MANAGEMENT PLAN FOR ESPERANCE COASTAL RESERVES

ISSUES PAPER

EXECUTIVE SUMMARY

The Department of Environment and Conservation, in accordance with the *Conservation and Land Management Act 1984*, carries out the management of all national parks, conservation parks and nature reserves in Western Australia, and prepares management plans on behalf of the Conservation Commission of Western Australia.

A draft management plan is currently being prepared for the Esperance Coastal Reserves. As part of this process, the following issues paper has been formulated following consultation with the Esperance Parks and Reserves Advisory Committee, field visits with local staff, and community workshops in Esperance, Condingup and Munglinup. The purpose of the issues paper is to highlight the values and main management issues of the Esperance Coastal Reserves to form the basis for the draft management plan, and to inform and assist people in participating in the initial stages of the management planning process.

Management Planning Area

The management planning area referred to as the 'Esperance Coastal Reserves' includes the national parks and nature reserves in the Esperance area, including the offshore islands and rocks of the Recherche Archipelago[1] as well as a number of proposed additions (Map 1). These national parks and nature reserves form a network of conservation areas that protect a wide variety of native plant and animal communities and landscapes. On a wider scale, the Esperance Coastal Reserves form a significant part of the South Coast Macro Corridor project, which seeks to provide major vegetated corridor links in the south coast region. The Recherche Archipelago is also an important part of the State's conservation reserve system as it provides safe refugia for many species no longer widespread on the adjoining mainland.

National Parks

There are three national parks within the Esperance Coastal Reserves; Stokes National Park, Cape Le Grand National Park and Cape Arid National Park. As national parks, these reserves are managed for conservation and nature-based recreation. Even though there are differences between these national parks in terms of visitation, size and values, there are many similarities in terms of environment and issues associated with them in order for them to be grouped within the one management planning process.

All the parks have significant areas that are being degraded by vehicle use and inappropriate recreation resulting in track and site erosion, proliferation of tracks, habitat destruction and disease spread. Cape Le Grand National Park is the most popular and accessible national park in the Esperance area with visitation steadily increasing. In particular, the camping area at Lucky Bay fills to overcapacity each summer and visitation pressure is only expected to intensify due to projected regional growth and increased tourism and marketing of the area.

Stokes and Cape Arid national parks are less developed than Cape Le Grand National Park, and provide a more remote experience. Cape Arid National Park extends considerably further inland than the other parks in the planning area (even though it is part of the Esperance 'Coastal Reserves'), and includes both temperate and arid environments. Cape Arid National Park has high biodiversity value especially with regard to flora and bird species, and provides critical habitat for threatened birds such as the western ground parrot.

The challenge for the planning process will be to manage the increase in visitation and changes in future recreational demand, whilst providing a wide range of recreational opportunities across all the national parks and maintaining the conservation and other particular values of the parks.

[1] Cross boundary issues between the terrestrial and marine environment will be considered in this current process due to the many interactions between these systems. For example, the seabirds and marine mammals of the planning area are impacted by both activities within the terrestrial and marine environments. The proposal to create a marine park within the waters of the Recherche Archipelago will be covered by a future marine planning processes.

Nature Reserves

The Esperance Coastal Reserves also include 16 nature reserves, which are primarily reserved to conserve the flora and fauna values of these areas. The major nature reserves within the planning area are Lake Shaster Nature Reserve, two large unnamed nature reserves adjacent to Stokes National Park, the Ramsar-listed Lake Gore Nature Reserve, the nationally significant wetland Lake Mortijinup Nature Reserve, the western part of the Nuytsland Nature Reserve, Woody Island Nature Reserve and the Recherche Archipelago Nature Reserve. The *South Coast Region Regional Management Plan* (CALM 1992) recommends that the tenure and purpose of some of, or part of, these nature reserves be changed to national park to formalise the current recreation occurring within these nature reserves. These recommendations will be reviewed and updated within the Esperance Coastal Reserves planning process to ensure the most appropriate tenure for the nature reserves is selected to maintain the values of the reserves.

Proposed Additions to the Conservation Reserve System

As well as the existing national parks and nature reserves, the planning area of the Esperance Coastal Reserves includes proposed additions to the conservation reserve system. These proposed additions which comprise unvested lands, arise from long-standing recommendations (i.e. from the *South Coast Region Regional Management Plan*). These recommendations now need to take into account the current conservation reserve system, knowledge of values of the reserves and/or interests in the reserves. Therefore, the recommendations regarding tenure, purpose and boundaries will be reviewed through the Esperance Coastal Reserves planning process.

Potential Additions to the Management Planning Area

Some further additions to the management planning area have been identified within a defined area of consideration (maps 1, 2 and 3) through the input of the Departmental planning team for the Esperance Coastal Reserves and the advisory committee. This has involved the aid of geographically based data analysis and new biological information. These additions would improve the comprehensiveness, adequateness and representation of the conservation reserve system and/or conserve significant habitat or vegetation areas. These have been referred to as 'potential' additions to the planning area. However, as these areas are further investigated and other agencies and bodies are consulted (such as the Traditional Custodians, local shires, the Water Corporation, Department of Industry and Resources, Department of Indigenous Affairs, and others that may have an interest in the areas) these potential additions may be deemed unsuitable to pursue, or it be may deemed that there may be other more appropriate ways of conserving the values of these areas other than including them in the formal conservation reserve system. If the potential additions are appropriate as part of the conservation reserve system then prior to the finalisation of the draft management plan, these areas would be included into the planning area for Esperance Coastal Reserves and referred to as proposed additions.

Major Issues

The issues paper outlines the key values of the Esperance Coastal Reserves and discusses the major issues for managing the natural environment, cultural heritage, visitor use, and resource use. A brief summary of these issues follows.

Natural Environment

The major issues that have been identified to date in managing the natural environment of the Esperance Coastal Reserves include the issues of:

- maintaining corridors of native vegetation and protecting important habitats;
- managing threatened vegetation communities and flora species such as the Russell Range threatened ecological community, the small two-colour kangaroo paw, the Twin Peak Island mallee, the goblet mallee, and the prickly honeysuckle;
- managing threatened and specially protected fauna species such as the New Zealand fur-seal, the Australian sea-lion, the black flanked rock-wallaby, the Recherche Cape Barren goose, malleefowl and the western ground parrot;
- salinisation, excessive inundation, increased nutrient loads and weed invasion in the wetlands and waterways resulting from clearing in the upper catchments;
- managing for projected climate changes (e.g. in reserve design and limiting other stresses);

- controlling environmental weeds such as African boxthorn, Victorian tea tree, bridal creeper and *Freesia* spp.;
- controlling introduced and other problem animals such as foxes, feral cats and rabbits;
- limiting the impacts of diseases such as *Phytophthora* dieback, *Armillaria* and aerial canker;
- preventing inappropriate fire regimes and events, whilst dealing with the challenges of remote and inaccessible areas; and
- management of waste such as appropriate waste disposal, and preventing marine pollution and debris.

