is currently being reviewed. The Department of Conservation and Land Management (CALM) manage both the Commonwealth and State components of the NMP. An area from the southern boundary of the marine park to Gnaraloo Bay has been identified by the Western Australian Government as a high priority area for marine reservation status.

To ensure the NMP is managed effectively it is vital that CALM has an understanding of the human uses, and particularly the interaction between competing uses. The human usage data needs to be described in both time and space. High quality human usage data has been collected from reliable sources with relevant expertise and experience in the NMP. The human usage data gathered as part of this report will be used to:

- assist in the management of the NMP;
- assist in the review of the 'Ningaloo Marine Park Management Plan 1989-1999';
- assist in the design and implementation of effective monitoring programs;
- assist in the day to day management of the NMP; and
- assist in the Marine Reserve Implementation Process for the southern extension of the NMP.

The data presented in this report are not exhaustive. This report presents a framework that can be used and more data added as it becomes available.

In the event of deficiencies being identified or new data collected could you send data to District Manager of CALM in Exmouth.

The aim of this data report is to determine spatial and temporal patterns and trends of human usage in the Ningaloo Marine Park and the proposed southern extension (Figure 1).

## 2 METHODS

The list of human activities and infrastructure that require spatial and temporal data is shown in Table 1. Ideally CALM requires data for all of these activities in the NMP and southern extension.

### 2.1 DESCRIPTION OF HUMAN ACTIVITIES AND TRENDS

The first step was to describe each of the activities found in Table 1 (except tenure) carried out in the marine park including information on potential impacts and trends (refer to section 3.1). The information in section 3.1 was sourced from published reports, CALM Exmouth District, Marine Conservation Branch, and Fisheries WA.

### 2.2 SPATIAL EXTENT OF HUMAN ACTIVITIES

The spatial boundaries of most of the activities (in Table 1) are presented in section 3.2 (Figures 2 to 10). Spatial data comes from a variety of sources including:

- 1) existing datasets from relevant government departments (eg. CALM, FWA, Aboriginal Affairs Department, and DOME);
- 2) existing datasets from within CALM (eg marine park boundaries);
- 3) community groups and locals who live/work in and adjacent to the marine park (eg fishermen, and commercial operators); and
- 4) CALM Exmouth District Office and Marine Conservation Branch.

All spatial data collected was added to a digital database in the form of ArcView shape files. To allow for a common viewing environment, all data was converted to Australian Map Grid 1984, with Australian Geodetic Datum. Metadata for all spatial data is shown in Appendix 1.

The methods used to put all the data into one viewing environment differed according to the form in which the data was acquired. Hand drawn maps and field sketches were digitised over Landsat imagery and rectified aerial photographs,

then sent to the CALM Exmouth District Office for checking. Digital data was clipped to the extent of the Marine Park (including areas under consideration for inclusion) and the projection and datum adjusted as necessary.

## **2.3 SEASONAL COMPONENT OF HUMAN ACTIVITIES**

Data for each activity was divided into three seasonal categories including high (peak season), Medium (shoulder season), and Low (off-season). The data came from previously published reports and local knowledge. Refer to section 3.3.

## **2.4 DATA MANAGEMENT**

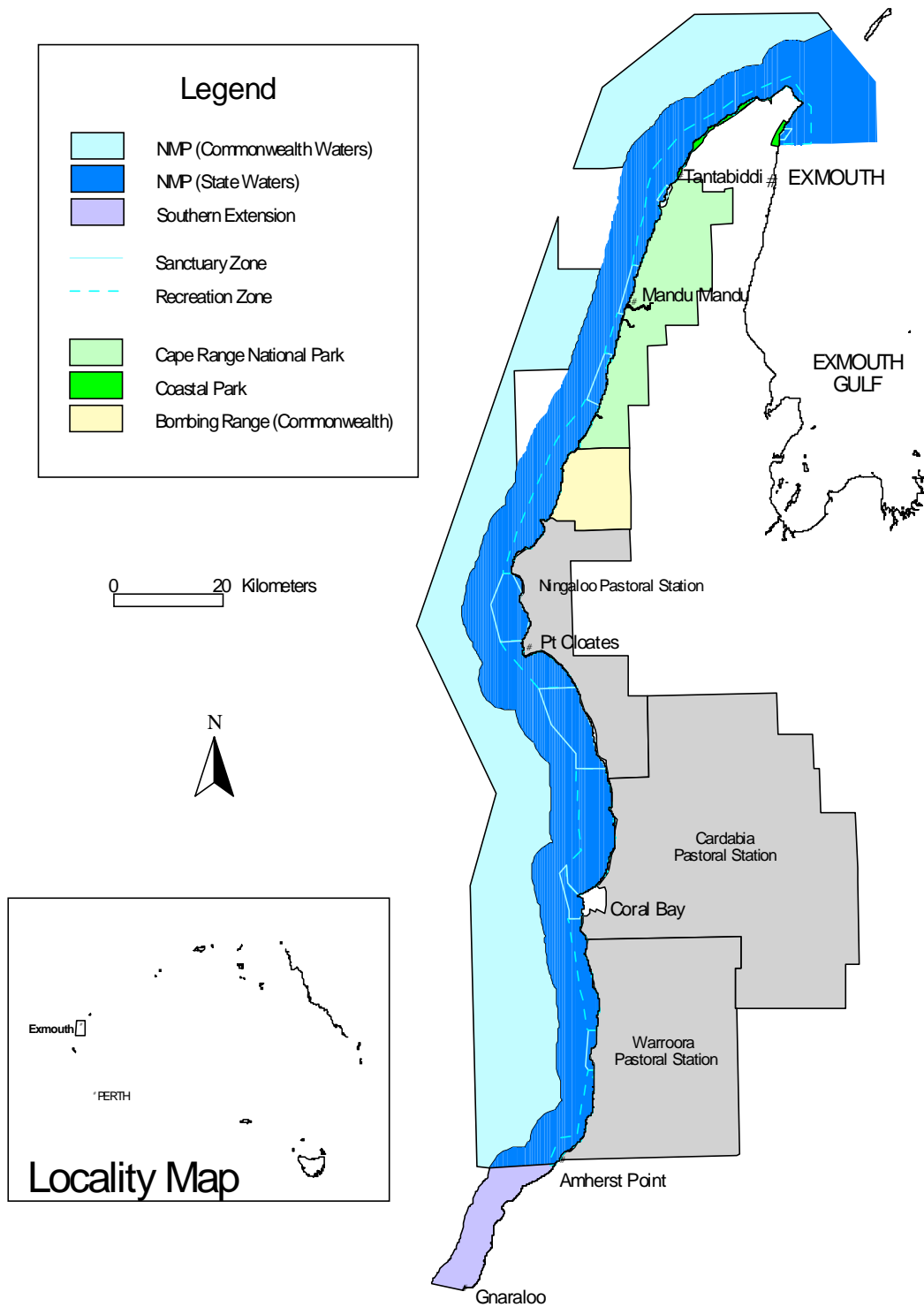
### **2.4.1 Original data**

The maps used in consultation with the local experts will be stored in hard copy, either at the Marine Conservation Branch Office or CALM Exmouth District Office. These are the base maps of onshore infrastructure with the spatial extent of different activities drawn on top.

Much of the information compiled in the descriptive and spatial results came from previously published reports. The unpublished trend data, such as the CALM aerial survey of the NMP – numbers of campsites, vehicles and boats is in Appendix 4 of this report.

### **2.4.2 Final Product**

Hard copy maps for each specific activity in the marine park and a CD-ROM will be created containing the ArcView project and associated data. The data will be held in two directories, Development and Production, with Development holding the original datasets and Production containing the final versions.



**Figure 1. Location map of Ningaloo Marine Park and proposed southern extension.**

**Table 1. Required Socio-Cultural Datasets for Management of Marine Parks**

<b><u>Tenure</u></b>	<b><u>Urbane &amp; Tourism Development</u></b>	<b><u>Industrial Development</u></b>	<b><u>Maritime Infrastructure</u></b>
<ul style="list-style-type: none"> <li>• Territorial Water Limits</li> <li>• Existing management/Ownership</li> <li>- Conservation Reserves (CALM)</li> <li>- Other Reserves (Govt./vested)</li> <li>- Private/Leasehold/VCL</li> <li>• Proposed Conservation Reserve</li> <li>• Marine Park Zoning</li> <li>• Petroleum Leases</li> <li>• Mining Leases</li> <li>• Aboriginal Claim Boundaries</li> <li>• Historical</li> <li>- Australian Heritage Commission areas</li> <li>- Aboriginal Sacred and Ceremonial Sites</li> <li>- Heritage/ Historical Sites</li> <li>- Shipwrecks</li> </ul>	<ul style="list-style-type: none"> <li>• Urban Development</li> <li>- existing</li> <li>- proposed</li> <li>• Resort</li> <li>- existing</li> <li>- proposed</li> <li>• Camping</li> <li>- existing</li> <li>- wild (free)</li> <li>- proposed</li> </ul>	<ul style="list-style-type: none"> <li>• shipping</li> <li>• oil &amp; gas exploration</li> <li>• oil &amp; gas production</li> <li>• mining</li> <li>• other industries</li> </ul>	<ul style="list-style-type: none"> <li>• anchorages</li> <li>• shipping lanes</li> <li>• port facilities</li> <li>• marina facilities</li> <li>• moorings</li> <li>• groynes</li> <li>• boat ramps</li> <li>• navigation markers</li> <li>• fish attracting devices</li> </ul>
<b><u>Commercial Fishing</u></b>	<b><u>Recreation: Fishing</u></b>	<b><u>Recreation: Non-extractive recreation</u></b>	<b><u>Scientific</u></b>
<ul style="list-style-type: none"> <li>• trawling</li> <li>• wetline fishing</li> <li>• netting</li> <li>• fish-trapping</li> <li>• rock lobster</li> <li>• abalone</li> <li>• aquaculture</li> <li>- non-feeding</li> <li>- feeding</li> <li>• collection</li> <li>- invertebrates</li> <li>- vertebrates</li> </ul>	<ul style="list-style-type: none"> <li>• rod &amp; line fishing</li> <li>- shore based</li> <li>- boat based</li> <li>• netting</li> <li>- set</li> <li>- haul</li> <li>- throw</li> <li>• drop netting</li> <li>• spearfishing</li> <li>• shell collection</li> <li>• rock lobster</li> <li>• crabbing</li> <li>• abalone</li> <li>• game fishing</li> <li>• bait collection</li> </ul>	<ul style="list-style-type: none"> <li>• powerboats</li> <li>• hovercraft</li> <li>• water skiing</li> <li>• jet skiing</li> <li>• parasailing</li> <li>• float planes</li> <li>• sailing vessels</li> <li>• paddle boats</li> <li>• kayaks/canoes</li> <li>• windsurfing</li> <li>• scuba diving</li> <li>• snorkelling</li> <li>• wildlife interaction</li> <li>• surfing</li> <li>• swimming</li> <li>• reef walking</li> <li>• beach walking</li> <li>• beach launching</li> </ul>	<ul style="list-style-type: none"> <li>• research and monitoring</li> <li>• extractive</li> </ul>



### **3 RESULTS**

#### **3.1 DESCRIPTION OF HUMAN ACTIVITIES AND TRENDS**

A description of each activity listed in Table 1 (except tenure) is presented in the following sections. From the gaps in the results it can be seen that there is a lot of useful information still to be gathered.

### 3.1.1 Urban Development – Existing

DESCRIPTION:

Exmouth – is a sub-regional centre that serves the Northwest Cape area. Exmouth was established in 1964 to service the US Naval Communications Station and Base. The US Navy withdrew from the area in 1996 and the communications station was taken over by the Australian Defence Force who will operate the station for the next 30 years. Exmouth has grown as a tourist destination, providing a base from which to explore the Ningaloo Marine Park. In 1991 approximately 17% (174 persons) of employment in the Exmouth Shire was due to direct tourism businesses (WA Planning Commission 1988). The peak tourist season occurs between March and October (higher during school holidays). In 1999 the number of visitors to Exmouth was approximately 116,000 per annum (Exmouth Shire 1999). For more details on visitor’s refer to Appendix 2 (Tourism activities on the Exmouth Peninsula and the Ningaloo Marine Park from 1991 to 2000 produced by Curtin University).

Coral Bay - is a tourist settlement that was established in the 1960’s. Since this time Coral Bay has grown to become a major tourist destination. The majority of Coral Bay residents are directly involved in tourism businesses. Coral Bay has a range of accommodation options including caravan parks, chalets, hotel, and holiday homes (refer to section 3.1.2). There are also a range of facilities including stores, restaurants, and a petrol station. Commercial operators provide a diverse range of activities for visitors. The peak tourist season occurs between March and October (higher during school holidays). During peak seasons Coral Bay is subject to overcrowding. In 1999 the number of visitors to Coral Bay was approximately 46,000 per annum (Exmouth Shire 2000). Future development in Coral Bay is restricted due to land availability and lack of key infrastructures (eg water and electricity). There is a proposed development to the north at Maud’s Landing (proposed marina and accommodation) which is expected to reduce the pressures on the services provide by Coral Bay (refer to section 3.1.3).

POTENTIAL IMPACTS:

- beach erosion due to vehicle and pedestrian movement;;
- nutrient, toxicant and pathogen inputs from deep sewage and sewage treatment in Exmouth via ground water flow and surface run off (storm water drains);
- nutrient, toxicant and pathogen inputs from septic tanks in Coral Bay via groundwater flows and run off.
- air pollution from burning off at the Coral Bay rubbish tip;
- litter;
- elevated feral animal populations (eg rabbits and mice in plague proportions); and
- increased mortality of wildlife due to domestic pets and traffic.

TRENDS:

Exmouth: Exmouth Shire population data. There has been a 13% increase in the resident population of Exmouth Shire between 1981 and 1998.

Year	Permanent Population	Population (including visitors)
1981	2,180 <sup>a</sup>	Data not available
1986	2,292 <sup>a</sup>	Data not available
1991	2,437 <sup>a</sup>	3,820 <sup>a</sup>
1996	2,058 <sup>a,b</sup>	3,908 <sup>a</sup>
1998	2,400 <sup>c</sup>	Data not available
1999	2,400 <sup>d</sup>	up to 5,000 visitors <sup>d</sup> (peaks in July)

<sup>a</sup> Data from WA Planning Commission 1988

<sup>b</sup> population decline in 1996 was due to the US Naval Base closing.

<sup>c</sup> Data from Exmouth Shire Directory 1998

<sup>d</sup> Data from Exmouth Shire

1999

	Population (including visitors)
Jan-Mar	2,400
Apr-Jun	3,000
Jul-Sep	5,000
Oct-Dec	3,000

Coral Bay: Resident Population data.

Year	Permanent Population	Visitors (Peak period)
1996	~60 <sup>a</sup>	2,500 <sup>a</sup>
1999	120-180 <sup>b</sup>	3,000 <sup>c</sup>
1999	150 <sup>d</sup>	4,000 <sup>d</sup> (peaks in July)

<sup>a</sup> Data from Ministry for Planning 1996

<sup>b</sup> Data from Carnarvon Shire

<sup>c</sup> Data from WA Tourism Commission – Gascoyne Region

<sup>d</sup> Data from Exmouth Shire

### 3.1.2 Resorts - existing

<b>DESCRIPTION:</b>				
<p>“Resort” style accommodation includes shearing sheds, holiday homes, villas, apartments, hotels, motels and caravan parks but excludes wild camping (refer to 3.1.4). Refer to Appendix 3 for a list of “Resorts” in the vicinity of the marine park grouped by the following regions:</p> <ul style="list-style-type: none"> <li>• <i>Exmouth area</i>: includes the Exmouth town site, south to the northern boundary of the Cape Range National Park;</li> <li>• <i>Outer Exmouth area</i>: includes the Cape Range National Park;</li> <li>• <i>Coral Bay area</i>: includes Coral Bay settlement and Mauds Landing; and</li> <li>• <i>Outer Coral Bay area</i>: includes area south of Coral Bay settlement to the southern boundary of Gnaraloo Station and the area north of Mauds landing to the northern boundary of Ningaloo Station.</li> </ul>				
<b>POTENTIAL IMPACTS:</b>				
<ul style="list-style-type: none"> <li>• beach erosion due to vehicle and pedestrian movement;;</li> <li>• nutrient, toxicant and pathogen inputs from deep sewage and sewage treatment and in Exmouth via ground water flow and surface run off (storm water drains);</li> <li>• nutrient, toxicant and pathogen inputs from resort septic via ground water flow and surface run off (storm water drains).</li> <li>• nutrient, toxicant and pathogen inputs from septic tanks in Coral Bay via groundwater flows and run off.</li> <li>• air pollution from burning off at Coral Bay rubbish tip;</li> <li>• litter;</li> <li>• elevated feral animal populations (eg rabbits and mice in plague proportions); and</li> <li>• increased mortality of wildlife due to domestic pets and traffic.</li> </ul>				
<b>TRENDS:</b>				
<b>Exmouth Area:</b> Caravan park accommodation data. There has been a 5-6% increase in the duration of visitor stays.				
<b><u>Year</u></b>	<b><u>Site Nights (000)</u></b>	<b><u>Guest Arrivals (000)</u></b>	<b><u>Number of Caravan Parks</u></b>	<b><u>Number of Sites</u></b>
1989			5	<i>Data not available</i>
1991	68.9 <sup>a</sup>	12.7 <sup>a</sup>	<i>Data not available</i>	<i>Data not available</i>
1992	68.6 <sup>a</sup>	13.2 <sup>a</sup>	<i>Data not available</i>	<i>Data not available</i>
1993	72.0 <sup>a</sup>	14.8 <sup>a</sup>	<i>Data not available</i>	<i>Data not available</i>
1994	72.2 <sup>a</sup>	23.9 <sup>a</sup>	<i>Data not available</i>	<i>Data not available</i>
1998	<i>Data not available</i>	<i>Data not available</i>	6 <sup>b</sup>	<i>Data not available</i>
<sup>a</sup> Data from Exmouth Tourist Bureau				
<sup>b</sup> including Kailis				
<b>Exmouth Area:</b> Accommodation (excluding caravan parks) data.				
<b><u>Year</u></b>	<b><u>Nights (000)</u></b>	<b><u>Guest Arrivals (000)</u></b>	<b><u>Number of facilities</u></b>	<b><u>Number of houses/beds/rooms</u></b>
1989	<i>Data not available</i>	<i>Data not available</i>	3-4	
<b>Outer Exmouth area:</b> No data available for this area				
<b>Coral Bay area:</b> Visitor accommodation figures for caravan parks only.				
<b><u>Year</u></b>	<b><u>Site Nights (000)</u></b>	<b><u>Guest Arrivals (000)</u></b>	<b><u>Number of caravan parks</u></b>	<b><u>Number of sites</u></b>
1996	<i>Data not available</i>	<i>Data not available</i>	<i>Data not available</i>	477 <sup>a</sup>
<sup>a</sup> Data from Ministry for Planning 1996				
No data available on non-caravan park type accommodation. One of the caravan parks (Bayview Coral Bay) has reported that there has been an increase of 40% of new arrivals between 1994 and 1999.				
<b>Outer Coral Bay area:</b> No data available				