Cultural Heritage

Throughout the Esperance Coastal Reserves, there is rich and varied history of both the Indigenous and non-Indigenous cultures, including pre-European settlement, European exploration, sealing, whaling and early agriculture. Issues identified to date in managing our cultural heritage within the Esperance Coastal Reserves include:

- increasing Traditional Custodians' involvement, and maintaining and/or increasing their traditional ties with the land;
- improving the inventory of Indigenous and non-Indigenous heritage sites;
- conserving sites and minimising disturbance; and
- providing education and interpretation on the wide variety of cultural heritage values across the reserves.

Visitor Use

The Esperance Coastal Reserves are widely visited by the local communities of Esperance, Kalgoorlie and Ravensthorpe as well as from further afield. The reserves provide a significant portion of the coastal recreational opportunities in the region and contribute importantly to the local economy by drawing many tourists to the region. Therefore, how the reserves are managed to deal with current and projected recreational use is critical in terms of protecting the conservation and cultural values of the reserves, but also in maintaining the important recreational and tourism values of the region. Issues identified to date in managing recreation and tourism within the Esperance Coastal Reserves include:

- providing an appropriate range of recreational opportunities including upgraded sites and facilities;
- maintaining some areas of remoteness, and consideration towards the creation of gazetted wilderness areas;
- dealing with the overcrowding of some sites and identifying the desired capacity of sites, or limits of acceptable change;
- reviewing access to enable appropriate recreational use and protection of the environment;
- informal recreational use of nature reserves;
- the need to review and/or input into commercial tourism opportunities and developments;
- the challenge of servicing and managing the remote reserves; and
- inappropriate activities such as firewood collection and the use of campfires and associated damage to vegetation and increase in wildfire risks, visitors bringing domestic animals into the reserves, and on occasion, vandalism and littering.

Resource Use

There are also demands on the natural resources of the reserves that require managing, in terms of potential traditional hunting and gathering, mining (although current Government policy excludes mining in national parks and class 'A' nature reserves), commercial fishing, aquaculture, scientific and research use, provision of utilities and services, beekeeping and water extraction.

More Information

The issues paper and appendices provide more detailed information on the main issues outlined above, and is a basis for public comment and engaging the community and interest groups as the draft management plan is prepared.

The progress of the draft management plan can be tracked via the *Planning Diary* newsletter: <http://www.naturebase.net/national_parks/management/index.html>.

Have Your Say

Working more closely with local communities, Traditional Custodians, reserve neighbours, park visitors, national resource management groups, other Government departments, community groups, tour operators and other businesses will lead to an improved management plan and conservation outcome for the Esperance Coastal Reserves.

If you would like to discuss any of the issues raised in this issues paper, register your interest in the draft management plan (which will be available for public comment when it is prepared), or join the community advisory committee which will be involved in the development of the draft management plan, please contact the local Departmental office in Esperance, or the Management Planning Unit in Kensington.

Contact details are as follows:

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Lucky Bay, Cape Le Grand National Park *Photo: Aberline Attwood*

TABLE OF CONTENTS

MANAGEMENT PLAN FOR ESPERANCE COASTAL RESERVES
ISSUES PAPER

INTRODUCTION

The Esperance Coastal Reserves span 370 km from Starvation Boat Harbour in the west almost to Point Culver in the east, and support outstanding conservation and recreational values. The planning area includes both mainland and island reserves that cover a variety of tenures, including nature reserve, national park, 5(1)(h) reserve[2], unvested Crown reserve and unallocated Crown land.

This issues paper highlights the values and main management issues of the Esperance Coastal Reserves, and has been prepared to inform and assist people in participating in the initial stages of the management planning process, as well as to form the basis for the draft management plan. The paper has been formulated following consultation with the Esperance Parks and Reserves Advisory Committee, Departmental planning team meetings, field visits with local staff, and community workshops in Esperance, Condingup and Munglinup. Consultation with other government agencies and stakeholder groups with an interest in the planning area will be undertaken during the preparation of the draft management plan.

MANAGEMENT PLANNING AREA

The planning area encompasses 21 existing and at least eight proposed conservation reserves—an area of over 610 000 ha—and includes all the coastal conservation reserves of the Esperance District managed by the Department of Environment and Conservation[3] (the Department) (Map 1). The planning area does not include those reserves covered by the *Esperance Lakes Nature Reserves Management Plan* 1999 (Lake Warden and four other lakes near the town of Esperance). The management planning area is mostly within the Shire of Esperance, with the western portion within the Shire of Ravensthorpe, and the eastern portion within the Shire of Dundas.

The major reserves that will be covered by the management plan include:

- Lake Shaster Nature Reserve;
- Stokes National Park;
- Nature Reserve 27888;
- Nature Reserve 26885;
- Lake Gore Nature Reserve;
- Lake Mortijinup Nature Reserve;
- Cape Le Grand National Park;
- Alexander Nature Reserve;
- Cape Arid National Park;
- part of Nuytsland Nature Reserve;
- Woody Island Nature Reserve; and
- Recherche Archipelago Nature Reserve.

The full list of existing and proposed reserves to be covered by the management plan is shown in Appendix 1.

The *South Coast Region Regional Management Plan* (CALM 1992) recommends changes to the purpose of several existing conservation reserves and proposed additions within the planning area (Appendix 2, and maps 2 and 3). Some of these recommendations now require refinement and/or modification to bring them up to date with current knowledge and planning directions and will be reconsidered during the management planning process (see Appendix 2 for further detail).

Potential Additions to the Management Planning Area

Within an 'area of consideration' of the coastal area south of South Coast Highway to the west of Esperance, and south of Fisheries Road to the east of Esperance, 'potential' additions have also been identified by the Departmental planning team for possible inclusion into the management planning area (Appendix 2, and maps 2 and 3).

[2] Reserves created under section 5(1)(h) of the *Conservation and Land Management Act 1984*.

[3] The Department of Environment and Conservation was formed on 1 July 2006 through the amalgamation of the former Department of Environment and the Department of Conservation and Land Management.

These additions would be sought in order to:

1. protect important fauna habitats and significant vegetation associations;
2. develop a comprehensive, adequate and representative conservation reserve system; and/or
3. enhance the South Coast Macro Corridor Network—in particular the coastal corridor and river foreshore corridors which connect the coastal corridor with unallocated Crown land to the north.

For example, several areas of either unvested Crown reserve or unallocated Crown land have been identified during a Departmental analysis of remnant vegetation that would be beneficial to the reserve system based on (1) and (2) above (see section on *Vegetation Communities and Associations*). The possible addition of these areas to the planning area and the public conservation estate will be further considered during the management planning process. Consultation with other agencies and bodies (such as the Traditional Custodians, local shires, the Water Corporation, Department of Industry and Resources, Department of Indigenous Affairs, and others that may have an interest in the areas) will also be necessary as part of the management planning process.

REGIONAL CONTEXT

The Goldfields-Esperance region is in the south-east of Western Australia, and borders South Australia and part of the Northern Territory. The Goldfields-Esperance region is the largest in the State, and includes large areas of the interior deserts as well as part of the southern coast and Nullarbor Plain. The largest towns are Kalgoorlie-Boulder and Esperance.

Gold and nickel mining have been central to the development of the Goldfields-Esperance region, with significant mining operations to the west near Ravensthorpe, and in the Goldfields, north of Norseman. Agriculture such as cropping, cattle and sheep farming activities is concentrated in the southern area of the region, around Esperance. A major port operates out of Esperance offering handling facilities for iron ore, nickel, fuel, bulk grains and fertiliser. Tourism is also significant to the region's economy, with 376 000 overnight domestic visitors to the Goldfields area, and 143 000 domestic and 11 000 international visitors to the Esperance area in 2002 (Department of Local Government and Regional Development 2003).

Whilst 98% of the pre-European vegetation cover within the Region remains, this is mostly from the interior parts of the region and only 11.2% is formally protected within conservation reserves. Approximately 19% and 23% of pre-European vegetation within the shires of Ravensthorpe and Esperance respectively is formally protected in conservation reserves (Departmental data May 2006).

Fitzgerald River National Park is approximately 50 km to the west of the planning area and is one of the largest and most biologically significant national parks in Australia. The eastern part of the planning area is in the more arid zone of the State, with the extensive Nullarbor Plain commencing within Nuytsland Nature Reserve.

There are no marine reserves adjacent to the planning area, however there are previous recommendations for two marine parks at Stokes Inlet (see section on *Catchment and Soil Protection*) and also within the waters of the Recherche Archipelago (CALM 1994). As part of the State Government's *Regional Marine Planning Initiative*, a strategic plan is currently being prepared for State waters of the south coast (Cape Leeuwin to the South Australian border). The strategic plan aims to provide a framework to integrate current and future planning and management of the marine region through a partnership of Government, community and stakeholder groups. The strategic plan will enhance cooperation and integration between sectors, recognise the importance of social, cultural and economic values as well as protect and maintain ecological integrity and biological diversity. The strategic plan will not be a process for the creation of specific marine protected areas. The planning process for Esperance Coastal Reserves will take into account the South Coast Regional Marine Strategy and the recommendations for the two marine parks.

BRIEF OVERVIEW OF THE PLANNING AREA

Reserves West of Esperance

Lake Shaster Nature Reserve was gazetted in 1973 and is at the western end of the planning area, located approximately 110 km west of Esperance. The reserve is split into two, bisected by the shire reserves at Munglinup Inlet. The nature reserve serves as a major coastal corridor link between Fitzgerald River National Park and Jerdacuttup Lakes Nature Reserve to the west and Stokes National Park to the east. The *South Coast Region Regional Management Plan* acknowledges that the level and type of recreation occurring in the eastern part of Lake Shaster Nature Reserve is inconsistent with nature reserve status, and proposes this part is incorporated into Stokes National Park (see section on *Recreational Use* and Appendix 2).

Stokes National Park is located approximately 80 km west of Esperance and was created in 1974. The park contains undulating coastal heath, surrounding the large Stokes Inlet. The Young and Lort rivers feed into Stokes Inlet, and the river corridors south of the South Coast Highway are proposed by this planning process[4] to be vested in the Conservation Commission as nature reserves. Camping areas have been established on the western shore of the inlet. Two-wheel drive access is available to the inlet only. Abalone divers seasonally operate out of Fanny and Margaret coves.

Stokes Inlet itself is unallocated Crown land, currently not part of Stokes National Park, and is commercially fished (see sections on *Catchment and Soil Protection* and *Commercial Fishing*). The planning process will consider whether Stokes Inlet should be re-incorporated back into Stokes National Park (the inlet was part of the National Park until 1981[5]) or at least added into the formal terrestrial conservation reserve system.

Two large unnamed nature reserves (nature reserves 27888 and 26885) are located approximately 50 km west of Esperance and to the east of Stokes National Park. The lower part of the Lake Gore Ramsar wetland system (between Lake Gore and the coast) is within Nature Reserve 26885. Tall, vegetated sand dunes and limestone cliffs in Nature Reserve 26885 afford scenic views over the ocean to the western-most islands of the Recherche Archipelago and northwards over cleared agricultural farmland in many areas. Recreation occurs at several sites within the nature reserves, and a shire (Esperance) recreation reserve enclave also exists within Nature Reserve 27888 at Quagi Beach.

Lake Gore Nature Reserve is part of the Lake Gore Ramsar site, internationally recognised for its value to waterbirds and of particular importance to the hooded plover (*Thinornis rubricollis tregellasi*) (see sections on *Native Animals* and *Habitats – Wetlands*). Lake Gore experiences regular inundation from adjacent cleared agricultural land, causing degradation of the wetland system (see section on *Catchment and Soil Protection*) and loss of habitat for migratory waders. Other lakes within the Lake Gore Ramsar site are not within the conservation reserve system (see section on *Habitat– Wetlands*). Lake Mortijinup Nature Reserve, a nationally recognised wetland, is further to the east of Lake Gore.

Reserves East of Esperance

Cape Le Grand National Park, 40 km east of Esperance, is the most visited reserve in the planning area (see section on *Recreational Opportunities – Visitor Numbers and Trends*). This is due to its high scenic quality, numerous attractive beaches, and the provision of well developed access, camping and day use facilities. It is also a well known tourist destination and is well publicised. Tourism Western Australia believes that Cape Le Grand is iconic and market ready, and can be used as leverage to attract visitors to the region (Tourism Western Australia 2003). It is popular with locals and tourists alike, and demand for camping during the extended summer peak season is high (see section on *Recreational Use – Camping and Day Use*). There were approximately 110 000 visits to the park in 2003-2004.