### 3.1.3 Resorts – Proposed

<p><b>DESCRIPTION:</b></p> <p><b>Exmouth Marina Development</b> – will commence in early 2001 and will consist of four stages including:</p> <ul style="list-style-type: none"> <li>• residential development of 118 canal lots and 72 dry lots;</li> <li>• commercial/mixed use/ short stay accommodation;</li> <li>• resort on the beach front; and</li> <li>• fishing industry canal and dry lots.</li> </ul>
<p><b>Mauds Landing Development</b> – a tourist accommodation and facilities project based on an inland marina concept will commence in early 2001 and will include:</p> <ul style="list-style-type: none"> <li>• marina with mooring pens and boat ramp;</li> <li>• 370 residential lots; and</li> <li>• 710 tourist accommodation units.</li> </ul>
<p><i>A study by Jones Land Wootton in 1993 identified four locations suitable for development (see below). The study recommended that only two of these sites should be developed. There is no current development of any of these proposals.</i></p>
<p><b>Milyering</b> – is considered a minor site located along a narrow section of the coastal plain. The site would be suitable for accommodation in the form of a wilderness lodge set into the foothills with various types of accommodation units to suit a wide range of tourist market segments.</p>
<p><b>Ningaloo Beach</b> – is an 85 ha site is located behind a two kilometre long sandy beach to the north of Point Cloates. The beach is suitable for swimming and informal beach use. There is potential for at least three separate tourist developments. There are restrictions of the positioning of buildings due to site aesthetics.</p>
<p><b>Winderabandi Pt</b> – is considered to be a major site. The site is adjacent to a major access channel through the reef. The site has a sandy bay to the north and south each having sandy beaches approximately two kilometres in length. The northern bay is sheltered and suitable for swimming and informal beach use and the southern bay is more exposed and suitable for specific water sports. The style of development would be low-key wilderness compatible accommodation based on a leisurely style of recreation based tourism with an ecological background due to the accessibility of the national park and marine park.</p>
<p><b>Lefroy Bay</b> – is in a sheltered bay north of Pt. Billy. The site is located adjacent to a 2km long high quality sandy beach. The lagoon is suitable as a moorage area and there is access through the reef. The site is suitable for an international quality, high-level tourist facility in the form of an Australian style wilderness lodge that offers a variety of accommodations. If the Cape Range National Park is extended to the south the Lefroy Bay development could function as a gateway to the national park and marine park.</p>
<p><b>POTENTIAL IMPACTS:</b></p> <ul style="list-style-type: none"> <li>• beach erosion due to vehicle and pedestrian movement;;</li> <li>• nutrient, toxicant and pathogen inputs from sewage systems via ground water flow and surface run off;</li> <li>• litter;</li> <li>• elevated feral animal populations (eg rabbits and mice in plague proportions);</li> <li>• increased mortality of wildlife due to domestic pets and traffic;</li> <li>• disruption to drainage patterns;</li> <li>• decline in site aesthetics; and</li> <li>• physical disturbance to wildlife (eg displacement, injury and death) and habitat such as feeding and breeding grounds (eg schooling sharks, turtle nesting, and bird roosting)</li> </ul>
<p><b>TRENDS:</b></p> <p>No data available</p>

### 3.1.4 Campsites - official, wild and proposed

<b>DESCRIPTION:</b> There are currently 18 official camp areas with approximately 110 campsites, located within the Cape Range National Park (CRNP). There are approximately 70+ wild camping areas scattered along the coast between the CRNP Gnarlaloo. A number of these camping areas are managed by the pastoral stations and pastoralists estimate that the number of campers has doubled since 1982 (Ningaloo Marine Park Management Plan 1989-1999).
<b>EXMOUTH AREA</b> There are no official or proposed campsites in the Exmouth area. Informal camping is permitted in Jurabi Coastal Park.
<b>CAPE RANGE NATIONAL PARK (All official sites)</b>
<b>Kurrajong</b> – is accessible by 2WD vehicles. The site has 10 camping bays – next to Pilgramuna.
<b>Neds Camp</b> – is accessible by 2WD vehicles. The site has 13 camping bays and facilities include tables, four sealed vault type toilets and five rubbish bins.
<b>Mesa Camp</b> – is accessible by 2WD drive vehicles. The site has 12 camping bays, and facilities include tables, two sealed vault type toilets and five rubbish bins.
<b>North T-Bone</b> – is accessible by 2WD vehicles. The site has three camping bays and facilities include a table, one sealed vault type toilet and one rubbish bin.
<b>South T-Bone</b> – is accessible by 2WD vehicles. The site has three camping bays and one rubbish bin.
<b>One Unit Bay</b> – is accessible by 2WD vehicles. The site has one camping bay and one rubbish bin.
<b>Lakeside</b> – is accessible by 2WD vehicles. The site has seven camping bays and facilities include a table, one sealed vault type toilet and four rubbish bins.
<b>Camp 13</b> – is accessible by 2WD vehicles. The site has one camping bay and one rubbish bin.
<b>Camp 14</b> – site is accessible by 2WD vehicles. The site has one camping bay and one rubbish bin.
<b>Tulki</b> – is accessible by 2WD vehicles. The site has seven camping bays and facilities include a table, one sealed vault type toilet and three rubbish bins.
<b>North Mandu Mandu</b> – is accessible by 2WD vehicles. The site has two camping bays and facilities include tables, one sealed vault type toilet and one rubbish bin.
<b>South Mandu Mandu</b> – is accessible by 2WD vehicles. The site has four camping bays and one rubbish bin.
<b>Pilgramunna</b> – is accessible by 2WD vehicles. The site has six camping bays and facilities include one sealed vault type toilet and three rubbish bins.
<b>Osprey Bay</b> – is accessible by 2WD vehicles. The site has sixteen camping bays and facilities include a shaded table, two sealed vault type toilets and four rubbish bins.
<b>Bungarra Camp</b> – is accessible by 2WD vehicles. The site has five camping bays and facilities include a one sealed vault type toilet.
<b>Yardie Creek Campsite</b> – is accessible by 2WD vehicles. The site has eight low-key camping bays and facilities include one sealed vault type toilet and three rubbish bins.
<b>1 K Camp</b> – is accessible by 4WD vehicles. The site has six camping bays and facilities include one sealed vault type toilet.
<b>Boat Harbour</b> – is accessible by 4WD vehicles. The site has four camping bays and no facilities.
<b>COMMONWEALTH BOMBING RANGE</b> There are numerous wild campsites with the main site used is known as “Doddies”. There is an old bus wreck at the site. None of these campsites have facilities.
<b>NINGALOO STATION (All wild sites)</b> There are numerous wild campsites located on Ningaloo Station. None of these campsites have facilities.
<b>Winderabandi</b> – is the main wild camping site on Ningaloo Station and encompasses Winderabandi Pt and Lefroy Bay. The area is accessible by 4WD vehicles. The individual camps are well spaced and are not within site of each other. Many campsites are well developed, as they are used for extended periods by campers that return annually.
<b>CARDABIA STATION (All wild sites)</b> <b>14 Mile Bruboodjoo</b> – is the main wild camping site is located north of Coral Bay on Cardabia Station and is accessible by 2WD vehicles. Many of the campers have used this site for decades. The campsite provides an overflow for Coral Bay during peak periods. There are approximately up to 15 sites and large groups often occur in the area. Campers have established pit toilets.

<b>WARROORA STATION</b> ( <i>all wild, however the station does manage camping on the station</i> ) Warroora Station has set aside six coastal areas for camping, which are listed below (north to south). Campers pay a fee. The camping areas have no facilities.		
<ul style="list-style-type: none"><li>• 14 Mile</li><li>• Caretakers Camp</li><li>• Pelican Point</li></ul>	<ul style="list-style-type: none"><li>• Maggies</li><li>• Bulbarli</li><li>• The Lagoon</li></ul>	
<b>GNARALOO STATION: NINGALOO MARINE PARK SOUTHERN EXTENSION</b> ( <i>all wild, however the station does manage camping on the station</i> )		
<b>3 Mile</b> – There is a pseudo caravan park, which provides un-powered campsites. The site is accessible by 2WD vehicles. Facilities at the site include septic toilets, showers, rubbish bins, barbeques and a store. Visitors are primarily surfers attracted to the area by surfing sites.		
<b>POTENTIAL IMPACTS:</b> <ul style="list-style-type: none"><li>• beach erosion due to vehicle and pedestrian movement;;</li><li>• nutrient, toxicant and pathogen inputs from pit toilets and rubbish pits via ground water flow and surface run off;</li><li>• litter;</li><li>• elevated feral animal populations (eg rabbits and mice in plague proportions);</li><li>• increased mortality of wildlife due to domestic pets;</li><li>• decline in site aesthetics;</li><li>• physical disturbance to wildlife (eg displacement, injury and death) and habitats (eg feeding and breeding grounds of schooling sharks, turtle nesting, and bird roosting, etc);</li><li>• disturbance of the environment through firewood collection; and</li><li>• removal of vegetation for fire wood.</li></ul>		
<b>TRENDS:</b> CALM has carried out aerial surveys along the entire length of the NMP once or twice a year (April, and July) since 1995 (refer to Appendix 4). No data is available on camping trends for pastoral stations.		
The total number of camps adjacent to the Ningaloo Marine Park determined from aerial Surveys.		
<b><u>Year</u></b>	<b><u>Number of camps</u></b>	
1995	257	
1999	357	
Cape Range National Park camping area data.		
<b><u>Year</u></b>	<b><u>Number of Camping Areas</u></b>	<b><u>Number of Camping Sites</u></b>
1996	8 <sup>a</sup>	90 <sup>a</sup>
1998	17 <sup>b</sup>	88 <sup>b</sup>
1999	18 <sup>b</sup>	110 <sup>b</sup>
<sup>a</sup> Data from Ministry for Planning 1996		
<sup>b</sup> CALM Exmouth District		

### 3.1.5 Day Visits

<b>DESCRIPTION:</b>		
Day use in the marine park is highest in the vicinity of the major tourist destinations including Exmouth and Coral Bay. Day use is lower in areas with limited access such as 4WD only accessible sites and sites where there are few boat access points. Visitors access the marine park from the shore and by sea. Visitors to the marine park visit either privately or with commercial tour operators (charter boat or safari tours). The types of activities that visitors engage in are addressed in the relevant sections. In the past the months from October – April were generally considered to be quiet, it would now appear that this quiet period has been reduced, with the quiet period extending over only one to two months in December and February.		
<b>EXMOUTH AREA</b>		
There are in excess of 25 tracks that branch off the main roads in the vicinity of Exmouth and provide access to the coast. The tracks vary in accessibility with some being accessible by 4WD vehicles only. The majority of these access points have no facilities.		
<b>Bundegi Beach</b> – is a major day use site located in close proximity to Exmouth. Access to the site is via a sealed road. Facilities at the site include septic type toilets, rubbish bins, jetty (section 3.1.8), boat ramp (section 3.1.11) and boat moorage/anchorage area (sections 3.1.9 and 3.1.10). The beach is used for swimming and informal beach use.		
<b>Surfers Beach</b> – is accessible by 2WD vehicles. Facilities at the site include a car park, one sealed vault type toilet and rubbish bins.		
<b>Tantabiddi</b> - is one of the few northern boat launching facilities. It is an extremely popular access point where visitors can launch their boats. Facilities at the site include a boat ramp (section 3.1.11), car park, septic type toilet block, rubbish bins and facilities for the disposal of fish offal.		
<b>CAPE RANGE NATIONAL PARK (CRNP)</b>		
Visitors can access the NMP through the CRNP. In 1998/99 a total of 84,000 visitors entered CRNP. However the actual number of visitors would be lower as this figure possibly includes repeat visitation. Road counter and Milyering statistics indicate that visitation has doubled over the last 10 years. The Curtin 1997 survey suggests that the majority of visitors to the CRNP would be visiting the NMP. There are 19 camping site and seven day use only areas that are used by visitors:		
The 19 camping sites include:		
Neds Camp	Camp 13	Osprey Bay
Mesa Camp	Camp 14	Bungarra Camp
North T-Bone	Kurrajong	1 K Camp
South T-Bone	Tulki	Boat Harbour
One Unit Bay	North Mandu Mandu	Yardie Creek
Lakeside	South Mandu Mandu	
Camp 13	Pilgramunna	
There are seven day use only sites adjacent to the CRNP includes:		
<b>Mangrove Bay</b> – which has no facilities at this site. There are bird and fauna hides.		
<b>Milyering Visitor Centre</b> – was constructed in 1988 as an information centre for park users. Approximately 72,691 people visited the centre during 98/99.		
<b>Turquoise Bay</b> – is a major day use site with a popular beach, opportunities for swimming, snorkelling and informal beach use. Authorised persons can launch small boats across the beach to the south of the site (4WD only). The site is also visited by a charter boat that anchors within the bay close to the beach. There is one sealed vault type toilet and no rubbish disposal facilities.		
<b>Oyster Stacks</b> – is used as a day use area only. There are no facilities at this site. This site is located within a sanctuary zone. There is a CALM recommended snorkel/dive trail at the site.		
<b>Sandy Bay</b> – is used as a day use area. The site is located adjacent to a sanctuary zone. Facilities include two shaded tables, and toilets. Beach fishing is permitted at this site. There are no rubbish disposal facilities.		
<b>Yardie Creek Day Use Area</b> – is the most southerly 2WD accessible day use site within CRNP. The site has facilities that include tables, two sealed vault type toilets, shaded picnic area and three rubbish bins. There is a beach suitable for informal beach use and during high seasons boat tours of Yardie Creek are conducted. To cross the forde across Yardie Creek requires a 4WD vehicle. It is estimated that between $\frac{1}{3}$ and $\frac{1}{4}$ of visitors to the national park travel south of Yardie Creek.		
<b>Bloodwood Creek Area</b> – is used as a day use area. Facilities include a carpark and wildlife viewing platform. There are two pit toilets but no rubbish disposal facilities.		

<b>COMMONWEALTH BOMBING RANGE</b>	
There are numerous coastal access tracks that are accessible by 4WD vehicle only. The main site visited is known as "Doddies". There is an old bus wreck at the site.	
<b>NINGALOO STATION</b>	
There are no designated day use areas, however day use occurs at any of the limited number of coastal access points. A 2WD accessible track connects the main road with the homestead. The north/south track is accessible predominantly by 4WD however 2WD vehicles also use this track.	
<b>CARDABIA STATION</b>	
There are limited coastal access tracks on Cardabia Station and most tracks are restricted to 4WD vehicles. The southern portion of Cardabia Station has the greatest access such as Coral Bay, which is accessible by 2WD vehicles. The northern regions of the station are less accessible and the coastline steep and not as popular as day use areas.	
<b>The Lagoon</b> – is a major day use site located to the north of Coral Bay. Access to the site is by 4WD vehicle only and there are no facilities. Activities carried out at the site include beach activities, swimming, diving and beach fishing.	
<b>Mauds Landing</b> – is a major day use site located to the north of Coral Bay. Access to the area is mainly by 4WD however 2WD vehicles can reach within 100 meters of the site. There are no facilities at the site. Activities at the site include beach activities, swimming and beach fishing.	
<b>Coral Bay</b> – is one of the most important day access points to the Ningaloo Marine Park. The marine park in this area is adjacent to a major tourist accommodation area. There is a diverse range of activities offered at Coral Bay including charter boats that provide visitors with the opportunities to fish, snorkel, SCUBA and wildlife viewing (turtles, manta rays) within the marine park. The foreshore of the settlement provides opportunities for swimming, informal beach use and a range of activities such as Snuba. There is a snorkel trail that is accessed from the settlement foreshore and another dive trail (Paradise Beach) accessible from the shore to the south of the settlement (CALM 1995).	
<b>WARROORA STATION</b>	
There are limited coastal access tracks on Warroora station with most tracks being requiring a 4WD vehicle. Day use areas typically occur in the vicinity of the six camping areas which include:	
14 Mile	Maggies
Caretakers Camp	Bulbarli
Pelican Point	The Lagoon
<b>GNARALOO STATION: NINGALOO MARINE PARK SOUTHERN EXTENSION</b>	
There are limited coastal access tracks on Gnarraloo Station, many of which are accessible by 2WD vehicles. The Gnarraloo homestead is only accessible by track from the south, this track is 2WD accessible. It is not possible to travel between Warroora Station and Gnarraloo Station due to the boundary gate being locked. The following site are the main day use areas:	
<b>Gnarraloo Bay</b> – is located to the north of Gnarraloo Station Homestead and is accessible by 2WD vehicle. It is possible to launch boats across the beach. The beach is used primarily by visitors staying at the homestead or at 3 Mile.	
<b>3 Mile</b> – is located to the south of the Gnarraloo Station Homestead and is accessible by 2WD vehicle. The main site includes a pseudo caravan park and a number of secondary sites are accessible from this area. The main activity carried out at the area is surfing.	
<b>POTENTIAL IMPACTS:</b>	
<ul style="list-style-type: none"> <li>• beach and dune erosion due to vehicle and pedestrian movement;;</li> <li>• nutrient, toxicant and pathogen inputs from pit toilets and rubbish pits via ground water flow and surface run off;</li> <li>• litter;</li> <li>• elevated feral animal populations (eg rabbits and mice in plague proportions);</li> <li>• increased mortality of wildlife due to domestic pets and traffic;</li> <li>• disturbance of the environment through firewood collection;</li> <li>• removal of vegetation for fire wood;</li> <li>• decline in site aesthetics;</li> <li>• degradation of benthic habitats due to anchor damage; and</li> <li>• physical disturbance to wildlife (eg displacement, injury and death) and habitat such as feeding and breeding grounds (eg schooling sharks, turtle nesting, and bird roosting).</li> </ul>	



TRENDS:				
Exmouth Tourist Bureau – Door counter statistics.				
	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>
Jan	4061	4078	4259	4698
Feb	2753	3091	2943	3612
Mar	4490	5531	4332	3258 <sup>a</sup>
Apr	7420	8821	8757	2130 <sup>a</sup>
May	5984	7186	8696	6560
Jun	6329	7120	8257	7398
Jul	12863	12870	14482	10640
Aug	10215	10310	11295	N/A
Sept	7448	9158	9237	Data not available
Oct	7258	8057	9318	Data not available
Nov	3908	5537	5773	Data not available
Dec	3740	4852	4812	Data not available
TOTAL	76469	86611	92161	32908
<sup>a</sup> Cyclone Vance				
Tantabiddi – Visitor and vehicle numbers accessing the Cape Range National Park from the north.				
Year	Total day visits (CRNP – Western Precinct)		Traffic Counter	
89/90	42,000		13,940	
90/91	44,000		14,804	
91/92	26,000		8,749	
92/93	48,000		Data not available	
93/94	54,000		Data not available	
94/95	54,000		10,000	
95/96	58,000		20,709	
96/97	78,000		28,000	
98/99	84,000		30,144	
South Yardie Creek – Visitor and vehicle numbers accessing the Cape Range National Park south of Yardie Creek.				
Year	Total day visits		Traffic Counter	
1989	10,000		3,201	
1997	28,000		9,125	

### 3.1.6 Shipping

<b>DESCRIPTION:</b> There is a major shipping lane that runs parallel to the coast and straddles the marine park. There is also a shipping lane that runs between the Muiron Islands and the NW Cape which vessels use to access the Naval Pier and Exmouth Gulf.
<b>POTENTIAL IMPACTS:</b> <ul style="list-style-type: none"> <li>• toxicant inputs from accidental spillage of fuels and oils from vessels;</li> <li>• toxicant inputs from hull antifouling of vessels (eg TBT);</li> <li>• damage to benthic habitats due to vessel grounding, anchors and propeller;</li> <li>• ships hitting marine wildlife such as whales and turtles; and</li> <li>• litter from vessels.</li> </ul>
<b>TRENDS:</b> No data available

### 3.1.7 Oil & Gas Exploration

<b>DESCRIPTION:</b> <p>To date the environmental performance of the petroleum industry within 50 kilometres of the marine park. has been of a high standard with few environmental incidents with little or no environmental consequence.</p> <p>Over 233,000 line kilometres of seismic surveys have being carried out, with the vast majority being offshore. Each of the surveys was conducted under specific conditions to ensure that environmental and safety matters were addressed. Out of a total 60 seismic surveys there was only one recorded incident, which was the loss of a hydrophone streamer in deep water to the west of the North West Cape.</p> <p>Approximately 62 wells have been drilled, with 90% of these offshore. Specific conditions require commitment to environmental management and require the preparation of oil spill contingency plans. There have only been two oil spills (350 litres and 500 litres) which were caused by insufficient burning during production testing. However monitoring showed that the oil rapidly dispersed and caused no long term environmental effects.</p> <p><i>The above details were provided by W Carr, General Manager Land Access, Department of Minerals and Energy.</i></p>
<b>POTENTIAL IMPACTS:</b> <ul style="list-style-type: none"> <li>• toxicant inputs from accidental spillage of fuels and oil from vessels and rigs involved in exploration and production;</li> <li>• toxicant inputs from spills from exploration drilling;</li> <li>• discharge of other substances (eg drilling mud) associated with exploration;</li> <li>• physical disturbance to wildlife (eg displacement, injury and death); and</li> <li>• litter.</li> </ul>
<b>TRENDS:</b> No data available

### 3.1.8 Port Facilities

<b>DESCRIPTION:</b>			
There are only three port facilities in the vicinity of the marine park, which include:			
<b>Exmouth Marina</b> – is a multi-functional harbour that provides a cyclone haven for recreational, charter and fishing boats that was opened in 1997. The marina has 50 pens (18 charter, 24 recreational, and eight trawler pens), moorings, an anchorage area and a boat ramp. There a future plans to increase the number of boat pens.			
<b>Bundegi Jetty</b> – is a short wooden jetty located to the north of the Bundegi boat ramp. Charter boats use the jetty for the transfer of equipment and passengers. The jetty is accessible only during high tide and in the past there can been conflict with its usage, as only two boats can tie up to the jetty at once.			
<p><b>Point Murat Naval Pier</b> – is located 15 km north of Exmouth and was built in 1964 by the US Navy to serve the communication station. The pier is 320 metres in length and has a steel super structure with a timber decking. There are two mooring dolphins to the north and south of the end of the pier. At the base of the pier there is a hard stand area and storage sheds. The US Navy used the pier until 1992 at which time the Australian Navy took possession. A small area of the NMP at Pt Murat encompassing the naval pier and surrounding waters has been declared a Prohibited Area under the <i>Defence (Special Undertakings) Act</i>. On average two naval vessels use the pier annually when delivering supplies to the communication station. These naval vessels use TBT antifouling paint. In the past the pier was used periodically by rig support vessels in the oil/gas industry (WA Planning Commission 1998).</p> <p>A discharge pipe is located half way along the underside of the pier, which discharges cooling water from the power station at a rate of approximately 32,000 litres per minute. The discharged water is salt water, approximately 2 - 5° C warmer than ambient seawater. Prior to 1992 oil waste from the power plant was also discharged with the cooling water. Currently small amounts of untreated sewage are discharged with the cooling water. Maintenance is periodically carried out on the pier. During the year 2000 it expected that 1-2 ton of garnet used in grit blasting will be discharged into the water.</p>			
<b>POTENTIAL IMPACTS:</b>			
<ul style="list-style-type: none"> <li>• toxicant inputs from accidental spillage of fuels and oil from vessels;</li> <li>• toxicant inputs from hull antifouling such as TBT;</li> <li>• nutrient inputs from sewage discharge from vessels;</li> <li>• possible slicks and odors from sewage;</li> <li>• localised elevated seawater temperatures;</li> <li>• introduction of marine pests during ballast water discharge;</li> <li>• litter; and</li> <li>• localised smothering of benthic communities due to grit.</li> </ul>			
<b>TRENDS:</b>			
Number of vessels using the port facilities.			
<b><u>Year</u></b>	<b><u>No. vessels using Exmouth Marina</u></b>	<b><u>No. of vessels using Bundegi Jetty</u></b>	<b><u>Number of vessels using Pt. Murat Naval Pier</u></b>
1999	Data not available	Data not available	1-2

### 3.1.9 Anchorages

<b>DESCRIPTION:</b>
Main anchorages within the marine park occur at:
<b>Bundegi</b> - the waters north of the Bundegi boat ramp on the inside of the reef are sandy and suitable for anchoring. The size of boats anchoring in the area are restricted as a result of water depth (tides).
<b>Tantabiddi</b> – the waters adjacent to the Tantabiddi boat ramp are used by boats for anchoring. There is a sandy bottom, the lagoon is wide, fairly deep and accessible via a major passage through the outer reef.
<b>Coral Bay</b> – moorings are limited and mainly installed by commercial operators. All other boats anchor with the majority anchoring along the beach using a stern and bow anchor. Boats also anchor in the vicinity of Bills Bay when engaged in other activities such as snorkelling, diving and fishing.
<b>POTENTIAL IMPACTS:</b>
<ul style="list-style-type: none"> <li>• toxicant (eg oil) and nutrient (eg sewage) inputs from anchored vessels;</li> <li>• damage to benthic habitats (eg corals) due to anchors;</li> <li>• smothering of corals by propeller wash; and</li> <li>• litter.</li> </ul>
<b>TRENDS:</b>
No data available

### 3.1.10 Moorings

<b>DESCRIPTION:</b>			
There are three main mooring areas within the marine park and one outside the marine park:			
<b>Exmouth Marina</b> – is a multi-functional harbour that provides cyclone protection for recreational, charter and fishing boats that was opened in 1997 (section 3.1.8). There are approximately 17 moorings in the harbour.			
<b>Bundegi</b> – there are both commercial and recreational vessel moorings located inside the reef to the north of the Bundegi boat ramp.			
<b>Tantabiddi</b> – there are both commercial and recreational vessel moorings located in the lagoon adjacent to the Tantabiddi boat ramp. Access to mooring area is through a large passage through the outer reef.			
<b>Coral Bay</b> - There are commercial moorings and some unofficial recreational moorings within Bills Bay adjacent to the Coral Bay settlement. There are also unofficial dive site moorings.			
<b>POTENTIAL IMPACTS:</b>			
<ul style="list-style-type: none"><li>• toxicant (eg oil) and nutrient (eg sewage) inputs from moored vessels;</li><li>• damage to benthic habitats (eg corals and seagrasses) due to the installation of environmentally unfriendly moorings; and</li><li>• litter.</li></ul>			
<b>TRENDS:</b>			
The number of established moorings at key sites within the marine park.			
<b><u>Year</u></b>	<b><u>Bundegi</u></b>	<b><u>Tantabiddi</u></b>	<b><u>Coral Bay</u></b>
1994	8 <sup>a</sup>	Data not available	Data not available
1999	Data not available	10-12 <sup>b</sup>	14
<sup>a</sup> Exmouth Tourist Bureau 1994			
<sup>b</sup> adhoc mooring sites			

### 3.1.11 Boat Ramps

<b>DESCRIPTION:</b>				
The majority of recreational boats used in the marine park are transported and launched on trailers. The majority of these boats are launched at one of the four main boat ramps (see below) however smaller boats (eg dingy) are often launched across the beach along the length of the NMP, typically in the vicinity of camping sites (see below).				
<b>BOAT RAMPS</b>				
<b>Exmouth Marina boat ramp</b> – is a concrete ramp located in the Exmouth Marina and was constructed in 1997 and provides access to the Exmouth Gulf.				
<b>Bundegi boat ramp</b> – is located to the north of Exmouth. This concrete boat ramp provides access to Exmouth Gulf and the northern tip of the marine park. A report by Marine Harbours (1993) identified a number of problems with the boat ramp and recommended ways it could be improved. Problems include overcrowding and the fact that the ramp operation was subject to weather and tidal conditions.				
<b>Tantabiddi boat ramp</b> – is located to the south of Exmouth. The boat ramp is divided into two ramps, one concrete and the other rock and mesh. The mesh half acts as a loading/preparation area. The boat ramp provides access to a wide section of the lagoon and is adjacent to a major passage through the outer reef.				
<b>Coral Bay boat ramp</b> – is located on the foreshore of the Coral Bay Settlement. The boat ramp consists of a firm sandy beach ramp that is defined by posts. The boat ramp is heavily used during peak seasons. Unlike the other boat ramps this ramp doesn't have a car park, so cars and their empty trailers park on the upper section of the beach in the vicinity of the boat ramp.				
<b>OTHER LAUNCH SITES</b>				
<b>Neds Camp boat launch site</b> – is located adjacent to the camping area. The launch site is across a wide sandy beach, which means only small boats (dingys) can be launched and retrieved. The majority of users are those staying at the camp.				
<b>Turquoise Bay boat launch site</b> – is located to the south of Turquoise Bay and is accessed by authorised users via a 4WD only track. The launch site is across a narrow firm beach and only small boats can be launched.				
<b>Yardie Creek launch site</b> – is located at the Yardie Creek crossing. Small boats can be launched into the creek or across the sandbar				
<b>Sandy Bay launch site</b> – is located in the vicinity of the camping area. The launch site is across a sandy beach.				
<b>Osprey Bay launch site</b> - is located in the vicinity of the camping area. The launch site is across a sandy beach.				
<b>14 Mile launch site</b> – is located in the vicinity of the camping area. The launch site is across a sandy beach.				
<b>Pelican Pt launch site</b> – is located in the vicinity of the camping area. The launch site is across a sandy beach.				
<b>Maggies launch site</b> – is located in the vicinity of the camping area. The launch site is across a sandy beach.				
<b>The Lagoon launch site</b> – is located in the vicinity of the camping area. The launch site is across a sandy beach.				
<b>Gnaraloo Bay</b> – There is a popular boat launch site in the bay				
<b>POTENTIAL IMPACTS:</b>				
<ul style="list-style-type: none"> <li>beach and dune erosion and vegetation damage due to vehicle and pedestrian movement;</li> <li>toxicant (eg oil) inputs from vehicles launching boats and from boats;</li> <li>damage to benthic habitats (eg corals and seagrasses) due to boat grounding and propeller damage and scouring; and</li> <li>litter from land-based and marine sources due to lack of rubbish disposal facilities.</li> </ul>				
<b>TRENDS:</b>				
Boat Ramp Usage (main ramps).				
<b>Year</b>	<b>Exmouth Marina</b>	<b>Bundegi</b>	<b>Tantabiddi</b>	<b>Coral Bay</b>
19xx	Data not available	Data not available	Data not available	Data not available
Other Boat launch sites: Data not available				
	<b>Neds Camp</b>	<b>Turquoise Bay</b>	<b>Mandu Sanctuary</b>	<b>Sandy Bay</b>
	<b>Osprey Bay</b>	<b>14 Mile</b>	<b>Pelican Pt.</b>	<b>Maggies</b>
	<b>The Lagoon</b>	<b>Gnaraloo Bay</b>		

### 3.1.12 Commercial Trawling

**DESCRIPTION:**

The northern-most boundary of the Ningaloo Marine Park (NMP) extends within the waters of the Exmouth Gulf Prawn Managed Fishery (EGPMF)

Prawn trawling usually occurs within this portion of the NMP between April and November each year. Primarily King Prawns are caught in this area and the frequency of trawling within the NMP is determined by the relative abundance of Tiger Prawns available in the lower portion of Exmouth Gulf.

There is some overlap between the Western Deepwater Trawl Fishery and the Commonwealth waters of the NMP. This fishery is classified as a Commonwealth Fishery and is managed by the Australian Fisheries Management Authority (AFMA).

Records to 1993 indicate little or no commercial trawl fishing has been conducted in the overlap area. There is currently no fishing permits issued to Deepwater Trawl vessels to fish within the NMP. *(Requires to be confirmed with AFMA and Environment Australia)*

**POTENTIAL IMPACTS:**

- localised depletion of target fish stocks;
- toxicant (eg oil) inputs from commercial fishing vessels;
- damage to benthic habitats due to trawling; and
- litter from fishing vessels(eg lost nets).

**TRENDS:**

No data available

### 3.1.13 Commercial Wetline Fishing

**DESCRIPTION:**

Commercial fishing is only permitted within the Ningaloo Marine Park in waters classified for general use only. All licensed commercial vessels (except one) are not permitted to commercially fish in any waters between Tantabiddi Well and Point Maud under a condition attached to their fishing boat licence.

There are approximately 15 active commercial vessels operating between Coral Bay and Exmouth. Other commercial vessels may fish these waters as they transit through the area from time to time. The fishery targets spanish mackerel, pink snapper, northwest snapper, spangled emperor and sweetlip emperor.

**POTENTIAL IMPACTS:**

- localised depletion of target fish stocks;
- toxicant (eg oil) inputs from commercial fishing vessels;
- damage to benthic habitats (eg corals and seagrasses) due to boat anchoring, grounding and propeller damage; and
- litter from fishing vessels (eg bait bags, fishing lines, and hooks).

**TRENDS:**

No data available

### 3.1.14 Commonwealth Western Tuna and Billfish Fishery

**DESCRIPTION:**

This fishery includes all waters within the Ningaloo Marine Park. This Fishery is classified as a Commonwealth fishery and is managed by the Australian Fisheries Management Authority (AFMA).

There are currently no fishing permits issued to Commonwealth tuna vessels to fish within the NMP.

*(Requires to be confirmed with AFMA and Environment Australia)*

**POTENTIAL IMPACTS:**

- localised depletion of target fish stocks;
- toxicant (eg oil) inputs from commercial fishing vessels;
- damage to benthic habitats (eg corals and seagrasses) due to boat anchoring, grounding and propeller damage; and
- litter from fishing vessels (eg bait bags, fishing lines, and hooks).

**TRENDS:**

No data available

### 3.1.15 Commercial netting

**DESCRIPTION:**

All waters of the Exmouth Gulf, south of a line from Point Murat to the mouth of the Ashburton River, are classified by Fisheries WA as the waters of the Exmouth Gulf Beach Seine Fishery. There are currently two licences in this fishery which is classified as a minor fishery. Fishing occurs between April and November from the shore and boats. The fishery targets, sea mullet, perth herring, sharks, whiting and yellowfin bream.

No fishing has occurred in the NMP during the past four years.

### 3.1.16 Commercial fish-trapping

**DESCRIPTION:**

There is no commercial fish-trapping in the NMP.

### 3.1.17 Commercial rock lobster fishing

**DESCRIPTION:**

There is no commercial rock lobster fishing in the NMP. Historically there was one commercial licence for taking rock lobster by hand whilst using SCUBA. This licence however was not renewed and was surrendered.

### 3.1.18 Commercial abalone fishing

**DESCRIPTION:**

There is no commercial abalone fishing in the NMP. However there is some scientific collection in the NMP.

### 3.1.19 Commercial aquaculture (non-feeding/feeding)

**DESCRIPTION:**

There are no aquaculture leases in the NMP. However there is some scientific collection of broodstock in the NMP.

### 3.1.20 Recreational rod & line fishing (shore based and boat based)

**DESCRIPTION:**

Recreational fishing within the NMP are permitted within recreation and general use zones and must comply with Fisheries WA regulations regarding daily bag limits, size limits, protected species and fish possession limits (Refer to *Ningaloo Marine Park & Exmouth Gulf: Fishing Guide, FWA*).

Recreational fishing is a popular activity within the NMP. FWA surveys during 1998/99 recorded the recreational fishing effort from boats launched from major boat ramps to be 54,000 boat hours, and 45,000 days fished per year. These figures do not include recreational fishing from charter boats (no data exists), recreational fishers fishing from the shore (refer to Appendix 7) or recreational fishers fishing from small boats launched across the beach (no data available) at areas other than the four major boat ramps.

The majority of recreational fishing use the rod and line method. The main species targeted include: spangled emperor (21% of the catch), chinaman cod (16%), blue-lined emperor (11%), sweetlip emperor (9%), and squid (9%). An additional 120 different species of fish are also caught but each of these species represent less than one percent of the catch.

**POTENTIAL IMPACTS:**

- localised depletion of target fish stocks;
- beach erosion due to vehicle and pedestrian movement;
- toxicant (eg oil) inputs from recreational fishing boats;
- damage to benthic habitats (eg corals and seagrasses) due to boat anchoring, grounding and propeller damage; and
- litter (eg bait bags, fishing line, hooks).

**TRENDS:**

Only anecdotal historic data on recreational fishing exists for the NMP. This data suggests that there has been a gradual shift amongst park visitors in recent years from fishing activities to more non-extractive activities.

### 3.1.21 Recreational netting

**DESCRIPTION:**

Recreational netting (ie set, haul and throw nets) requires a Recreational Net Fishing Licence issued by Fisheries WA. Beach netting is a traditional pastime but relatively uncommon in many areas of NMP. Only transient species (eg mullet) are targeted using set and haul nets. Net fishing can occur at the following locations for 3 hours in the morning and afternoon: Ned's camp/ Mesa, Winderabandi, Bruboodjoo, and 14 mile. Throw nets can be used in all areas of the marine park except for sanctuary zones. (Refer to *Ningaloo Marine Park & Exmouth Gulf: Fishing Guide, FWA*).

**POTENTIAL IMPACTS:**

- localised depletion of target fish stocks;
- beach erosion due to vehicle and pedestrian movement;
- damage to benthic habitats (eg corals) due to use of nets; and
- litter (eg lost nets).

**TRENDS:**

No data available.