Cape Arid National Park, located 120 km east of Esperance, is one of the most significant areas for flora and fauna biodiversity conservation in the south of Western Australia. Similar to Cape Le Grand National Park, Cape Arid National Park includes a series of sandy coves and beaches interspersed with rocky granite

[4] The Lort River and Young River corridors were both proposed in the *South Coast Region Regional Management Plan* to become linear nature reserves, but Young River corridor south of the South Coast Highway for unknown reasons was not.

[5] In 1981 Stokes Inlet was excluded from Stokes National Park after it was realised that the vesting of the inlet conflicted with the *Land Act 1933*. The Land Act has since been superseded by the *Land Administration Act 1997* and would allow inclusion back into the terrestrial conservation reserve system.

headlands, with islands of the Recherche Archipelago contributing to the high scenic quality. However, unlike many of the other coastal reserves in the planning area, Cape Arid National Park extends inland approximately 70 km to the north and includes a large area within the arid zone. Inland the main feature is the Russell Range with Mt Ragged (594 m) most prominent. Approximately 20 000 people visit Cape Arid National Park each year (see section on *Recreational Opportunities – Visitor Numbers and Trends*). Cape Arid National Park currently offers more remote opportunities than Cape Le Grand National Park, although demand for this type of experience is increasing pressure on sites within the park (see section on *Recreational Opportunities – Incremental Creep*).

Nuytsland Nature Reserve is a linear coastal reserve (approximately 450 km in length) comprising high cliffs, ocean beaches and sand dune systems of the Great Australian Bight and Roe Plain. Only the western portion of the reserve, to the end of Wylie Scarp, will be considered in this management plan as this part of the reserve is becoming increasing popular as a recreational fishing destination by residents of the Goldfields and Esperance, and four-wheel drive use is increasing. There are also a number of enclaves within the reserve including Israelite Bay Shire Reserve managed by the Shire of Esperance.

Island Reserves

The Recherche Archipelago Nature Reserve is made up of over 100 islands and 1200 'obstacles to shipping' (comprising of reefs, islets and rocks) totalling over 7000 ha of land area and stretching 230 km from east to west and up to 50 km offshore. The islands of the archipelago represent the high points of the Albany-Fraser Oregon, now flooded by the ocean. Most of the islands are exposed to high or moderate wave action and there are few safe anchorages or landings. In form and character, the islands resemble the granite headlands of the coastal mainland reserves. Granite peaks reach a considerable height on several of the islands including Mondrain (Baudin Peak 222 m), Remark (220 m) and Twin Peaks (183 m). Only Middle Island has a recognised foreshore dune complex. There is also a 1 km 'pink lake' (Lake Hillier) on the island. Approximately 325 native flora species have been identified from the islands and several, including Woody, Mondrain, and Middle, support eucalypt forest over 10 m tall.

The waters of the Recherche Archipelago have been proposed for future consideration as a marine park. The islands are important for their endemic fauna, several threatened species, breeding sites for seabirds, sea lions and seals, and unique vegetation types (especially those that are long unburnt). Middle Island, at 1080 ha, is the largest island in the archipelago. Woody Island Nature Reserve—with a purpose of Conservation of Flora and Fauna, Recreation and Tourism Development—is the only readily accessible island close to Esperance. It is also the only island on which overnight accommodation, provided by a commercial concession, is available. There were over 16 000 visitors to Woody Island in 2003-2004 (see section on *Visitor Numbers and Trends*). The planning process will consider the compatibility of nature reserve status with the current visitor use of the island, with a view to proposing that the reserve purpose be changed to national park.

In addition to the islands of the Recherche Archipelago, Investigator Island Nature Reserve, situated approximately 25 km off the coast from Lake Shaster Nature Reserve (east), is also in the planning area.

KEY VALUES OF THE PLANNING AREA

The key values of Esperance Coastal Reserves include:

Conservation Values

- Intact and varied natural landscapes with high scenic quality such as coastal cliffs, rocky headlands, granite peaks, quartzite hills, island chains, lakes, wetlands, inlets, fine sandy beaches with bays.
- A rich mosaic of vegetation complexes representing, woodland, mallee and coastal health, and wetland ecosystems protecting restricted vegetation communities and conservation significant flora populations.
- A major biogeographical transition zone between the south-west and arid zone which is rich in flora and fauna species, comparable with biological hotspots such as the Fitzgerald River National Park and Stirling Range National Park.
- Near coastal granite hills such as Mt Le Grand, Mississippi Hill, Mt Arid and isolated inland hills such as Mt Ragged and Russell Range, which provide refugia for threatened flora species.
- Extensive areas of intact fauna habitat suitable for populations of conservation significant fauna.

- Internationally and nationally significant wetland systems that provide habitat for a significant proportion of global populations of hooded plovers and banded stilts, important refuges for moulting and breeding birds, migration stopover areas for migratory shorebirds and drought refuge for thousands of other waterbirds.
- High level of vegetation connectivity between reserves.
- Islands that provide refugial habitat for terrestrial fauna and relictual populations of mammals once widespread on the mainland such as critical weight mammals[6].

Recreational Values

- Remote areas of potential wilderness quality.
- A terrestrial environment that provides opportunities for a wide range of nature-based recreational opportunities including recreational driving, bushwalking, picnicking, camping, fishing and wildlife interaction.
- Access to coastal and marine environments that provide opportunities for water-based recreational activities such as swimming, surfing, snorkelling and diving.
- Coastal day use and camping opportunities for local, national and international visitors.
- Coastal hiking, small heritage walks and opportunities for walking up several peaks and scenic hills.
- Wild coastal scenery, attractive bays with fine white sandy beaches set between rocky headlands.

Cultural Values

- Aboriginal sites and landscapes of mythological, ceremonial, cultural and spiritual significance.
- Sites and landscapes of European exploration and settlement.
- Potential for 'joint management' between the Department and Indigenous Traditional Custodians.

Economic Values

- Nature-based tourism opportunities for commercial tour operators, focusing on the reserves' wide range of natural and cultural values.
- The iconic status of Cape Le Grand National Park providing leverage to attract visitors to the region.
- Tourism expenditure from visitors attracted by the reserves' natural and cultural values.

Educational Values

- An extensive range of community, educational and interpretation opportunities based on the conservation and cultural values of the area and the Department's management.
- A diverse array of natural environments providing numerous research opportunities to increase knowledge associated with ecosystem biological and physical processes, species of flora and fauna and their habitats, and the effects and management of threatening processes.