### 3.1.22 Recreational spear fishing

<b>DESCRIPTION:</b> Spearfishing is permitted within all areas of the NMP except the waters between Tantabiddi and Winderbandi Pt, and in sanctuary zones. There are restrictions on spear fishing including the prohibition of spear fishing on SCUBA and spearing fish such as groper, tuskfish, cods, and coral trout (Refer to <i>Ningaloo Marine Park &amp; Exmouth Gulf: Fishing Guide, FWA</i> ). Spear fishing is not a common method of taking fish within the marine park. A total of 11 boats were identified as being involved in spearfishing during the 1998/99 FWA surveys at major boat ramps.
<b>POTENTIAL IMPACTS:</b> <ul style="list-style-type: none"> <li>• localised depletion of target fish stocks; and</li> <li>• damage to benthic habitats (eg corals) due to boat anchoring, grounding, propeller damage and divers.</li> </ul>
<b>TRENDS:</b> No data is available.

### 3.1.23 Recreational shell collection

<b>DESCRIPTION:</b> The collection of shells and corals (living or dead) in the NMP is prohibited, except for common species (eg oysters) which may be taken outside of sanctuary zones. (Refer to <i>Ningaloo Marine Park &amp; Exmouth Gulf: Fishing Guide, FWA</i> ). However local residents and artists collect many dead shells and sponges. Historically (prior to declaration of the NMP) shell collection was a common recreational activity in the intertidal areas of the northern regions of the park. In many cases amateur collectors collected large quantities of shells. It is commonly believed that the intertidal areas in the vicinity of Exmouth and Bundegi were completely stripped of shells and other animals.
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### 3.1.24 Recreational rock lobster fishing

<b>DESCRIPTION:</b> Recreational fishers can take Western rock lobsters and tropical rock lobsters by hand without the use of SCUBA (lobster pots prohibited) within the NMP (excluding sanctuary zones). A special fisheries bag limit applies to the marine park. (Refer to <i>Ningaloo Marine Park &amp; Exmouth Gulf: Fishing Guide, FWA</i> ).
<b>POTENTIAL IMPACTS:</b> <ul style="list-style-type: none"> <li>• localised reduction of lobster stocks;</li> <li>• beach erosion due to vehicle and pedestrian movement; and</li> <li>• damage to benthic habitats (eg corals) due to boat anchoring, grounding, propeller damage; snorkelers and extracting lobsters.</li> </ul>
<b>TRENDS:</b> No data available

### 3.1.25 Recreational crabbing

<b>DESCRIPTION:</b> Mud crabs can be taken by hand (drop nets prohibited) within the NMP (excluding sanctuary zones) and must comply with Fisheries WA regulations regarding daily bag limits and size limits (refer to <i>Ningaloo Marine Park &amp; Exmouth Gulf: Fishing Guide, FWA</i> ). Mud crabs are found at Lakeside, Mangrove Bay, Yardie Creek and southern Bills Bay.
<b>POTENTIAL IMPACTS:</b> <ul style="list-style-type: none"> <li>• localised reduction of mud crabs; and</li> <li>• damage to benthic habitats (eg corals) due to boat anchoring, grounding, propeller damage; and snorkelers.</li> </ul>
<b>TRENDS:</b> No data available

### 3.1.26 Recreational game fishing

**DESCRIPTION:**

Recreational game fishing within the NMP is permitted within the recreation and general use zones and must comply with Fisheries WA regulations regarding daily bag limits, size limits, protected species and fish possession limits (Refer to *Ningaloo Marine Park & Exmouth Gulf: Fishing Guide, FWA*).

Recreational game fishing typically targets prized fish such as marlin and sailfish but most typically catches fish such as tunas, mackerels, trevallies, wahoo, cobia and dolphin fish. Each of these species represents less than one percent of the total recreational catch. Much of the game fishing is carried out on a catch and release basis.

Game fishing is primarily carried out from larger boats capable of operating in the major passages and outside the protection of the reef in deeper waters. The majority of the larger boats operating in the NMP are charter boats, operating out of Exmouth, Bundegi, Tantabiddi, and Coral Bay.

**POTENTIAL IMPACTS:**

- localised depletion of target fish stocks; and
- litter.

**TRENDS:**

The number of commercial boats (charter boats) engaged in game fishing.

<u>Year</u>	<u>Exmouth</u>	<u>Bundegi</u>	<u>Tantabiddi</u>	<u>Coral Bay</u>
19xx	Data not available	Data not available	Data not available	Data not available

The number of recreational boats engaged in game fishing.

<u>Year</u>	<u>Exmouth</u>	<u>Bundegi</u>	<u>Tantabiddi</u>	<u>Coral Bay</u>
19xx	Data not available	Data not available	Data not available	Data not available

### 3.1.27 Powerboats

<b>DESCRIPTION:</b>				
Power boat usage within the NMP can be divided into four distinct user groups, which include: 1) commercial (eg charter boats), 2) privately owned recreational boats and 3) hire boats. The majority of boats operate in four main areas including Exmouth marina, Bundegi, Tantabiddi and Coral Bay.				
<b>Commercial boats</b> – tend to be the largest vessels operating in the marine park, between five and 25 metres in length. Commercial boats operate out of Exmouth marina, Bundegi, Tantabiddi and Coral Bay. Charter boats carry out a number of activities including snorkelling, SCUBA, fishing (including game fishing), wildlife viewing (eg whales, dugongs, turtles) and wildlife interactions (eg. whale sharks, and manta rays. Commercial fishing boats also operate in the vicinity of the marine park (eg. trawlers, and wetliners). Refer to Appendix 5 for a list of commercial operators (excluding commercial fishing boats) that operate within the marine park				
<b>Recreational boat</b> – usage in the marine park is predominantly small boats (eg dinghy) which operate within the sheltered waters of the lagoon. Smaller boats do not always require the boat ramps and can be launched at beach launch sites. Therefore small boat use is common throughout the marine park, especially in the vicinity of camping areas. Larger boats can only be launched from the boat ramps (Exmouth Marina, Bundegi, Tantabiddi and Coral Bay). These boats are capable of operating outside the lagoon. Larger boats also use the marine park but can only access the coast at Tantabiddi, Bundegi, and Exmouth, where the water depth and suitable navigation passages exist.  FWA surveys conducted in 1998/99 determined that the number of fishing boats launched from major boat ramps to be approximately 15,000 per year, and spending 54,000 hours fishing per year.				
<b>Hire boats</b> – A number of commercial operators based in Exmouth and Coral Bay hire out boats to visitors. Hire boats are used throughout the marine park.				
<b>POTENTIAL IMPACTS:</b>				
<ul style="list-style-type: none"><li>• toxicant inputs from accidental spillage of fuels and oil from boat;</li><li>• nutrient and pathogen inputs from sewage discharged from boats;</li><li>• damage to benthic habitats (eg corals) due to boat anchoring, moorings, grounding, propeller damage; and scouring;</li><li>• litter;</li><li>• physical disturbance to wildlife (eg displacement, injury and death); and</li><li>• conflict with other park users (eg Boat use conflicts with swimmers).</li></ul>				
<b>TRENDS:</b>				
Total number of CALM licenced commercial operators operating within the marine park				
<b><u>Year</u></b>	<b><u>Commercial boats (Charter)</u></b>	<b><u>Commercial boats (professional fishing)</u></b>	<b><u>Recreational boats</u></b>	
19xx	Data not available	Data not available	Data not available	
The number of CALM licenced commercial boats operating out of.				
<b><u>Year</u></b>	<b><u>Exmouth Harbour</u></b>	<b><u>Bundegi</u></b>	<b><u>Tantabiddi</u></b>	<b><u>Coral Bay</u></b>
1995	6	Data not available	Data not available	2 resident 2 seasonal
The number of recreational boats operating out of.				
<b><u>Year</u></b>	<b><u>Exmouth Harbour</u></b>	<b><u>Bundegi</u></b>	<b><u>Tantabiddi</u></b>	<b><u>Coral Bay</u></b>
19xx	Data not available	Data not available	Data not available	Data not available
The number of Hire boats operators at.				
<b><u>Year</u></b>	<b><u>Exmouth Harbour</u></b>	<b><u>Bundegi</u></b>	<b><u>Tantabiddi</u></b>	<b><u>Coral Bay</u></b>
1999	5	5	5	2-3

### 3.1.28 Jet skiing

<b>DESCRIPTION:</b> Jet ski use within the NMP has been limited. In the late 1990's a commercial operator trialed a jet ski hire business in the Coral Bay area. The trial resulted in protests from visitors and other operators in Coral Bay, due to the incompatibility of this activity in the area and the venture was abandoned. There is a licensed operator at Bundegi that operates jet skis. The use of privately owned jet skis is increasing.
<b>POTENTIAL IMPACTS:</b> <ul style="list-style-type: none"> <li>• toxicant inputs from accidental spillage of fuels and oil from jet skis;</li> <li>• damage to benthic habitats (eg corals) due to jet ski grounding, and jet scouring;</li> <li>• litter from vessels;</li> <li>• physical disturbance to wildlife (eg displacement, injury and death); and</li> <li>• conflict with other park users (eg jet ski use conflicts with swimmers).</li> </ul>
<b>TRENDS:</b> No data available

### 3.1.29 Kayaks/canoes

<b>DESCRIPTION:</b> Kayak/canoe use in the marine park can be divided into three main groups that include: 1)private users kayaks/canoes, 2) commercial kayak/canoe tours and 3) kayak/canoe rental. Kayaks/canoes are used throughout the NMP. There are currently three CALM licenced operators (sea kayaks) within the marine park..				
<b>POTENTIAL IMPACTS:</b> <ul style="list-style-type: none"><li>• damage to benthic habitats (eg corals) due to grounding, and paddle contact.</li></ul>				
<b>TRENDS:</b> The number of operators renting kayaks/canoes				
<u>Year</u>	<u>Exmouth</u>		<u>Coral Bay</u>	
	<u>No. Operators</u>	<u>No. kayaks/canoes</u>	<u>No. Operators</u>	<u>No. kayaks/canoes</u>
1999	3	15	1	3

### 3.1.30 Wind surfers

<b>DESCRIPTION:</b> Recreational wind surfing is becoming a more popular activity in the NMP. The main wind surfing location is near Jurabi Pt. at a place known as "Grave Yard". Approximately six wind surfers visit this area annually.
<b>POTENTIAL IMPACTS:</b> <ul style="list-style-type: none"> <li>• Damage to benthic habitats (eg corals) due to board and mast contact.</li> </ul>
<b>TRENDS:</b> No data available

### 3.1.31 SCUBA diving

<b>DESCRIPTION:</b>				
SCUBA diving is a popular activity for visitors to the marine park, however the amount of revenue generated by SCUBA diving activities is not known. Visitors can go SCUBA diving privately (shore/boat-based) or through one of the many commercial dive operators. Opportunities for SCUBA diving exist along the entire length of the NMP, however the majority of dive sites are concentrated in the vicinity of Bundegi, Tantabiddi and Coral Bay. Commercial dive operators are based primarily at Exmouth (18 operators) and also at Coral Bay (5 operators) and a further ~10 other dive shops from throughout the state visit the marine park.				
<b>EXMOUTH AREA</b>				
<b>Navy Pier</b> – is a popular commercial dive site that is rated as one of the top ten best dives in Australia, with an estimated 6,000 divers annually. The site's attraction is the abundance of large fish, and accessibility. The Department of Defence issues licences to commercial dive operators to conduct dive activities at the pier. Dives can only occur on the slack water and are carried out during the day and night.				
<b>The Sponge Gardens</b> – dive site is located seaward of the navy pier. The dive is classified as a deep dive at 25m+ and is a drift dive. Exmouth dive operators typically dive this site as part of their training course for advanced divers. The benthic habitat is dominated by sponges.				
<b>The Labyrinth</b> – is a popular commercial dive site that is easily accessible by boat from Exmouth. The site is popular due to the abundance of fish and especially large fish.				
<b>The Blizzard</b> – is a popular commercial dive site that is easily accessible by boat from Exmouth. The site is popular due to the abundance of fish and especially large fish.				
<b>CORAL BAY AREA</b>				
<b>The Lagoon</b> – is a popular commercial and recreational dive site located north of Coral Bay that is accessible by land or boat.				
<b>Lotties</b> – is a popular commercial dive site located south of Coral Bay. The site is located just outside of the sanctuary zone. The site is popular due to the abundance and diversity of fish.				
<b>Ashos</b> – is a popular commercial dive site located in the vicinity of Coral Bay and is easily accessed by boat. The site is located within a sanctuary zone. The site is popular due to its abundance and diversity of fish and corals				
<b>POTENTIAL IMPACTS:</b>				
<ul style="list-style-type: none"> <li>• toxicant inputs from accidental spillage of fuels and oil from boat;</li> <li>• nutrient and pathogen inputs from sewage discharged from boats;</li> <li>• damage to benthic habitats (eg corals) due to boat anchoring, moorings, grounding, propeller damage; scouring and divers;</li> <li>• litter from vessels;</li> <li>• physical disturbance to wildlife (eg displacement, injury and death); and</li> <li>• conflict with other park users (eg recreational fishers).</li> </ul>				
<b>TRENDS:</b>				
The number of commercial dive operators and customers.				
<b>Year</b>	<b>Exmouth</b>		<b>Coral Bay</b>	
	<b>No. Operators</b>	<b>No. Divers</b>	<b>No. Operators</b>	<b>No. Divers</b>
1989	1 (1 staff)	Operated 8 hrs/week	1	Data not available
1999	18	Data not available	5	Data not available
During 1999 a further 10 dive shops visit the NMP.				

### 3.1.32 Snorkelling

<b>DESCRIPTION:</b>				
Snorkelling is a popular activity amongst visitors to the NMP. There are opportunities for snorkelling along the entire length of the NMP. However the majority of snorkelling sites are concentrated around popular day use areas such as Bundegi (between jetty and boat ramp), Tantabiddi (glass bottom boat operation area), Mesa (proposed glass bottom boat operation area), Turquoise Bay, and Coral Bay. There are two categories of snorkelers including 1) visitors snorkelling privately (shore and/or boat-based) and 2) visitors snorkelling through one of the commercial operators operating in the marine park (shore and/or boat-based). Many commercial operators offer snorkelling as part of their tour, eg wild life interaction (whale sharks) and wildlife viewing (glass bottom boats) (Refer to section 3.1.32). Currently commercial operators are based primarily at Exmouth and Coral Bay. The main snorkelling locations in the marine park are listed below. Refer to Appendix 5 for a list of operators (Charter and Safari)				
<b>Pilgramunna Ledges</b> – site has one snorkelling trail that is recommended in the CALM publication.				
<b>Turquoise Bay</b> – is a popular snorkelling site for park visitors. Commercial operators (boat and land-based) use this area. The site has two snorkel trails (Turquoise Bay brain coral and Turquoise Bay southern drift) recommended in the CALM publication.				
<b>Lakeside Bombies</b> – site has a snorkelling trail that is recommended in the CALM publication.				
<b>Oyster Stacks</b> – site has two snorkelling trails that are recommended in the CALM publication.				
<b>Coral Bay</b> – is one of the most popular snorkelling sites in the marine park. The area has two snorkelling trails (Paradise Beach and Coral Bay foreshore) that are highlighted in the CALM publication.				
<b>POTENTIAL IMPACTS:</b>				
<ul style="list-style-type: none"> <li>• toxicant inputs from accidental spillage of fuels and oil from boat;</li> <li>• nutrient and pathogen inputs from sewage discharged from boats;</li> <li>• damage to benthic habitats (eg corals) due to boat anchoring, moorings, grounding, propeller damage; scouring and snorkelers;</li> <li>• litter from vessels;</li> <li>• beach erosion due to vehicle and pedestrian movement;</li> <li>• physical disturbance to wildlife (eg displacement, injury and death);</li> <li>• safety issues between vessels and snorkelers; and</li> <li>• conflict with other park users (eg recreational fishers).</li> </ul>				
<b>TRENDS:</b>				
The number of CALM licenced charter boats offering snorkelling and the number of customers.				
<b>Year</b>	<b>Exmouth</b>		<b>Coral Bay</b>	
	<u>No. Operators</u>	<u>No. snorkelers</u>	<u>No. Operators</u>	<u>No. snorkelers</u>
19xx	Data not available	Data not available	Data not available	Data not available
The number of CALM licenced land-based operators (Safari sighting seeing) offering snorkelling and the number of customers.				
<b>Year</b>	<b>Exmouth</b>		<b>Coral Bay</b>	
	<u>No. Operators</u>	<u>No. snorkelers</u>	<u>No. Operators</u>	<u>No. snorkelers</u>
1999	16 <sup>a</sup>	Data not available	6	
<sup>a</sup> “outside” operators licenced to snorkel in the NMP.				

### 3.1.33 Wildlife interaction

<p><b>DESCRIPTION:</b></p> <p>In the NMP there are opportunities for visitors to view and interact with whale sharks, corals, fish, whales, turtles, manta rays and dugongs. These opportunities are primarily provided by CALM licenced commercial operators such as ‘glass bottom’ boats for viewing corals and fish and “charter” boats for the others (see below). Commercial operators engaged in these activities are licenced and managed by CALM. Refer to Appendix 5 for a list of CALM licenced commercial operators.</p>
<p><b>Coral</b>– commercial operators run “glass-bottom” boats that provide visitors with the opportunity to view corals/fish. A number of operators also provide the opportunity to snorkel (detailed in section 3.1.30). Some operators are also licensed to feed fish. An operator at Coral Bay also hires “glass bottom” dinghy. Coral viewing boats operate from Bundegi (prior to Cyclone Vance), Tantabiddi and Coral Bay. Operators are reliant on areas that support a healthy, high diversity and abundance of corals and fish species.</p>
<p><b>Humpback whales</b> – are commonly sighted between the months of June and November as they migrate along the Ningaloo Coast. CALM licenced commercial operators run whale watching cruises out of Exmouth, Bundegi, Tantabiddi and Coral Bay. Marine mammals are protected under Wildlife Conservation (Close Season for Marine Mammals) Notice 1998 (<i>Wildlife Conservation Act 1950</i>). These activities must be carried out in accordance with the notice. There were 15 Marine Mammal Interaction licences issued by CALM in 1998-1999. Many Exmouth locals use their private vessels to view Humpback whales in Exmouth Gulf.</p>
<p><b>Turtles</b> –commonly occur in the waters of the NMP. During the breeding season (summer) turtles nest primarily north of Jurabi Point. The breeding season provides the opportunity for visitors to view turtle nesting at night. Visitors can view nesting turtles either on their own or as part of tours offered by CALM licenced Safari sight seeing operators. CALM surveys of nesting turtles and human interactions in January 1995 recorded 483 people visiting the main turtle nesting area at Jurabi over 14 nights. It was estimated that approximately 1000 green turtles nested during the 1995 breeding season (Unpublished CALM Data). There are currently no specific licences to cover these activities and there is a need to develop a code of conduct.</p>
<p><b>Dugong</b> – populations within the NMP are small and scattered. There is a small population that occurs seasonally in the Coral Bay area. No charter boat operators offer exclusive dugong viewing cruises, however they do advertise they could be sighted during their cruises.</p>
<p><b>Whale Sharks</b> – occur in the NMP between the months of April and June. Whale shark interaction (swimming with whale sharks) is one of the largest and most lucrative tourism industries in the NMP. In 1995 it was estimated that 15.7% of the mean expenditure (\$3,189) of a visitor is on whale shark tours. CALM licenced commercial operators work out of Tantabiddi and Coral Bay. Whale Shark interactions mainly occur between Pt Murat and Yardie Creek in the north and Coral Bay and Pt Cloates in the south. Light aircraft are used to locate the whale sharks. Visitors can interact with whale sharks privately. Whale sharks are protected under Wildlife Conservation (Close Season for Whale Sharks) Notice 1996 (<i>Wildlife Conservation Act 1950</i>). Under this notice only authorised CALM licenced operators can interact with whale sharks. All activities must be carried out in accordance with the notice.</p>
<p><b>Manta rays</b> –occur along the Ningaloo reef throughout the year, typically frequenting specific feeding areas. CALM licence commercial operators provide visitors with the opportunity to swim/snorkel with manta rays. Visitors can also interact with manta rays privately. There are currently no specific licences to cover these activities and there is a need to develop a code of conduct.</p>
<p><b>Fish feeding</b> – occurs in CALM designated areas within the vicinity of Coral Bay. There are three commercial operators that are licensed by CALM to carry out fish feeding. Only authorised CALM licenced operators can engage in fishing feeding. These activities must be carried out in accordance with the CALM fish feeding guidelines.</p>
<p><b>POTENTIAL IMPACTS:</b></p> <ul style="list-style-type: none"> <li>• toxicant inputs from accidental spillage of fuels and oil from boat;</li> <li>• nutrient and pathogen inputs from sewage discharged from boats and fish feeding;</li> <li>• damage to benthic habitats (eg corals) due to boat anchoring, moorings, grounding, propeller damage; scouring and snorkelers;</li> <li>• beach erosion due to vehicle and pedestrian movement;</li> <li>• litter;</li> <li>• physical disturbance to wildlife (eg displacement, injury and death); and</li> <li>• alteration of natural fish behaviour (increased aggression) due to feeding fish feeding.</li> </ul>

<b>TRENDS:</b>						
<b>Coral Viewing</b> - The number of boats operating and number of passengers.						
<b>Year</b>	<b>Bundegi</b>		<b>Tantabiddi</b>		<b>Coral Bay</b>	
	<b>No. Boats</b>	<b>Passengers</b>	<b>No. Boats</b>	<b>Passengers</b>	<b>No. Boats</b>	<b>Passengers</b>
19xx	Data not available	Data not available	Data not available	Data not available	Data not available	Data not available
<b>Whale Watching</b> – The number of boats operating and number of passengers.						
<b>Year</b>	<b>Bundegi</b>		<b>Tantabiddi</b>		<b>Coral Bay</b>	
	<b>No. Boats</b>	<b>Passengers</b>	<b>No. Boats</b>	<b>Passengers</b>	<b>No. Boats</b>	<b>Passengers</b>
19xx	Data not available	Data not available	Data not available	Data not available	Data not available	Data not available
<b>Turtles</b> – The number of people and vehicles observed at night between 2 <sup>nd</sup> – 16 <sup>th</sup> January between Point Murat and Tantabiddi boat ramp. (CALM data)						
<b>Year</b>			<b>Tantabiddi</b>		<b>Coral Bay</b>	
	<b>No. vehicles</b>	<b>Visitors</b>	<b>No. Boats</b>	<b>Passengers</b>	<b>No. Boats</b>	<b>Passengers</b>
1995	146	483	Data not available	Data not available	Data not available	Data not available
<b>Whale shark interactions</b> - The number of licences, passengers, and vessels.						
<b>Year</b>	<b>No. licences</b>	<b>No. Passengers</b>	<b>Mean no. of vessels per day</b>		<b>Total no. vessel days</b>	
1993	16 <sup>a</sup>	1000 <sup>b</sup>	3.5 <sup>c</sup>		~200 <sup>c</sup>	
1994	15 <sup>a</sup>	1799 <sup>b</sup>	~4 <sup>c</sup>		~235 <sup>c</sup>	
1995	15 (13 North/2 South) <sup>a</sup>	2500 <sup>b</sup>	~4.1 <sup>c</sup>		~235 <sup>c</sup>	
1996	14 (13 North/2 South) <sup>a</sup>	2829 <sup>b</sup>	~4.6 <sup>c</sup>		~255 <sup>c</sup>	
1999	15 (12 Operate)12 operate	Data not available	Data not available		Data not available	
<sup>a</sup> data from Whale Shark Interaction Management Plan 1997						
<sup>b</sup> data from Whale Shark Interaction Management Plan 1997 (figures based on CALM records and log book returns provided by commercial operators, represent cumulative totals of paying passengers, rather than the number of different individuals, as a number of people will have participated on more than one day).						
<sup>c</sup> data from Whale Shark Interaction Management Plan 1997 (figures estimated from graph of CALM records and log book returns provided by commercial operators).						
<b>Whale shark interactions</b> - The number of whale shark encounters and estimate value of whale shark tourism.						
<b>Year</b>	<b>No. of whale shark encounters</b>	<b>Estimated value of whale shark tourism in WA (\$ million per annum)</b>				
1993	348 <sup>a</sup>	Data not available				
1994	736 <sup>a</sup>	Data not available				
1995	489 <sup>a</sup>	6.4 <sup>b</sup>				
1996	921 <sup>a</sup>	7.3 <sup>b</sup>				
1997	Data not available	8.4 <sup>b</sup>				
1998	Data not available	9.7 <sup>b</sup>				
1999	Data not available	11.1 <sup>b</sup>				
<sup>a</sup> data from Whale Shark Interaction Management Plan 1997 (figures obtained from CALM records and log book returns provided by commercial operators, represent the total number of encounters and do not take into account multiple encounters with the same shark by different vessels, either on the same day or on different days).						
<sup>b</sup> data from Whale Shark Interaction Management Plan 1997 (estimates are based on a 15% annual rate of growth, a mean expenditure per participant of A\$3,189 and an overseas visitor figure of 70%).						
<b>Manta ray interactions</b> - The number of boats operating and number of passengers.						
<b>Year</b>	<b>Bundegi</b>		<b>Tantabiddi</b>		<b>Coral Bay</b>	
	<b>No. Boats</b>	<b>Passengers</b>	<b>No. Boats</b>	<b>Passengers</b>	<b>No. Boats</b>	<b>Passengers</b>
1999	15	Data not available	Data not available	Data not available	4	Data not available
<b>Fish Feeding</b> - The number of operators licensed to fish feed. Are there figures						
<b>Year</b>	<b>Bundegi</b>		<b>Coral Bay</b>			
	<b>No. Boats</b>	<b>Passengers</b>	<b>No. Boats</b>	<b>Passengers</b>		
1999	1	Data not available	2	Data not available		



### 3.1.34 Surfing

<b>DESCRIPTION:</b>
There are number of popular surfing sites along the Ningaloo coastline. The main sites are detailed below.
<b>EXMOUTH AREA</b>
<i>Muiron Islands</i> – this surfing site is accessible by boat
<i>Surfers Beach</i> – this surfing site is accessible by 2WD vehicle
<i>Vlamingh Head</i> – this surfing site is accessible by 2WD vehicle
<b>CAPE RANGE NATIONAL PARK</b>
<i>Yardie Creek</i> – this surfing site is accessible by 2WD vehicle and requires a boat to access surf breaks
<i>I K Camp</i> – this surfing site is accessible by 4WD vehicles only and requires a boat to access surf breaks
<b>GNARALOO STATION</b>
<i>Three Mile</i> – is located to the south of the Gnarraloo Homestead and is one of the most popular surfing location in the vicinity of the marine park.
<b>POTENTIAL IMPACTS:</b>
<ul style="list-style-type: none"> <li>• beach and dune erosion due to vehicle and pedestrian movement;</li> <li>• litter;</li> </ul>
<b>TRENDS:</b>
No data available

### 3.1.35 Reef Walking

<b>DESCRIPTION:</b>
During periods of low tide some locations along the Ningaloo reef become exposed. Reef walking is a popular pastime of visitors to the marine park, however there is no data available on the popularity or locations of this activity. It can be assumed that reef walking is most likely to be concentrated in the vicinity of coastal access points (eg day use and camping areas) and in locations where the exposed reef is easily accessible from the shore.
<b>POTENTIAL IMPACTS:</b>
<ul style="list-style-type: none"> <li>• damage to exposed benthic habitats (eg corals) due to trampling; and</li> <li>• litter.</li> </ul>
<b>TRENDS:</b>
No data is available

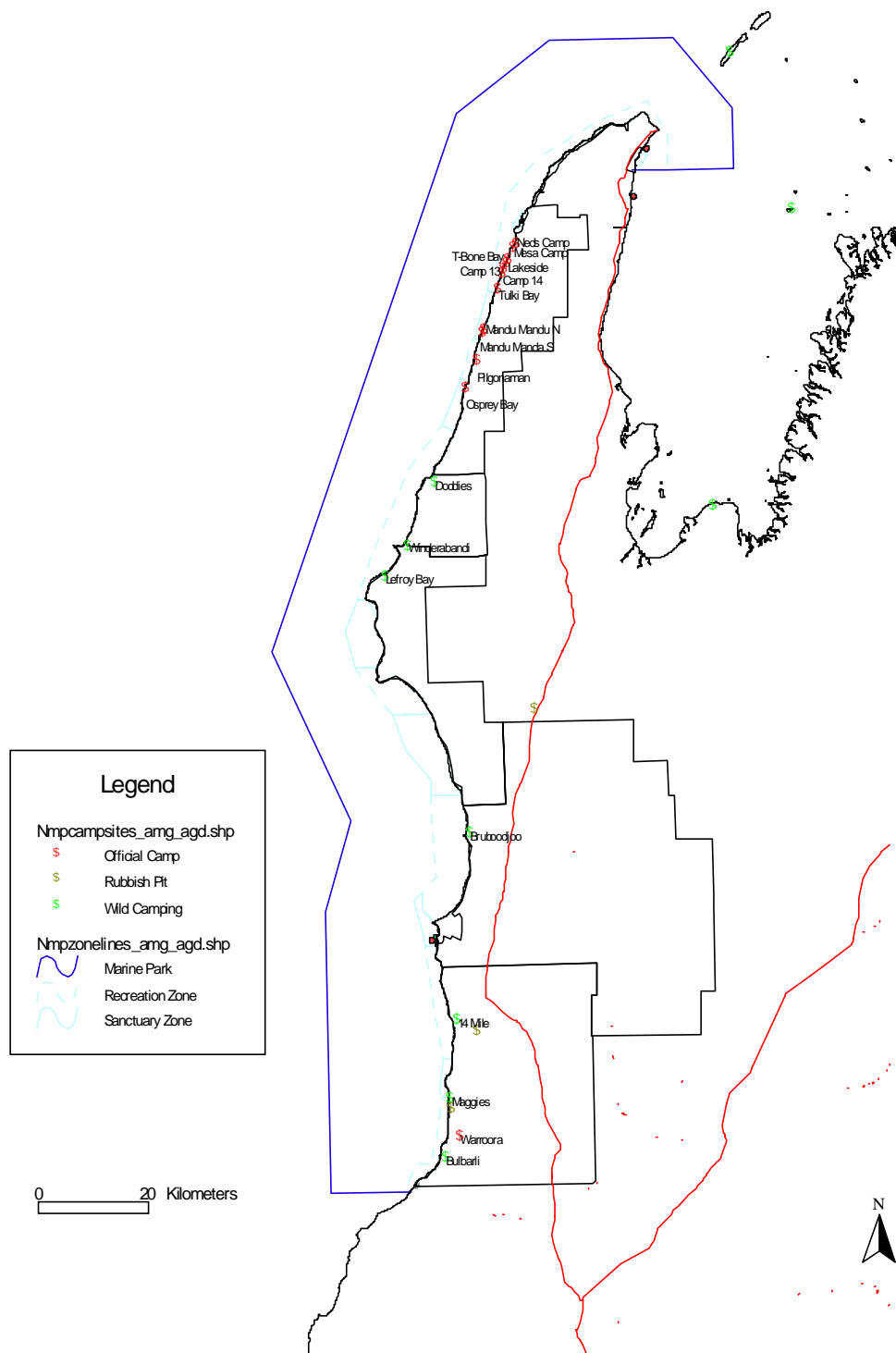
### **3.2 SPATIAL EXTENT OF HUMAN ACTIVITIES**

Table 2 is A summary of the spatial data available on different human activities. The list human uses from Appendix 1 is used as a base line. Any limitations of the available data are briefly described.

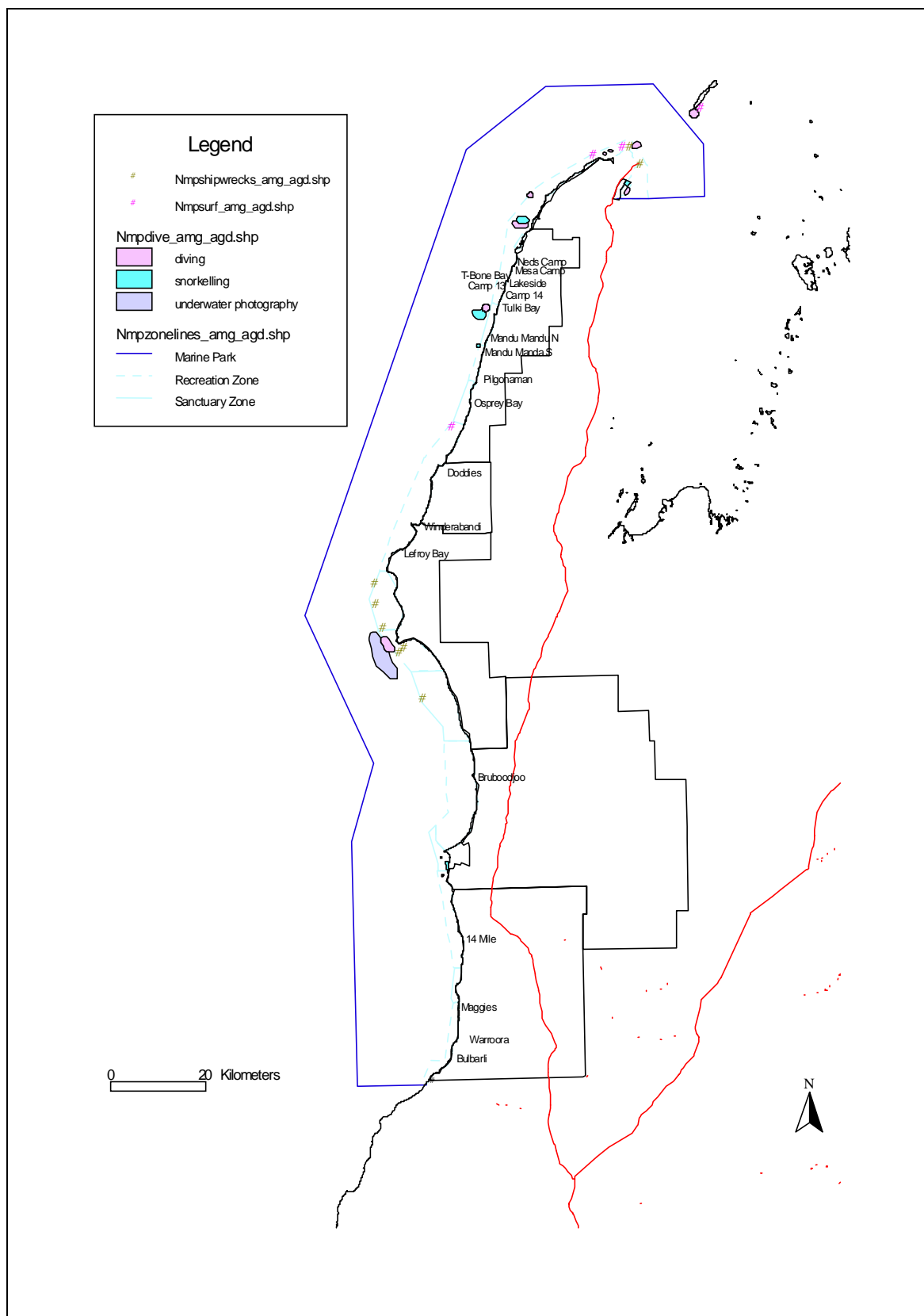
Figures (2 - 10) are maps showing the spatial extent of each human activity within the study area.