INDIGENOUS INVOLVEMENT IN MANAGEMENT

Consistent with the Government's consultation paper *Indigenous Ownership and Joint Management of Conservation Lands in Western Australia* (Government of Western Australia 2003), opportunities for Aboriginal involvement in the management of lands and waters managed by the Department have increased significantly in the past few years.

The input of the Traditional Custodians into this management plan will be achieved in a number of ways:

- representation on the Esperance Parks and Reserves Advisory Committee by members of the Esperance Nyungars native title claim (WC96/64), which is the claimant group covering the largest proportion of the planning area[7];
- through the Goldfields Land and Sea Council, with which the Department has a Memorandum of Understanding;

[6] Mammals weighing between 35 g and 5 kg. These Australian mammals have been the most affected by environmental changes following European settlement.

[7] Other native title claimants that cover parts of the planning area such as the Mt Ragged area of Cape Arid National Park, Nuytsland Nature Reserve east of Point Malcolm, and the eastern group of the Recherche Archipelago, include the Ngadju (WC99/2) and the Narnoobinya Family Group (WC97/40) and the Ngadjunngarra (WC87/105) native title claimants.

- through the Bay of Isles Aboriginal Community Inc. The Department has worked closely with this group over many years, working on a number of joint projects including coastal environmental protection work and various training programs;
- through the proposed Cape Le Grand Indigenous Heritage and Management Advisory Committee. This group will complement the Esperance Parks and Reserves Advisory Committee (see section on *Community Involvement*), and may be a precursor to a park council for Cape Le Grand National Park; and
- through other opportunities for joint management of the planning area as they arise.

MANAGING THE NATURAL ENVIRONMENT

Biogeography

Under the Interim Biogeographical Regionalisation for Australia (IBRA) classification system, the planning area comprises part of three IBRA regions: Esperance Plains (Recherche subregion ESP2), Mallee (Eastern Mallee subregion MAL1), and a small part of Coolgardie (Mardabilla subregion COO1). The proportion of each subregion in conservation reserves[8] is 29.04% (433 507 ha of 1 579 282 ha), 27% (936 130 ha, including some large individual reserves, of 3 426 723 ha), and 12.8% (236 882 out of 1 850 399 ha) respectively. As 15% is increasingly being seen as the benchmark for reservation in a comprehensive, adequate and representative reserve system (CALM 2003a), the Mardabilla subregion is under reserved. Further, despite the comparatively high reservation figures—achieved by the presence of large conservation reserves, some vegetation types for the Recherche and Eastern Mallee subregions remain very poorly represented and large areas of the subregions have been extensively cleared, leading to a biased representation within the subregion (CALM 2003a).

Therefore, additions to the public conservation estate to deliver a more comprehensive, adequate and representative conservation reserve system will need to be addressed during the planning process (see sections *Management Planning Area* and *Vegetation Communities and Associations*).

The planning area is adjacent to two Interim Marine and Coastal Regionalisation for Australia (IMCRA) regions; the WA South Coast and Eucla (Thackway and Cresswell 1998). There are no marine reserves near the planning area, although the waters within the Recherche Archipelago are proposed for marine reservation (CALM 1994).

Geology

The majority of the reserves lie within the Archaean Yilgarn Craton and the Proterozoic Albany-Fraser Orogen. Part of Nuytsland Nature Reserve extends into the Phanerozoic Eucla Basin and some of the islands of the Recherche Archipelago Nature Reserve are part of the Bremer Basin.

The Yilgarn Craton along the reserves is mostly granite covered by weathering products and soils. The main rock types within the Albany-Fraser Orogen are granite and gneiss intruded by dolerite dykes. The Eucla and Bremer basins are the youngest forms of geology in the area, formed by inundation of the ocean over the land. These basins comprise easily erodable sedimentary rocks, with predominantly limestone formations in the Eucla Basin.

The significant geomorphological features within the planning area have been identified as the granite hills and outcrops at Cape Le Grand and Cape Arid national parks, and the Recherche Archipelago (CALM 2003a). Granite peaks also act as a focal point for lightning strikes, the biggest cause of wildfire in the planning area (see section on *Fire*).

Other significant geomorphological features in the planning area include the peaks of the Russell Range including Mt Ragged, other inland hills and the karst[9] areas in Cape Arid National Park and Nuytsland Nature Reserve. Potentially there could also be stromatolite-like organisms in the salt lakes near Point Malcolm in Nuytsland Nature Reserve.

[8] A high reservation level does not necessarily follow that there is a comprehensive sample of the variety of environments and landscapes within the subregion—there can be a 'bias' in the system (Thackway and Cresswell 1995).

[9] Karst is a limestone region with underground streams and many cavities caused by dissolution of the rock.

While these geomorphological features are dominant scenic features, there are no formal geoheritage[10] sites within the planning area.

Catchment and Soil Protection

The rivers along the coast extend up to 80 km inland and discharge into inlets or estuaries. Most of the major rivers are west of Esperance.

Stokes, Torradup and Barker inlets are the major estuaries in the planning area. Torradup Inlet and Barker Inlet are within Stokes National Park and Nature Reserve 26885 respectively and are vested with the Conservation Commission. The tidal parts of Stokes Inlet were recommended for reservation as a marine reserve for the purposes of conservation of flora and fauna and public recreation, and managed in conjunction with Stokes National Park (CALM 1994). The inlet is a 'normally closed' lagoonal estuary (Bancroft *et al*. 1997), only opening occasionally to the ocean, due mainly to increased run-off from cleared agricultural land in the upper catchment. A terrestrial and marine integration study by the Department in 1998 recommended that estuaries and inlets previously identified for marine reservation in CALM (1994) that are 'normally' or 'permanently closed', should be considered for inclusion in the surrounding terrestrial reserves (Colman 1998). Therefore, this planning process will consider whether the inlet should be incorporated[11] into the terrestrial conservation reserve system. This would still provide protection of estuarine values as well as allowing for the practical and complementary management of the surrounding conservation reserves (see also sections *Brief Overview of the Planning Area – Reserves West of Esperance* and *Commercial Fishing*).

There are also several often interconnected wetland systems and freshwater lakes, such as Ewart's Swamp, within the planning area. Many of these are vulnerable to actions in the upper catchments. For example, clearing in the upper catchment can lead to changes in the season and level of inundation of some areas. Seasonally higher water levels have led to a reduction in the 'beach' area around Lake Gore, reducing the area available for breeding of hooded plovers (see section on *Native Animals – Birds*) and vegetation loss in low lying areas to the west of the lake. Salinity and siltation are also potential threats to Lake Gore, which is being assessed as a potential Natural Diversity Recovery Catchment. Salt loads have increased in Lake Gore and sedimentation has increased from 8 mm per 100 years to 40 to 60 cm in the last 50 years (T. Massenbauer pers. comm. 2005). Similar processes threaten estuaries such as Torradup and Stokes inlets within Stokes National Park.

Jenamullup, Jorndee, Poison and Fern creeks have been identified as 'near pristine' rivers with catchments still relatively uncleared (<20% cleared) (Gunby *et al*. 2004). Jorndee Creek and Poison/Fern Creek estuaries have also been identified as near pristine. Conversely, Dalyup Creek has 80% or more of its catchment cleared and, along with the Munglinup, Young and Lort rivers, has been identified as eutrophic. Continued liaison with catchment groups and other government departments aimed at reducing these sorts of impacts is required.

Groundwater is scarce and generally brackish to saline throughout the region. However, groundwater from Reserve 24486 is used for part of the Esperance water supply and complicates the recommendation for this reserve to be added to Lake Mortijinup Nature Reserve (Appendix 2 and see section on *Habitats – Wetlands*).

Native Flora

Herbarium data indicate that there are at least 1319 native taxa within the planning area from 147 families; the main families being Myrtaceae (eucalypts and paperbarks – 160 species), Proteaceae (banksias and grevilleas – 104 species), Papilionaceae (peas – 77 species), Orchidaceae (orchids – 66 species), Epacridaceae (heaths – 57 species), Cyperaceae (sedges – 54 species), Asteraceae (daisies – 53 species) and Mimosaceae (wattles – 43 species) (Herbarium data April 2006). However, long-term survey data on species occurrences for most reserves are limited, with data often confined to specific threatened species or for a few large reserves (CALM 2003a). Detailed knowledge of the flora of the planning area is poor as a result.

[10] State-wide and nationally significant features of geology that offer important information or insight into the formation or development of the continent, have high landscape value or that can be used for research, teaching or for a reference site.

[11] Actually re-incorporated, see earlier footnote on why Stokes Inlet was excluded from Stokes National Park in 1981.

Rare and Priority Flora

There are six species declared as 'rare flora' under the *Wildlife Conservation Act 1950* within the planning area: the small two-colour kangaroo paw (*Anigozanthos bicolor* subsp. *minor*), cumquat eremophila (*Eremophila denticulata* subsp. *trisulcata*), the Twin Peak Island mallee (*Eucalyptus insularis*), the goblet mallee (*Eucalyptus merrickiae*), the prickly honeysuckle (*Lambertia echinata* subsp. *echinata*), and *Stachystemon vinosus* (Herbarium data April 2006, Atkins 2006).

The small two-colour kangaroo paw is found within the planning area within the western portion of Lake Shaster Nature Reserve and historically near Mt Baring in Cape Arid National Park. There is also an unconfirmed report within Dalyup Nature Reserve. While the subspecies is known from a range of 290 km, few populations remain. The subspecies rapidly declines in the years following fire and become difficult to find. Threats include inappropriate fire regimes, damage from vehicles, road maintenance, poor recruitment, grazing from macropods and rabbits, and competition with weeds (Patten *et al*. 2004, R. Butler pers. comm. 2005).

The Twin Peak Island mallee is found on North Twin Peak Island within the Recherche Archipelago Nature Reserve, and also at Cape Le Grand National Park. On the mainland this tree is a small, slender-stemmed mallee no higher than 2 m, which usually grows amongst dense scrub in shallow loamy soil in crevices of Mt Le Grand and surrounding areas. On North Twin Peak Island, it takes the form of a tall mallee up to 8 m high, found along a watercourse on the western slopes of the island. The primary threat to the species is low population size/numbers to which frequent fire may be a potential threat, although the fire response of the species is still unknown.

A disjunct population of the goblet mallee is found within the planning area at Nuytsland Nature Reserve almost 160 km away from other known populations. Recent survey work suggests that populations have possibly been underestimated and hence this species may be recommended to be removed from the rare flora list in the future (R. Butler pers. comm. 2005).

The subspecies of the prickly honeysuckle occurs only within Cape Le Grand National Park near Lucky Bay. It occurs below and between rock outcrops, slopes and hillcrests. Populations of the subspecies are fragmented and there is a decline in both area and quality of habitat from the effects of *Phytophthora cinnamomi*. The main threats include poor survival of seedlings, small population sizes, limited genetic diversity and *Phytophthora* (Monks *et al*. 2001). Wildfire is a potential threat as the current populations are in long unburnt vegetation. The success of translocations in 1998 and 1999 was impacted by *P. cinnamomi* with one subpopulation now being regularly sprayed with phosphite (see section on *Diseases*).

In June 2006, *Stachystemon vinosus* and cumquat eremophila, both previously priority taxa, were declared as rare flora under the Wildlife Conservation Act. Cumquat eremophila was downgraded from rare in 1999 to Priority 4. However further taxonomic work has indicated that most listed populations are a related undescribed taxon and only three extant populations over a narrow range of 46 km are the true cumquat eremophila. Populations in the planning area occur near Mt Ragged in Cape Arid National Park. Threats include inappropriate fire and soil disturbance regimes, poor recruitment and declining populations, grazing and trampling by feral rabbits, camels and horses, and weed invasion (Fitzgerald *et al*. 2004). *Stachystemon vinosus* has been recorded within the planning area at Mt Ragged in Cape Arid National Park and north west of Mt Baring on unallocated Crown land (identified for consideration for as a potential addition to the conservation estate) adjacent to Cape Arid National Park. However further surveys have failed to relocate these populations and all other populations are small, fragmented and within Shire road reserves or mining tenements.

There are also 80 species of priority flora[12] within the planning area; three Priority 1, 32 Priority 2, 27 Priority 3 and 18 Priority 4 species (Herbarium data April 2006, Atkins 2006). Priority 1 and 2 flora in particular are

[12] Priority 1 species: taxa with few, poorly known populations on lands not managed for conservation. Highest priority for survey.
Priority 2 species: taxa with few, poorly known populations on conservation lands.
Priority 3 species: taxa with several, poorly known populations, some on conservation lands.
Priority 4 species: taxa in need of monitoring.
Priority 5 species: taxa in need of monitoring (conservation program dependent).

still considered to be under threat even though they are not declared as 'rare' under the Wildlife Conservation Act.

There are Interim Recovery Plans for the small two-coloured kangaroo paw, prickly honeysuckle and the cumquat eremophila. The *Declared Rare and Poorly Known Flora in the Esperance District* Wildlife Management Program Number 21 (Craig and Coates 2001) gives information about the threatened flora species, and makes management recommendations.