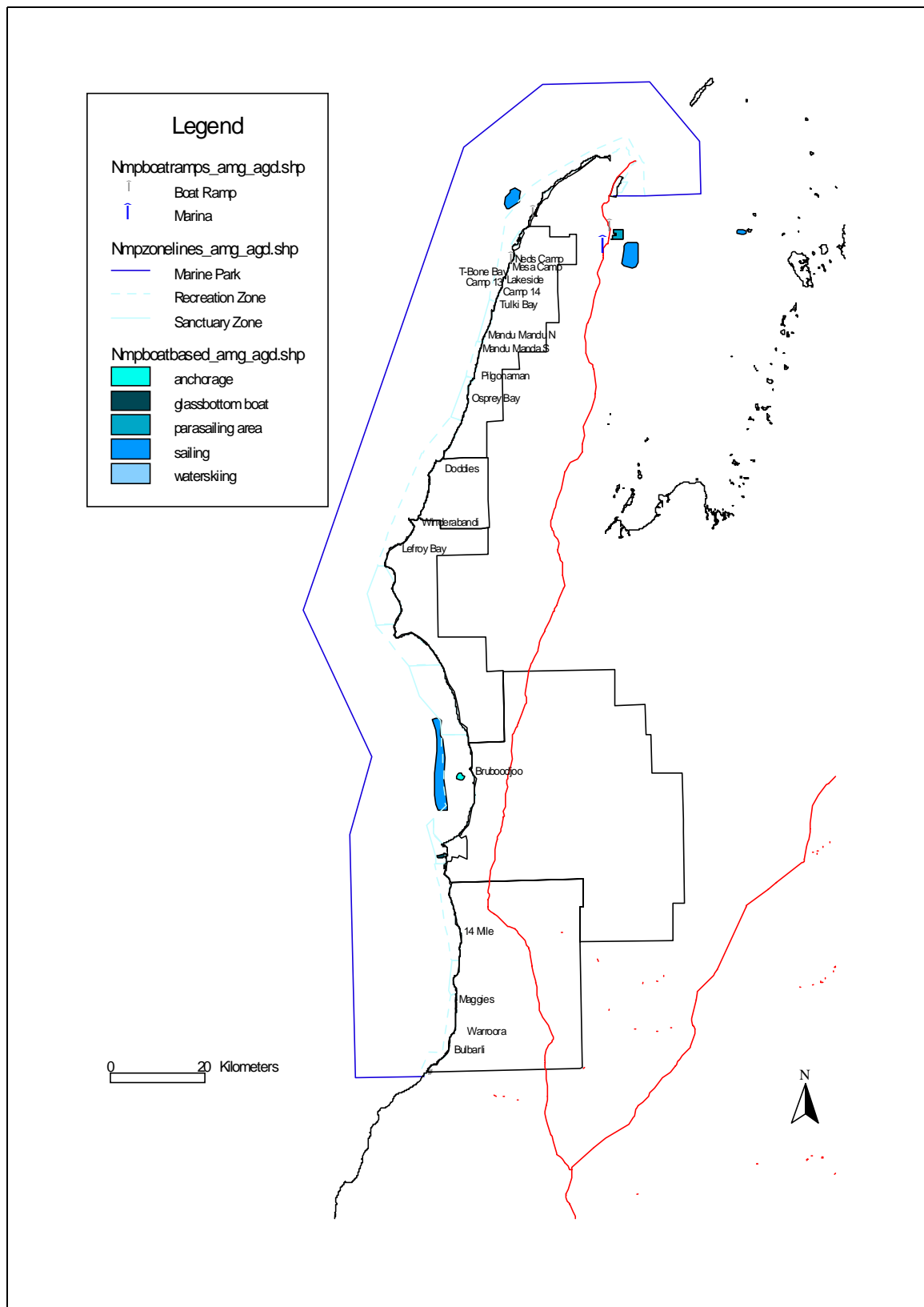
**Table 2. Spatial data availability for human usage in Ningaloo Marine Park**

Human Usage Dataset	Data Availability	Human Usage Dataset	Data Availability	Human Usage Dataset	Data Availability
<b>TENURE</b>		<b>INDUSTRIAL DEVELOPMENT</b>		• Spearfishing	Yes
Territorial Water Limits	Yes	Shipping	Yes (not complete)	• Shell collecting	Yes
Existing		Oil/Gas Exploration	Oil/Gas wells	• Rock lobster	No
Leasehold/Management		Oil/Gas Production			
• Conservation Reserves	Yes	Mining	No	• Crabbing	No
• Other Reserves	Yes	<b>MARITIME INFRASTRUCTURE</b>		• Gamefishing	No
• Private/Leasehold/VCL	Cadastre	Anchorage	Anchorage only Coral Bay	• Bait collection	No
Proposed Conservation Area	Southern Extension Study Area	Shipping Lanes	Not official shipping lanes	• Non-extractive	
Marine Park Zoning	Yes	Port facilities	DOT Navigation Charts (cartographic files not GIS)	• Water skiing	Yes
Petroleum Leases	Yes	Marina facilities	No	• Jetskiing	Yes
Mining Leases	No	Moorings	No	• Parasailing	Yes
Aboriginal Claim Boundaries	No	Groynes	Yes	• Sailing	Yes
Historical		Boat ramps	No	• Powerboats	No
• Australian Heritage Commission Sites	No	Navigation Markers	No	• Hovercraft	No
• Aboriginal Sacred and Ceremonial Sites	Yes (the sites are not identified exactly but within 1 or 10km grid squares depending on their sensitivity.)	Fish Attracting Devices		• Float planes	No
• Heritage/Historical Sites	No	<b>COMMERCIAL FISHING</b>		• Paddle boats	No
• Shipwrecks	Yes	Trawling	No	• Kayaks/canoes	No
<b>URBAN &amp; TOURISM DEVELOPMENT</b>		Wetline fishing	No	• Windsurfing	No
Urban Development	Yes (modified from cadastre)	Netting	No	• Beach walking	Yes
-Existing	No	Fish-trapping	No	• Swimming	Yes
Proposed		Rock lobster	No	• Reef walking	No
Roads	Roads & topographic data	Abalone	No	• Beach launching	No
Airstrips	Yes	Aquaculture (non-feeding/feeding)	Aquaculture licenses (none in NMP, some in Exmouth Gulf)	• Surfing areas	Yes
Helipads	N/A	<b>RECREATION</b>		• SCUBA diving	Yes
Resort Development		Fishing		• Snorkelling	Yes
• Existing	No	• Rod & line	Yes	• Wildlife interactions	Interaction/viewing not differentiated, but different species noted
• Proposed	No	• Netting	No	• Wildlife viewing	No
Campsites	Yes				



**Figure 2. Campsites in Ningaloo Marine Park**





**Figure 4. Boat based activities in Ningaloo Marine Park**

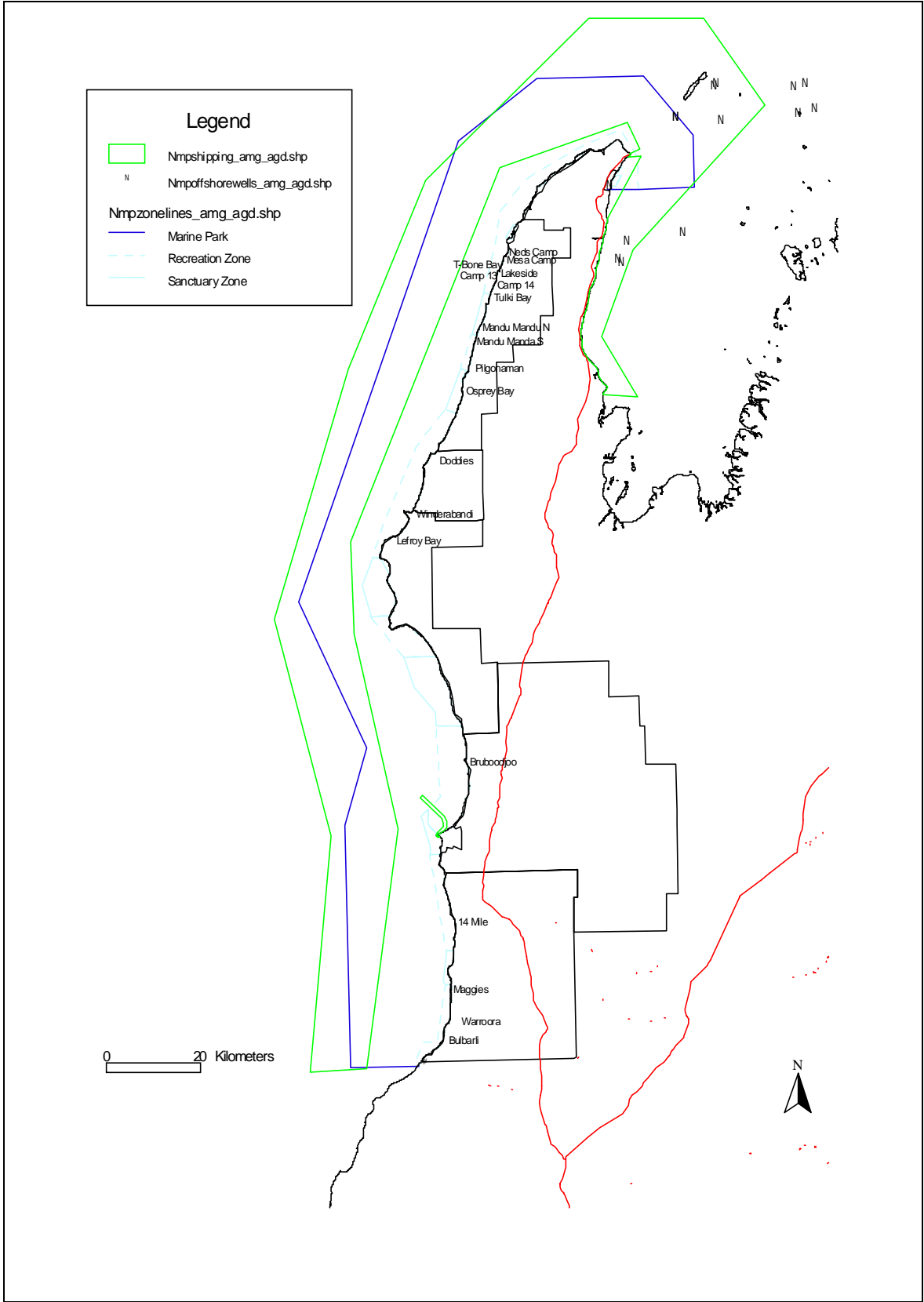
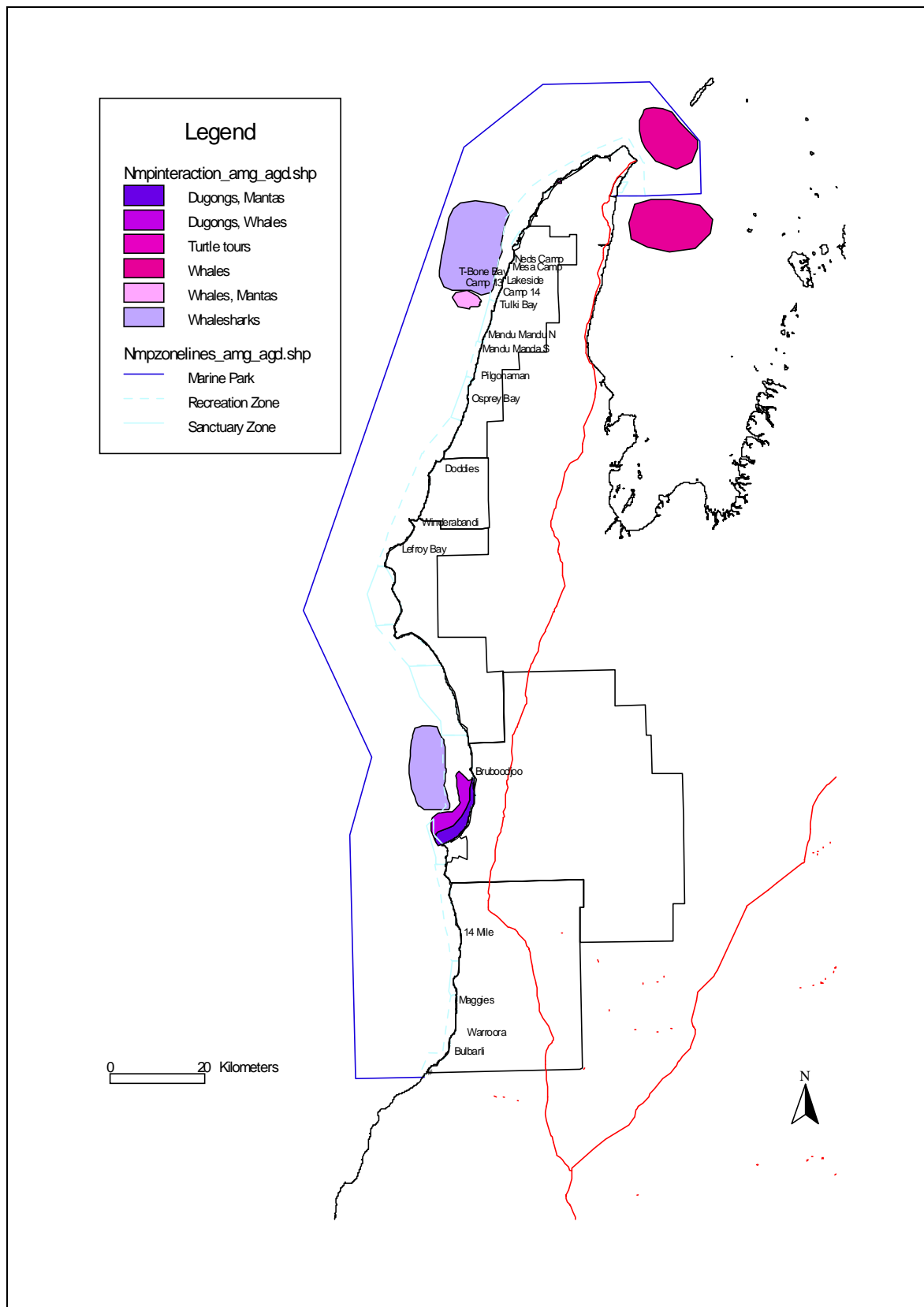
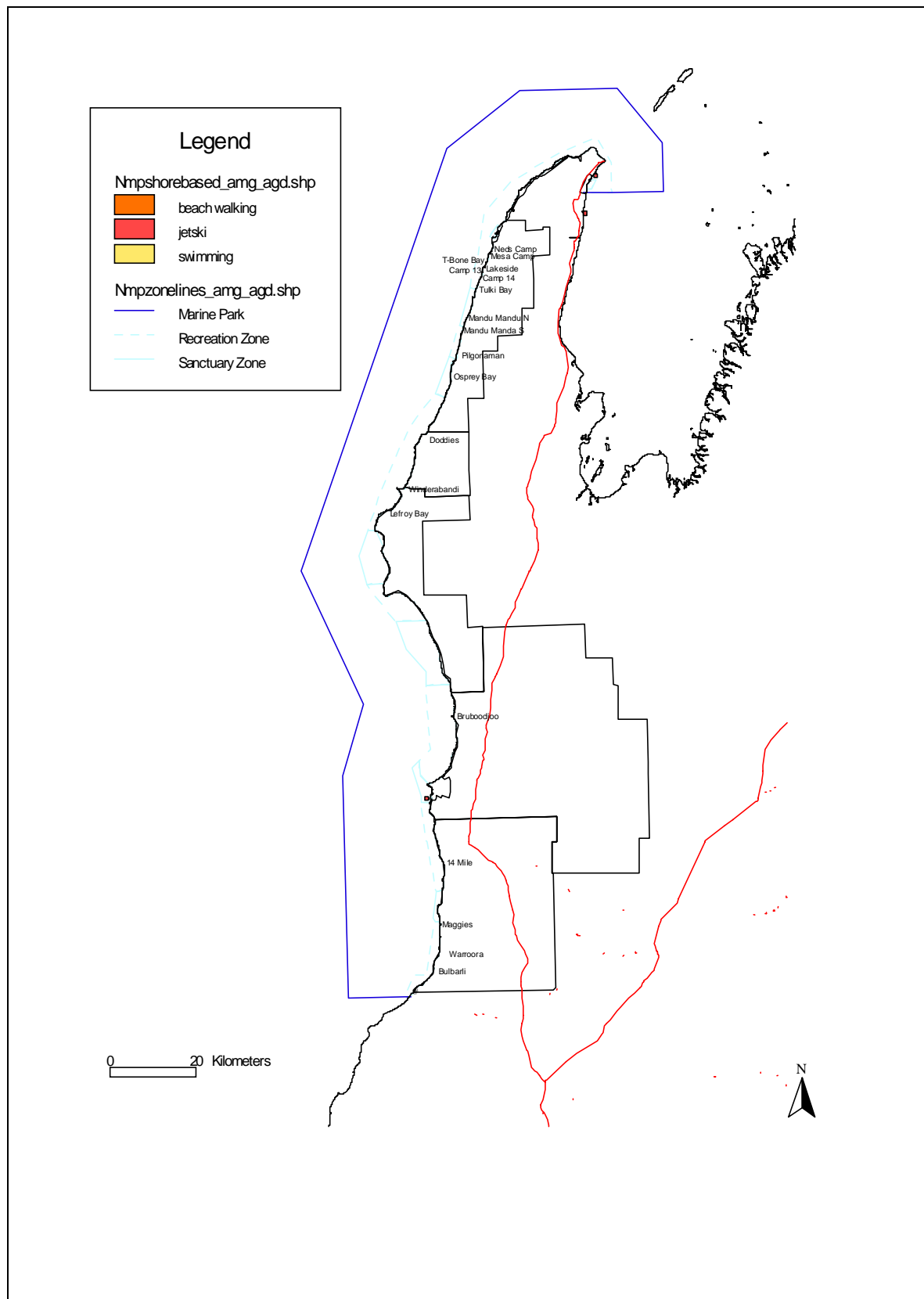


Figure 5. Industrial activities in Ningaloo Marine Park

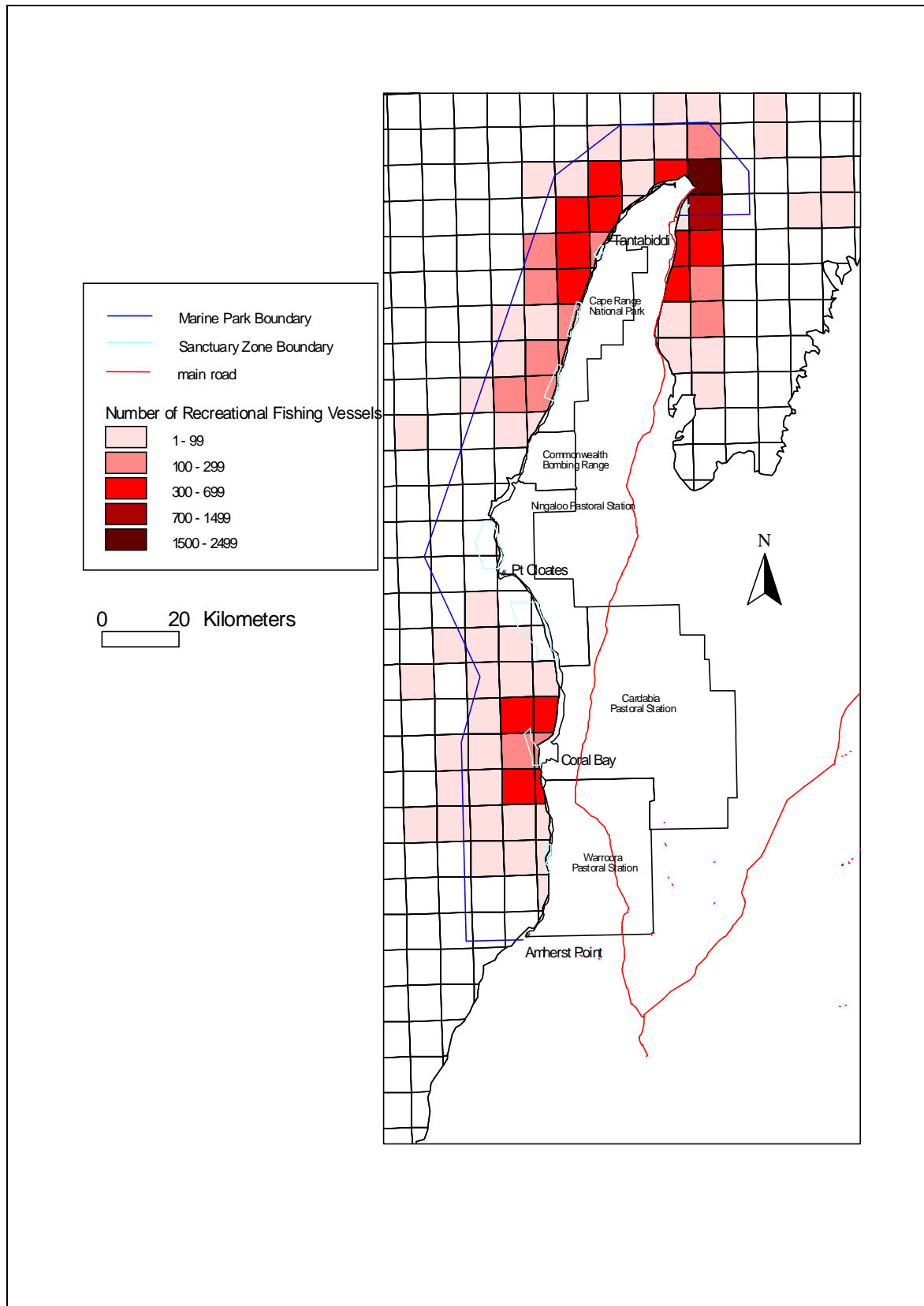


**Figure 6 Wildlife Interaction and Wildlife Viewing in Ningaloo Marine Park**





**Figure 7. Shorebased Activities in Ningaloo Marine Park**





**Figure 8. Number of Recreational Fishing Vessels in Ningaloo Marine Park (Data supplied by Fisheries Western Australia)**





### **3.3 SEASONAL COMPONENT OF HUMAN ACTIVITIES**

The peak season is around July for most tourism and recreational activities, with the exception of wildlife viewing and interaction. The wildlife interaction depends on the season for each species, with turtle nesting happening from November to January. The seasonal variations for all activities are set out in Table 3.

**Table 3 Seasonal Description of human activities**Low Season Shoulder Season Peak Season 

HUMAN ACTIVITY	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
<b>Urban &amp; tourism development</b>												
resort visitors												
Camping												
<b>Industrial development</b>												
Shipping												
Oil and gas exploration												
<b>EXTRACTION OF LIVING RESOURCES</b>												
<b>Commercial fishing</b>												
trawling												
wetline fishing												
<b>Recreational fishing</b>												
rod & line fishing												
netting												
spearfishing												
rock lobster												
crabbing												
game fishing												
<b>NON-EXTRACTIVE</b>												
powerboats												
jet skiing												
sailing vessels												
kayaks/canoes												
windsurfing												
SCUBA diving												
snorkelling												
wildlife viewing - corals												
wildlife viewing - dugongs												
wildlife viewing - Whale watching												
wildlife viewing - turtle nesting												
wildlife interaction - whale sharks												
wildlife interaction - manta rays												
wildlife interaction - fish feeding												
surfing												
reef walking												

## 4 REFERENCES

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- Williams, R and Wood, D (2000). Tourism activities on the Exmouth peninsula and the Ningaloo Marine Park from 1991 to 2000: A review of tourism activity survey data in the Exmouth, cape Range National Park and Ningaloo Marine Park Areas 1991-2000. Curtin University of Technology. Unpublished Report.

**APPENDIX 1: METADATA**

Required Dataset	Theme	Filename	Source	Source Filename	Completeness
<b>Tenure</b>					
Territorial Water Limits	Territorial Water Limits	Nmpcoast_amg_agd.shp	AMBIS	Ambis.shp	Complete
EXISTING LEASEHOLD/MANAGEMENT					
Conservation Reserves	Conservation Reserves	Nmpcalmres_amg_agd.shp	CALM	Clw498ll_m.shp	Complete
Other Reserves	Other Reserves	Ningocres_amg_agd.shp	CALM	Ocres.shp	Complete
Private/Leasehold/VCL	Station and crown land boundaries.	Nmpadjacentlands_amg_agd.shp	DOLA	SCDB CD-ROM	Complete
Proposed Conservation Area	Proposed Conservation Area	Nmpzonepoly_amg_agd.shp	CALM	AreaofInterest_ll.shp	Complete
Marine Park Zoning	Marine Park Zoning	Nmpallzonepoly_amg_agd.shp Nmpzonelines_amg_agd.shp	DOLA design file.	Ningzone.dgn	Complete
Petroleum Leases	Petroleum Leases	Nmpleases_amg_agd.shp	DME	Wapmap_99_02_15_ll_wgs84.shp	Complete
Mining Leases					
Aboriginal Claim Boundaries					
Historical					
Australian Heritage Commission Sites					
Aboriginal Sacred and Ceremonial Sites	Aboriginal Sacred and Ceremonial Sites	Nmpabsites_mag_agd.shp	AAD	Sites_ll_wgs84.shp	
Heritage/Historical Sites					
Shipwrecks	Shipwrecks	Nmpshipwrecks_amg_agd.shp	Museum of Western Australia	Shipwrk.shp	Complete
<b>Urban &amp; Tourism Development</b>					
Urban Development					
Resort Development					
Campsites	Campsites	Nmpcampsites_amg_agd.shp	CALM, Gascoyne Coast Streetsmart touring map	-	Still being checked
<b>Industrial Development</b>					
Shipping	Shipping	Nmpshipping_amg_agd.shp	CALM		
Oil/Gas Exploration	Oil/Gas wells	Nmpoffshorewells_amg_agd.shp	DME	wells_dme_ll_wgs84.shp	Complete
Oil/Gas Production					
Mining					
<b>Maritime Infrastructure</b>					
Anchorage	Anchorage in Coral Bay	Nmpboatbased_amg_agd.shp	CALM		Only one site
Shipping Lanes					
Port facilities	DOT Navigation Charts		DOT charts	Inset_tant.dgn, Inset_harb.dgn, Inset_bund.dgn, 900cstb.dgn, 900csta.dgn, 900cntb.dgn, 900cnta.dgn	
Marina facilities					
Moorings					
Groynes					
Boat ramps	Boat ramps	Nmpboatramps_amg_agd.shp	CALM, Gascoyne Coast Streetsmart touring map	-	Still being checked
Navigation Markers					
Fish Attracting Devices					
Onshore infrastructure	Topographic Data	Ningtopoclipped.shp	DEP	Ningtopo50.shp	Complete - perhaps not up to date



Required Dataset	Theme	Filename	Source	Source Filename	Completeness
<b>Commercial Fishing</b>					
Trawling					
Wetline fishing					
Netting					
Fish-trapping					
Rock lobster					
Abalone					
Aquaculture licenses (non-feeding/feeding)	Aquaculture licenses	Nmpaquacult_amg_agd.shp	FWA	Aq090899_wgs84.shp	Complete
<b>Recreation</b>					
Rod & line Netting Spearfishing Shell collecting Rock lobster Crabbing Abalone Game fishing Bait collection	Recreational fishing data	Nmprecfish_amg_agd.shp	CALM	-	Different types not specified - still being checked
Water skiing Jetskiing Parasailing Sailing	Boat Based Recreation	Nmpboatbased_amg_agd.shp	CALM, DOT navigable waters dataset	Navwaters_z50_gda.shp (water-skiing & parasailing areas only)	Still being checked
Powerboats					
Hovercraft					
Float planes					
Paddle boats					
Kayaks/canoes					
Windsurfing					
Beachwalking Swimming	Shore Based Recreation	Nmpshorebased_amg_agd.shp	CALM	-	Still being checked
Reef walking					
Beach launching					
Surfing areas	Surfing areas	Nmpsurf_amg_agd.shp	CALM	-	Still being checked
Scuba Diving Snorkelling	Scuba Diving and Snorkelling Areas	Nmpdive_amg_agd.shp	CALM	-	Still being checked
Wildlife Interactions	Wildlife Interactions	Nmpinteraction_amg_agd.shp	CALM	-	Still being checked

## **APPENDIX 2: TOURISM ACTIVITIES ON THE EXMOUTH PENINSULA AND THE NINGALOO MARINE PARK FROM 1991 TO 2000**

### **3 SECTION TWO – 1991, 1997, & 2000 SURVEY RESULTS COMPARED**

#### **3.1 AN EXPLANATORY NOTE ON THE SURVEY DATA**

In 1993 Ross Dowling published a report on survey data collected in 1991 through interviews with 577 residents and 684 visitors in the Gascoyne conducted over a period of two years from October 1989 to April 1991 (only the Exmouth townsite figures are used below) (Dowling 1993a, 1993b). Later, in 1997, Curtin University students surveyed 188 residents and visitors in Exmouth townsite. These two sets of survey data were compared below with the survey conducted in the Ningaloo Marine Park and adjacent areas in April 2000. Comparison has been limited to only correlating questions that appear in all three surveys. (Note: surveys conducted outside the Exmouth townsite in April 2000 have been included in the data analysis below).

#### **3.2 SUMMARY OF SURVEY DATA COMPARISONS**

- In 1997 89% of visitors were staying in the area for 3 weeks or more. In 2000 91% of visitors stated they would be staying the area for two weeks or less.
- In 1991 most visitors to the area came from other parts of WA (70%) or interstate (22%) with only 8% of visitors from overseas. By 1997 32% of visitors had come to the area from overseas with 43% from WA and 25% from interstate. In 2000 52% of visitors had come from other parts of WA, 36% from overseas with only 12% from interstate.
- In 1997 30% of visitors came to Exmouth as part of a multi-destination holiday trip from home. Popular stop-offs along the way on this journey were Monkey Mia, Carnarvon, Geraldton, Broome and Perth. In 2000 this pattern of travel has increased with up to 45% of visitors making the trip to Exmouth as part of a multi-destination journey rather than just a single destination trip from home.
- In 1997 71% of visitors had driven to the area with 13% flying in and 9% coming by bus. In 2000 the number of visitors arriving by car had increased to 76% (hire and owner/driver combined) with 15% by bus and 6% by plane.
- In 1997 approximately 55% of visitors stayed in camping/backpackers or caravan accommodation followed by hotel (19%), and rental holiday homes. In 2000 nearly 89% of visitors stayed in backpackers/camp or caravan accommodation and 11% at the hotel. In 1997 approx. 60% of visitors indicated that their preferred style of accommodation was camping/backpackers. In 2000 the results indicate approx. 70% preferred this style of accommodation.
- In 1991 visitors indicated that the climate, opportunities for fishing and natural attractions (in particular the ranges and the reef) were the most significant factors for their stay in the area. In 1997 50% of visitors indicated that water-based recreation was one of the key reasons for visiting the area. In 2000 visitors indicated that the Ningaloo Marine Park, access to the coast generally, peace & quiet, the natural environment were their main priorities for visiting in the area. Snorkelling, coastal marine life, beaches and fishing were indicated as the highlights of visitors experiences in the area.
- In 1991 the most preferred visitor activities in the area were sightseeing (29%), relaxing (28%) and fishing (26%). In 1997 diving (57%), fishing (53%) and lying on the beach (52%) were most preferred visitor activities. In 2000 snorkelling (74%), diving (43%) and swimming with whale sharks (43%) were reported to be the highest priority of activities in the area.
- In 1997 visitors indicated that fuel prices and general costs of living in the area combined with limited night life activities were the most undesirable aspects of their holiday to the Exmouth area. In 2000 insects, adverse weather (recent cyclonic conditions) and the distance from home were listed as the least desirable aspects of their visit.
- In 1997 80% of visitors said they would visit again probably within the next two years. In 2000 85% of visitors stated that they would return to the area, again, predominantly in the next two years.
- In 1997 most visitors predicted they would spend approximately \$650 on accommodation, food, activities and expenses in approximately a 1:1:2:1 ratio during their stay. In 2000 most visitors expected to spend \$750-\$900 in a 1:1:3:1 ratio on the same items.

### Expenditure

<i>Expenditure items</i>	<i>1997</i>	<i>2000</i>
Accommodation	\$120	\$150
Food	\$120	\$150
Activities	\$250	\$450
Sundry expenses	\$160	\$150

- Between 1997 and 2000 a slight shift can be seen away from the 31-45 age group towards the 18-30 and 46-60 age group. Slightly more women than men responded in 2000 to the survey as compared with more male respondents in 1997.

### Age Group

<i>Age range</i>	<i>1997</i>	<i>2000</i>
18-30	44%	45%
31-45	34%	30%
46-60	13%	22%

### Male/Female

<i>Sex</i>	<i>1997</i>	<i>2000</i>
Male	62%	46%
Female	38%	54%

- Between 1997 and 2000 a slight shift in income distribution of households represented by respondents has occurred. In 2000 more visitors come from households with an income of more than \$50,000 per year and less than \$20,000 per year with a slight decrease in those from the \$21,000 - \$30,000 and \$41,000 - \$50,000 per year income groups.

### Household Income

<i>Household Income</i>	<i>1997</i>	<i>2000</i>
\$10,000 – \$20, 000 p.a	16%	19%
\$21,000 - \$30,000 p.a	17%	13%
\$ 31,000 - \$40, 000 p.a	19%	19%
\$41,000 - \$50,000 p.a	12%	12%
> \$50,000 p.a	26%	36%

## 3.3 DISCUSSION OF TRENDS

Over the last ten years some major changes have occurred in visitors groups and activity patterns in the area.

- The average visit to the area has decreased from three to two weeks and increasingly has become part of a multi-destination journey.
- The major visitor groups to the area are increasingly international visitors and visitors from within Western Australia (on the increase after a decline in recent years from 1991). Interstate visits are again in decline despite a peak in 1997.
- Increasingly visitors to the area come as part of a multi-destination trip, usually by car from home. The numbers of visitors who have driven into the area has increased with bus tours also gaining popularity and flights in decreasing.
- The majority of visitors stay in camping/caravan or backpacker accommodation and are increasingly indicating that this is their preferred accommodation style into the future.
- The main attractions to the area remain the natural environment and opportunities for natural attractions and experiences.
- The focus of activities in the area is becoming increasingly water based. Activity patterns are also changing from a dispersed pattern of activities across land and water (such as sight-seeing, relaxing and fishing) to a concentration of activity around the coast and waters (snorkelling, swimming with whale sharks, diving, fishing). Fishing in particular is less of a priority with more observational activities becoming popular.
- A small increase (5%) in visitors stating that they will be returning to the area within the next two years could indicate a steady rise in visitor numbers over the next few years or at least a continuation of the types of numbers already being received into the area.
- Visitor spending is increasing but the focus of values remains the same with preference for cheap accommodation and food and the majority of expenditure (increasingly) on activities in the area.

- The number of older visitors to the area is increasing (45-60) while middle age groups (31-45) decline and younger age groups (18-30) sustain similar numbers.
- Visitors continue to represent mainly households earning less than \$50,000 with a consistent spread across income increments in this bracket.

#### **4 SECTION THREE – CONCLUSIONS**

In conclusion the data collected over the last ten years in and around Exmouth and the Ningaloo Marine Park indicate a range of trends which have impacts on decisions both about environmental management and development in the area. The three key trends are:

1. The continuing attraction of the area for visitors and residents alike is its natural environment, both marine and terrestrial but increasingly the marine environment;
2. A shift in activity from land and water based activities may indicate the need to review directions for management in this area. In particular, the most favoured activities with visitors are increasingly individual and independent activities such as snorkelling, diving and swimming with a decreasing emphasis on activities like fishing; and
3. Visitors continue to use the area as a nature-based activity destination and consistently look to find cheap services (such as accommodation) to allow for maximum expenditure and enjoyment on activities.

**APPENDIX 3: ACCOMMODATION**

<b>Exmouth town site</b> – The following accommodation facilities are available:	
<b><u>Business</u></b>	<b><u>Maximum Occupancy</u></b>
Argosy Court	12 units (60 beds in total)
Escape Backpackers	<i>Data not available</i>
Exmouth Budget Accommodation	<i>Data not available</i>
Mermaid Luxury Homes	2 homes (16 beds in total)
Ningaloo Apartments	<i>Data not available</i>
Osprey Villas	<i>Data not available</i>
Potshot Hotel	101 units – 124 two bedroom apartments 45 resort rooms 10 homestead Budget Accommodation rooms 11 sleep & shower rooms 11 economy units
Exmouth Base Lodge	<i>Data not available</i>
Giralia Station	<i>Data not available</i>
Seabreeze Resort	<i>Data not available</i>
Exmouth YHA	<i>Data not available</i>
Ningaloo Lodge	<i>Data not available</i>
Exmouth Caravan Park	240 powered sites, 27 onsite vans (sleep 4-6), 8 units
Exmouth Cape Tourist Village	140 powered sites, 20 un-powered, no data available on number of camping sites
Ningaloo Caravan Holiday Park	<i>Data not available</i>
Lighthouse Caravan Park	107 powered sites, 10 un-powered sites, no data available on the number of camping sites.
Yardie Caravan Park	<i>Data not available</i>
<b>Exmouth outer region</b> – The following accommodation facilities are available:	
<b><u>Business</u></b>	<b><u>Maximum Occupancy</u></b>
Ningaloo Reef Retreat - is a low-key resort that provides accommodation in a wilderness camping setting. The Retreat is also used a day use area	12 beds
Ningaloo Homestead	<i>Data not available</i>
<b>Coral Bay</b> – There are 3 accommodation facilities in Coral Bay and a number of holiday houses.	
<b><u>Business</u></b>	<b><u>Maximum Occupancy</u></b>
Ningaloo Reef Resort	<i>Data not available</i>
Peoples Park Caravan Park	<i>Data not available</i>
Bayview Coral Bay (holiday village & Caravan Park & Lodge & backpackers)	<i>Data not available</i>
Holiday Homes	<i>Data not available</i>
<b>Coral Bay outer region</b> – There is 1 accommodation facilities at Gnarraloo Homestead	
<b><u>Business</u></b>	<b><u>Maximum Occupancy</u></b>
Gnaraloo	<i>Data not available</i>

## APPENDIX 4: AERIAL SURVEYS OF THE NINGALOO MARINE PARK

The Department of CALM conducts annual aerial surveys using light aircraft during peak usage periods (April and July). The objective of the aerial surveys is to collect data on human usage such as the numbers of campsites, vehicles and recreational boats. Aerial surveys cover the Ningaloo coast from the North West Cape south to Coral Bay. For the purpose of the aerial survey the coast is divided into management sectors that include the North West Cape, Cape Range National Park, Ningaloo, and Coral Bay sectors. See below for aerial survey data on numbers of campsites, vehicles and recreational boats.