Species Richness and Endemism

Cape Arid National Park appears to be particularly rich in flora species based on recently collected data (Keighery unpubl.). The northern part of Cape Arid National Park straddles a large part of a major biogeographical transition zone between the South-West Botanical Province and the semi-arid South-Western Interzone (Beard 1975, 1980), and consequently supports range end flora and fauna species from both zones—recent information indicates that Cape Arid National Park may be on a par with the Fitzgerald River and Stirling Range national parks for flora and probably even richer than these for fauna values. The southern end of Russell Range in particular, within Cape Arid National Park, has been identified as a centre of flora endemism and high species diversity (CALM 2003a).

There are at least 29 species endemic to the planning area, most of these are still common within the area. However, of the 86 rare and priority flora (mostly the rare, Priority 1 and Priority 2 taxa) recorded within the planning area, 44 taxa are either locally endemic (with a range of less than 150 km) or endemic to the bioregion (Esperance, Mallee or Coolgardie bioregions as applicable) (WA Herbarium data 2005).

Vegetation Communities and Associations

Threatened Ecological Communities

There is one threatened ecological community (TEC) with five occurrences within the planning area. The 'Russell Range mixed thicket vegetation complex' TEC is a narrow endemic community with a range of less than 50 km^2 across Cape Arid National Park and Nuytsland Nature Reserve. Although the community is widespread within its range and most or all of the former occurrences remain, it is classified as being vulnerable to existing or future threatening processes such as changed fire regimes and dieback caused by *Phytophthora cinnamomi*.

Vegetation Associations

Almost all of the planning area is within the Esperance Plains and Mallee regions of the South-West Botanical Province (Beard 1973, 1975, 1980). The very eastern section is in the South-Western Interzone.

There are 24 vegetation associations within the planning area (Beard 1973, 1975, 1980). Almost half of these are significant in that they have been highly cleared or poorly reserved (based on criteria used by Hopkins *et al*. 2000). Although five of the associations are represented in the additions proposed in the *South Coast Region Regional Management Plan* (CALM 1992), none are adequate to ensure the long-term security of the associations. Therefore, preliminary work has been carried out by the Department's Esperance District to recommend additions to the conservation reserve system based on analysis of the vegetation associations as well as a finer soil landscape assessment. From this work, therefore, there are several potential areas for addition to the planning area to be investigated further during the management planning process (Appendix 2, maps 2 and 3). These potential additions (of which boundaries are to be determined throughout the planning process) include:

- four reserves north of Lake Shaster Nature Reserve: unvested Crown reserve 18030 and surrounding unallocated Crown land, unvested Crown reserve 29448, unvested Crown reserve 29447 and unvested Crown reserve 29446;
- Oldfield river corridor (unvested Crown reserves 31757 and 31758); and
- part of Reserve 28170 west of Cape Le Grand Road.

Other areas of remnant vegetation identified as limited or poorly reserved are mostly on freehold land. Mechanisms to provide protection to these remnants will be considered during the planning process (e.g. voluntary covenants or Land for Wildlife agreements).

Native Animals

Threatened and Specially Protected Fauna

There are 13 threatened and specially protected fauna taxa listed under the Wildlife Conservation Act recorded within the planning area (February 2006 data). These include:

- five mammals—New Zealand fur-seal (*Arctocephalus forsteri*), Australian sea-lion (*Neophoca cinerea*), black-flanked rock-wallaby (*Petrogale lateralis lateralis*), Recherche rock-wallaby (*Petrogale lateralis hacketti*), and chuditch (*Dasyurus geoffroii*)[13];
- six birds – Australasian bittern (*Botaurus poiciloptilus*), Recherche Cape Barren goose (*Cereopsis novaehollandiae grisea*), peregrine falcon (*Falco peregrinus*), malleefowl (*Leipoa ocellata*), Carnaby's black cockatoo (*Calyptorhynchus laitirostris*), and the western ground parrot (*Pezoporus wallicus flaviventris*); and
- two reptiles – Recherche dugite (*Pseudonaja affinis tanneri*), and the carpet python (*Morelia spilota imbricata*).

There is need for further fauna surveys in the planning area to fill in the knowledge gaps for some reserves and to follow up historical records of threatened fauna populations. While some survey work for vertebrates has been carried out in several reserves, and information collected for the bird atlas and threatened bird distributions, most reserves do not have any long-term species presence/absence data, even for vertebrates (CALM 2003a). Similarly, there is no information on fauna for many of the proposed additions and many habitats for threatened fauna have not been surveyed.

Mammals

Pinnipeds

New Zealand fur-seals live and breed along the south coast of Australia and New Zealand and nearby sub-Antarctic islands. Numbers are steadily increasing after nearly being hunted to extinction for their meat, oils and hides in the early nineteenth century by European sealers (see section on *Non-indigenous Heritage*). A survey of the Recherche Archipelago in 1952 revealed only one colony of 50 adult fur-seals at Salisbury Island (Serventy 1953), whereas there are now at least 14 breeding colonies (Shaughnessy 1990, Shaughnessy *et al*. 1994, Gales and Wyre 1996, Gales *et al*. 2000). In 1990, it was estimated that 89% of the State's population of New Zealand fur-seals were from the Recherche Archipelago and in particular, two thirds from three major colonies in the Recherche Archipelago; Salisbury Island, Seal Rock and Cooper Island (Shaughnessy 1990). At least another 17 non-breeding islands are used as haul-out sites, the most important islands being Termination, Little and Pointer (Shaughnessy 1990, Shaughnessy *et al*. 1994).

Threats to the New Zealand fur-seal include illegal shooting, entanglement in fishing and aquaculture gear (see section on *Aquaculture*), fisheries, human disturbance during breeding seasons (including tourism, aircraft and vessels), oil spills (see section on *Marine Pollution*) and disease (see section on *Diseases – Animal Diseases*) (Shaughnessy 1999). Shaughnessy (1990) recommended that the major fur-seal colonies be considered for prohibited area status under section 62 of the Conservation and Land Management Act. This will be considered during the management planning process[14], similar to recent measures taken to protect Australian sea-lions at Carnac Island (CALM 2003b) and the Turquoise Coast islands (CALM 2004).