### CAMPSITES

North West Cape: Number of camps detected during aerial surveys					
<u>Site</u>	<u>14/07/1995</u>	<u>21/07/1995</u>	<u>15/04/1996</u>	<u>18/07/1996</u>	<u>11/07/1997</u>
Bundegi Recreation Zone	1	0	0	0	<i>Data not available</i>
Bundegi Sanctuary Zone	0	0	0	0	<i>Data not available</i>
Tower Bay	0	0	0	0	<i>Data not available</i>
Lighthouse Bay	0	0	0	0	<i>Data not available</i>
Jurabi Coast	0	0	1	2	<i>Data not available</i>
Tantabiddi Coast	0	2	0	0	<i>Data not available</i>
Cape Range National Park: Number of camps detected during aerial surveys					
<u>Site</u>	<u>14/07/1995</u>	<u>21/07/1995</u>	<u>15/04/1996</u>	<u>18/07/1996</u>	<u>11/07/1997</u>
Mangrove Bay Sanctuary	0	1	0	8	0
Milyering Coast	36	30	8	28	28
Mandu Sanctuary Zone	4	8	2	5	6
Pilgramunna Coast	9	9	7	10	21
Osprey Sanctuary Zone	13	4	7	1	0
Yardie Coast	8	7	2	9	12
Ningaloo: Number of camps detected during aerial surveys					
<u>Site</u>	<u>14/07/1995</u>	<u>21/07/1995</u>	<u>15/04/1996</u>	<u>18/07/1996</u>	<u>11/07/1997</u>
Sandy Point Coast	37	14	9	24	28
Winderabandi Coast	53	32	4	12	33
Lefroy Bay Coast	109	65	9	66	109
Cloates Sanctuary	1	0	0	2	1
Black Rock Coast	30	20	1	13	15
Dugong Sanctuary	1	0	1	0	0
Coral Bay: Number of camps detected during aerial surveys					
<u>Site</u>	<u>14/07/1995</u>	<u>21/07/1995</u>	<u>15/04/1996</u>	<u>18/07/1996</u>	<u>11/07/1997</u>
Bruboodjoo Coast	53	24	9	18	57
Mauds Township	2	1	0	0	1
Mauds Sanctuary	0	0	0	0	1
Anderson Coast	63	36	8	0	79
Pelican Sanctuary	7	0	3	4	3
Warroora Coast	45	26	13	23	42
Zones Number of camps detected during aerial surveys					
<u>Site</u>	<u>14/07/1995</u>	<u>21/07/1995</u>	<u>15/04/1996</u>	<u>18/07/1996</u>	<u>11/07/1997</u>
North West Cape	1	2	1	2	0
Cape Range national Park	70	59	26	61	67
Ningaloo Station	231	131	24	117	186
Coral Bay	170	87	33	45	183
<b>Total for marine park</b>	<b>472</b>	<b>279</b>	<b>84</b>	<b>225</b>	<b>436</b>

**VEHICLES**

North West Cape: Number of vehicles detected during aerial surveys					
<u>Site</u>	<u>14/07/1995</u>	<u>21/07/1995</u>	<u>15/04/1996</u>	<u>18/07/1996</u>	<u>11/07/1997</u>
Bundegi Recreation Zone	34	39	16	10	<i>Data not available</i>
Bundegi Sanctuary Zone	5	3	0	6	<i>Data not available</i>
Tower Bay	9	5	4	4	<i>Data not available</i>
Lighthouse Bay	23	48	3	20	<i>Data not available</i>
Jurabi Coast	32	19	14	18	<i>Data not available</i>
Tantabiddi Coast	4	35	17	21	<i>Data not available</i>
Cape Range National Park: Number of vehicles detected during aerial surveys					
<u>Site</u>	<u>14/07/1995</u>	<u>21/07/1995</u>	<u>15/04/1996</u>	<u>18/07/1996</u>	<u>11/07/1997</u>
Mangrove Bay Sanctuary	0	2	0	8	7
Milyering Coast	38	39	2	40	34
Mandu Sanctuary Zone	14	30	20	27	9
Pilgramunna Coast	9	10	13	11	23
Osprey Sanctuary Zone	13	5	2	1	2
Yardie Coast	35	13	9	37	32
Ningaloo: Number of vehicles detected during aerial surveys					
<u>Site</u>	<u>14/07/1995</u>	<u>21/07/1995</u>	<u>15/04/1996</u>	<u>18/07/1996</u>	<u>11/07/1997</u>
Sandy Point Coast	39	16	0	37	39
Winderabandi Coast	53	23	1	22	36
Lefroy Bay Coast	109	49	0	68	117
Cloates Sanctuary	2	1	2	4	2
Black Rock Coast	30	18	0	17	14
Dugong Sanctuary	1	1	0	0	1
Coral Bay: Number of vehicles detected during aerial surveys					
<u>Site</u>	<u>14/07/1995</u>	<u>21/07/1995</u>	<u>15/04/1996</u>	<u>18/07/1996</u>	<u>11/07/1997</u>
Bruboodjoo Coast	97	24	4	22	57
Mauds Township	4	8	3	4	1
Mauds Sanctuary	32	25	0	6	2
Anderson Coast	66	48	2	0	89
Pelican Sanctuary	7	0	0	5	3
Warroora Coast	46	18	0	26	50
Zones Number of vehicles detected during aerial surveys					
<u>Site</u>	<u>14/07/1995</u>	<u>21/07/1995</u>	<u>15/04/1996</u>	<u>18/07/1996</u>	<u>11/07/1997</u>
North West Cape	107	149	54	79	0
Cape Range national Park	109	99	46	124	107
Ningaloo Station	234	108	3	148	209
Coral Bay	252	123	9	63	202
<b>Total for marine park</b>	<b>702</b>	<b>479</b>	<b>112</b>	<b>414</b>	<b>518</b>

**BOATS**

North West Cape: Number of boats detected during aerial surveys					
<u>Site</u>	<u>14/07/1995</u>	<u>21/07/1995</u>	<u>15/04/1996</u>	<u>18/07/1996</u>	<u>11/07/1997</u>
Bundegi Recreation Zone	27	16	9	0	<i>Data not available</i>
Bundegi Sanctuary Zone	1	0	0	18	<i>Data not available</i>
Tower Bay	10	5	0	3	<i>Data not available</i>
Lighthouse Bay	5	1	0	1	<i>Data not available</i>
Jurabi Coast	1	0	1	1	<i>Data not available</i>
Tantabiddi Coast	3	12	4	8	<i>Data not available</i>
Cape Range National Park: Number of boats detected during aerial surveys					
<u>Site</u>	<u>14/07/1995</u>	<u>21/07/1995</u>	<u>15/04/1996</u>	<u>18/07/1996</u>	<u>11/07/1997</u>
Mangrove Bay Sanctuary	0	0	1	4	13
Milyering Coast	7	5	6	5	3
Mandu Sanctuary Zone	0	0	0	0	0
Pilgramunna Coast	3	2	1	0	0
Osprey Sanctuary Zone	4	1	2	0	0
Yardie Coast	6	2	3	5	1
Ningaloo: Number of boats detected during aerial surveys					
<u>Site</u>	<u>14/07/1995</u>	<u>21/07/1995</u>	<u>15/04/1996</u>	<u>18/07/1996</u>	<u>11/07/1997</u>
Sandy Point Coast	18	6	4	2	0
Winderabandi Coast	1	3	3	2	3
Lefroy Bay Coast	43	15	3	17	18
Cloates Sanctuary	0	0	0	0	0
Black Rock Coast	5	1	0	0	1
Dugong Sanctuary	0	0	1	0	1
Coral Bay: Number of boats detected during aerial surveys					
<u>Site</u>	<u>14/07/1995</u>	<u>21/07/1995</u>	<u>15/04/1996</u>	<u>18/07/1996</u>	<u>11/07/1997</u>
Bruboodjoo Coast	23	15	0	11	18
Mauds Township	1	6	1	0	1
Mauds Sanctuary	49	24	17	37	24
Anderson Coast	22	19	10	20	18
Pelican Sanctuary	1	2	0	1	1
Warroora Coast	1	2	3	0	2
Zones Number of boats detected during aerial surveys					
<u>Site</u>	<u>14/07/1995</u>	<u>21/07/1995</u>	<u>15/04/1996</u>	<u>18/07/1996</u>	<u>11/07/1997</u>
North West Cape	47	34	14	31	0
Cape Range national Park	20	10	13	14	17
Ningaloo Station	67	25	11	21	23
Coral Bay	97	67	31	69	64
<b>Total for marine park</b>	<b>231</b>	<b>136</b>	<b>69</b>	<b>135</b>	<b>104</b>



## APPENDIX 5: COMMERCIAL OPERATORS (CHARTER BOATS) LICENCED BY CALM TO OPERATE IN THE NINGALOO MARINE PARK.

CALM Lic #	NAME	LOCATION	Type of Activity			
			CORAL VIEWING	BOAT TOURS *	SCUBA DIVING/ SNORKELLING	WHALE SHARK VIEWING
HQ67576E1	Alauron Pty Ltd T/ Western Waters Aquatic Adventures	<i>Not known</i>		Yes	Yes	
HQ67358	Australian Scuba Centre	<i>Not known</i>		Yes	Yes	
HQ67520WS C	Coral Bay Adventures	Coral Bay	Yes (sub-sea explorer)		Yes	Yes
	Coral Bay Dive Centre	Coral Bay			Yes	
	Coral Bay Leisure Hire	Coral Bay				
	Coral Bay Ocean Game Fishing Charters	Coral Bay		Yes		
HQ67227	Coral Coast Dive and Fishing Adventures	<i>Not known</i>		Yes	Yes	
HQ67438	Coral Cruiser Tours	<i>Not known</i>		Yes	Yes	
HQ67540	Coral Seas Contracting T/A Laguna Dive	<i>Not known</i>		Yes	Yes	
HQ67522WS	Diving Ventures	<i>Not known</i>			Yes	Yes
HQ67076N	Doug Hunt Coral Viewing	<i>Not known</i>	Yes			
HQ67523WS	Exmouth Dive Centre	Exmouth		Yes	Yes	Yes
HQ67195	Exmouth Information, Accommodation, Tour and Charter Centre	<i>Not known</i>		Yes		
	Exmouth Game Fishing Charters	Exmouth		Yes		
HQ67071NMP	Glass Bottom Boats –Ecology Cruises	Tantabiddi/ Coral Bay	Yes		Yes	
HQ67222	High Roller	<i>Not known</i>		Yes		
HQ67529WS	King Dive	Exmouth			Yes	Yes
HQ67524WS	Makaira II Charters	Exmouth			Yes	Yes
HQ67367	Moonlight Charters	<i>Not known</i>		Yes	Yes	
	MV Ningaloo	Coral Bay		Yes	Yes	
HQ67459	Nelson Marine Pty Ltd T/A Norcape Game Fishing Charters	<i>Not known</i>		Yes	Yes	
Q67079WS	Ningaloo Adventures	<i>Not known</i>		Yes	Yes	Yes
HQ 67531WA	Ningaloo Blue Charters	Exmouth		Yes	Yes	Yes
	Ningaloo Coral Explorer		Yes		Yes	
HQ67451	Ningaloo Deep	<i>Not known</i>		Yes	Yes	
HQ67527WS	Ningaloo Deep Charters (Wildthing) Pty Ltd	<i>Not known</i>		Yes	Yes	Yes
HQ67377	Ningaloo Experience – Coral Bay	<i>Not known</i>		Yes	Yes	
HQ67533WS C	Ningaloo Reef Dive	Exmouth/ Coral Bay			Yes	Yes

CALM Lic #	NAME	LOCATION	Type of Activity			
			CORAL VIEWING	BOAT TOURS *	SCUBA DIVING/ SNORKELLING	WHALE SHARK VIEWING
	Nor Don Charters	<i>Not known</i>		Yes	Yes	
HQ67525WS	North Star Charters	<i>Not known</i>			Yes	Yes
HQ67354	Nor-West Seafoods	<i>Not known</i>	Yes	Yes	Yes	
HQ67362	Ocean Quest Charters	<i>Not known</i>	Yes	Yes		
	Paradise West Charters	<i>Not known</i>		Yes	Yes	Yes
HQ67536	Paul Wittwer T/A Reef Retreat and Ningaloo Reef Bus Lines	<i>Not known</i>			Yes	
HQ67530WA	Perth Diving Academy	<i>Not known</i>			Yes	Yes
HQ67359	Seafari Charters	<i>Not known</i>		Yes	Yes	
	Sea Force Charters	Coral Bay		Yes		
	Seasports Hire Coral Bay	<i>Not known</i>				
HQ67205	Scottish Finance Pty Ltd T/A Exmouth Cape Tourist Village	<i>Not known</i>			Yes	
HQ67299	Snuba Australia	<i>Not known</i>		Yes		
HQ67174	Sou West Dive Charters	<i>Not known</i>		Yes	Yes	
HQ67480	Sunseeker Enterprises P/L T/A Exmouth Dive Centre and Ningaloo Reef Dive (Coral Bay)	Coral Bay		Yes	Yes	
HQ67189	Suntown Enterprises T/A Ningaloo Fishing and Diving Services	<i>Not known</i>		Yes	Yes	
HQ67128 NMP	Suburbia Holdings	<i>Not known</i>	Yes			
HQ67528WS	Suric Holdings Pty Ltd (Exmouth Dive Centre)	<i>Not known</i>			Yes	Yes
HQ67526WS	The Gun	<i>Not known</i>			Yes	Yes
HQ67324	Three Islands Marine Charters Pty Ltd	Exmouth		Yes	Yes	Yes
HQ67361	Tossip Transport Pty Ltd T/A Gulf Explorer Marine Wildlife Tours	<i>Not known</i>	Yes	Yes		
	Village Dive	<i>Not known</i>			Yes	
HQ67180	Wain Family Trust	<i>Not known</i>	Yes			
HQ67426	Willie Unit Trust T/A Willie Pearl Lugger Cruises	<i>Not known</i>		Yes	Yes	
HQ67181	Willie Yacht Charters	<i>Not known</i>		Yes		
HQ67185	Western Australian Getaway SCUBA	<i>Not known</i>			Yes	
HQ67521WS	Whale Shark Adventures	<i>Not known</i>				Yes

- Boat Tours include activities such as bottom fishing, gamefishing, wildlife viewing, etc..

**COMMERCIAL OPERATORS (SAFARI OPERATORS) LICENCED BY CALM TO OPERATE IN THE NINGALOO MARINE PARK.**

CALM Lic #	NAME	LOCATION
	ATV Eco Tours	Coral Bay
	Neil McLeods Ningaloo Safari Tours	Exmouth

## APPENDIX 6: NUMBER OF CAMPS ALONG THE NINGALOO COAST IN 1995 AND 1999

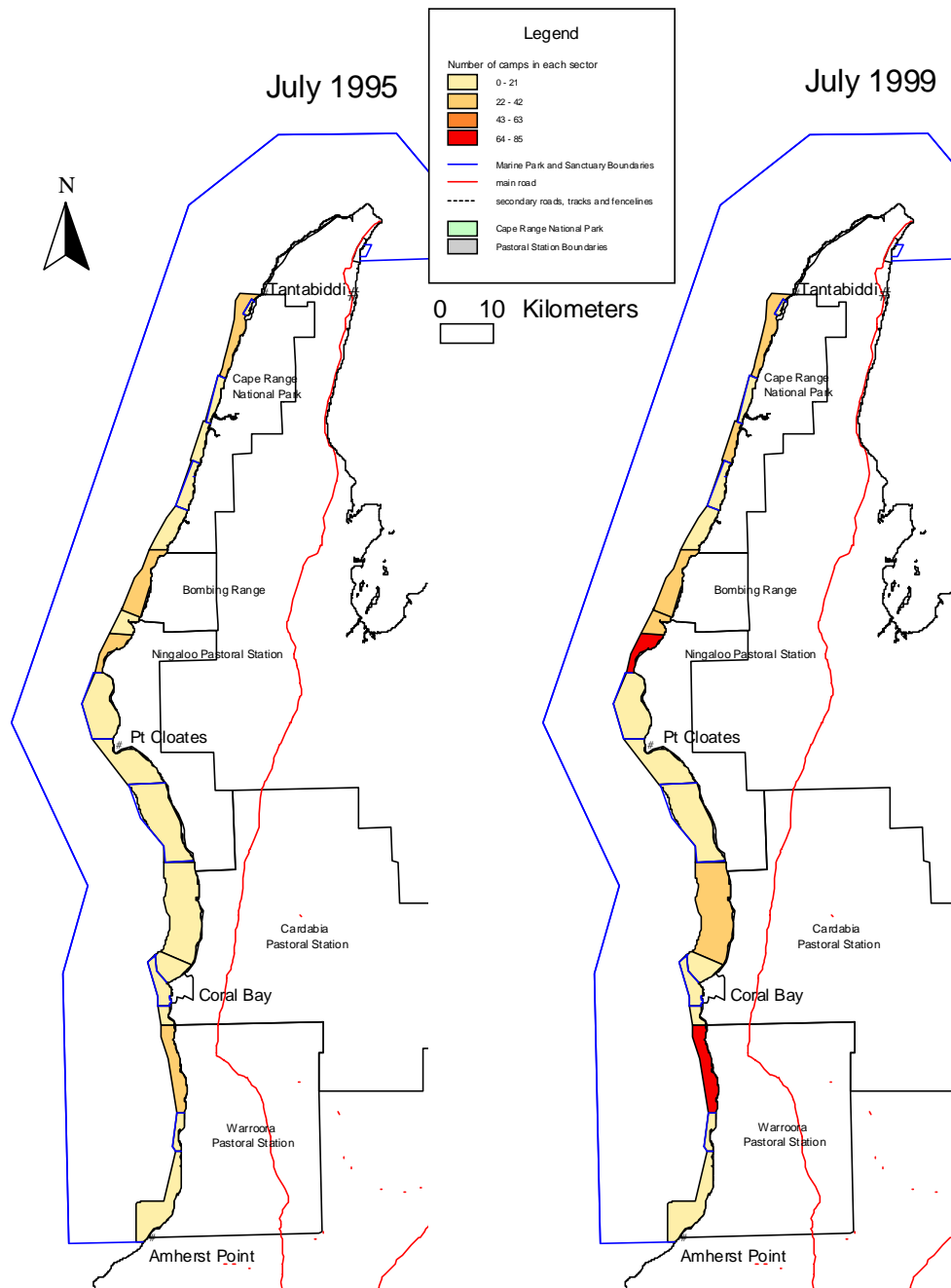


Figure 10: Number of camps in Ningaloo Marine Park in July 1995 and July 1999 as determined by aerial survey.

# **APPENDIX 7: SHORE BASED FISHING EFFORT FOR 1998/99** *(Data from Fisheries Western Australia – Research Division)*

AREA	SEASON	EFFORT (HOURS)	EFFORT (ANGLER DAYS)
YARDIE	Spring	5505.50	1879.01
	Summer	1650.00	563.14
	Autumn	5228.67	1784.53
	Winter	9568.00	3265.53
NINGALOO	Spring	4290.00	1464.16
	Summer	5115.00	1745.73
	Autumn	6578.00	2245.05
	Winter	8320.89	2839.89
GNARRALOO	Spring	1779.56	607.36
	Summer	825.00	281.57
	Autumn	2891.43	986.84
	Winter	4722.67	1611.83

# **LOCATIONS SURVEYED DURING SHORE BASED FISHING SURVEY OF 1998/99** *(Data from FWA – Research Division)*

YARDIE	NINGALOO	GNARRALOO
Bloodwood Creek	Bruboodioo Point (9 Mile)	14 Mile
Bundegi Beach	Crayfish Bay	3 Mile Camp
Camp 13 & 14	Doddy's Camp	5 Fingers
Lakeside	Jane Bay	Amherst Point
Lighthouse Bay	Lefroy Bay	Cape Farquhar
Mesa Camp	Maud's Landing	Caretakers Camp
Ned's Camp	Ningaloo Homestead	Coral Bay Beach
Osprey bay	Point Edgar	Gnarraloo Bay
Pilgramunna	Sandy point	Gnarraloo Homestead
Sandy Bay	Winderabandi Point	Harpoons
T-Bone Bay		Maggies
Tantabiddi		Monument Cliff
Tulki Beach		Pelican Point
Yardie Creek		Red Bluff
		South Boundary
		Stevensons
		Sth Ahmerst Point
		The Lagoon
		Turtles
		Warroora Homestead