The Australian sea-lion occurs only in Western Australia and South Australia and is Australia's only endemic, and least numerous, seal species. Populations of the Australian sea-lion also declined significantly in the early nineteenth century due to hunting, and recovery has been much slower than that of the New-Zealand fur-seal. Several colonies have also declined by a further 25% over the last 10 years (DEH 2005a). This may be due to different life cycle characteristics and interaction with humans (fishing practices and disturbance from island visitation). The total population size is thought to be about 11 200 across 67 breeding colonies (DEH 2005a)—the population size along Western Australia's south coast is estimated to be between 1750 and 2210 (Gales *et al*. 1994). Within the planning area, Australian sea-lions reside and breed on at least 16 of the islands of the Recherche Archipelago (Gales 1990, Gales *et al*. 1994, Gales and Costa

[13] Also, there were possible bilby (*Macrotis lagotis*) sightings along Fisheries Road in Cape Arid National Park after the 2002 fires, and the Munglinup River corridor after the Dec/Jan 2005 wildfire.

[14] Where human interaction is deemed to adversely impact on other fauna, prohibited access areas will also be considered during the planning process. In particular, seabird breeding colonies, for example the breeding areas for the little penguin and little shearwater on Woody Island.

1997) as well as Investigator Island (Gales and Wyre 1999). This represents over 50% of the breeding locations in Western Australia and over 25% of the total known breeding locations. Kimberley and Six Mile islands were two of the three largest breeding colonies in the planning area, and two of the top five in the State.

Unique amongst pinnipeds, the Australian sea-lion has a non-annual breeding season that differs across the breeding colonies. Breeding occurs about 18 months apart, so pupping in one colony occurs during different seasons from year to year (Gales *et al*. 1994). The females show extreme levels of breeding fidelity to the site they were born at, so previously inhabited colonies are unlikely to be recolonised by immigration from neighbouring colonies. This also leaves individual colonies vulnerable to localised depletions or extinctions caused by environmental or human disturbance.

In 1950, Serventy (1953) reported many sea-lions on the beach of Daw Island and breeding in the vegetation adjacent to the beach. Gales *et al*. (1994) visited Daw Island six times in the period 1990 to1994 and no breeding, or more than a single sea-lion, was observed. Gales *et al*. (1994) linked this to the use of the island as an anchorage for commercial fisherman. At least another 51 islands and/or rocks within the Recherche Archipelago are used as haul-out (resting) sites. These sites are also vulnerable to human disturbance. Other threats include entanglement in, and ingestion of, discarded fishing gear and other marine debris (see section on *Marine Debris*), oil spills (see section on *Marine Pollution*) and disease (see section on *Diseases – Animal Diseases*). The Australian sea-lion was listed as vulnerable in February 2005 under the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act).

There are four unnamed islands south of the western part of Lake Shaster Nature Reserve identified as potential additions to the management planning area. At least one of these is known to be a haul-out site for Australian sea-lions. The planning process will consider whether these islands should be added to the conservation estate to protect the Australian sea-lions and the other values of the islands.

The Department has prepared a draft pinniped management program (Gales and Wyre 1999). This program identified six islands in the planning area to be key sites for New Zealand fur-seal population monitoring: Investigator Island, Seal Rock, Hood Island, Salisbury Island, Daw Island and New Year Island. Four islands have been identified to monitor Australian sea-lion populations: Investigator Island, Kimberley Island, Salisbury Island and Six Mile Island.

Occasionally other seals that normally live in the Antarctic or sub-Antarctic visit the planning area. Some of these animals are injured or in poor condition (Mawson and Coughran 1999, Gales *et al*. 1992). The Australian fur-seal (*Arctocephalus pusillus*), sub-Antarctic fur-seal (*Arctocephalus tropicalis*), leopard seal (*Hydrourga leptonyx*) and Southern elephant seal (*Mirounga leonina*) have all been sighted within the eastern end of the planning area. These species are not listed as threatened or specially protected under Western Australian legislation, however, the Australian fur-seal and the Southern elephant seal are listed as vulnerable under the EPBC Act and are covered under a recovery plan (DEH 2004).

Rock-wallabies

Two subspecies of rock-wallaby occur in the planning area—the black-flanked rock-wallaby on Salisbury Island and the reintroduced populations within Cape Le Grand National Park, and the Recherche rock-wallaby on Wilson, Mondrain and Westall islands of the Recherche Archipelago.

The black-flanked rock-wallaby is confined to Western Australia, where it has a disjunct distribution in the Pilbara, the Wheatbelt and the South Coast. It has declined in distribution and abundance over much of its range with local and regional extinctions still occurring (Pearson and Kinnear 1997). Prior to the reintroduction into Cape Le Grand National Park in 2003, the only extant population on the South Coast was on Salisbury Island (320 ha), the third largest island in the Recherche Archipelago. However, there are fossil deposits within Cape Arid National Park and anecdotal records of populations at Mt Ragged which indicate the black-flanked rock-wallaby did once occur on the adjacent mainland (the Mt Ragged population is thought to have been impacted by a major wildfire in 1943).

A 1982 survey of Salisbury Island estimated the black-flanked rock-wallaby population to be 249 animals (WA Department of Fisheries and Wildlife 1982, Burbidge *et al*. 1982). Main and Yadav (1971), who

examined macropod populations on a number of islands off Western Australia, concluded that the smallest viable insular macropod population is between 200 and 300 animals. In the summer of 1992-93, two-thirds of Salisbury Island was burnt and although the population of black-flanked rock-wallaby persists, it is not known at what numbers (Burbidge and Halse pers. comm. cited in Pearson and Kinnear 1997).
Threats to the Salisbury island population primarily relate to fire, introduction of predators and/or disease (Burbidge 2004a). As the island is remote and difficult to land at, direct human impacts are unlikely. There is a recovery plan for the black-flanked rock-wallaby (Hall and Kinnear 1991) and a recovery outline in the *Action Plan for Australian Marsupials and Monotremes* (DEH 1996).

As it is known that the black-flanked rock-wallaby did exist in the planning area on the mainland, as part of the recovery plan for the subspecies, 26 black-flanked rock-wallabies from Mt Caroline Nature Reserve in the Wheatbelt were translocated to Cape Le Grand National Park in 2003 and 2004, following six years of baiting for foxes. It was hoped that the translocated population would increase by 50% within three years. Surveys in 2004 were successful in relocating nine rock-wallabies which had dispersed up to 10 km from their release point (M. Fitzgerald pers. comm. 2005), indicating an ability to expand their range. However, subsequent surveys have failed to relocate the rock-wallabies—presumably because the reflective ear tags have fallen off. Also no evidence of breeding has been detected, so it cannot be determined whether the reintroduction has been successful as yet. Threats to this population are wildfire and introduced predators such as the European fox (Kinnear *et. al* 1988).

The Recherche rock-wallaby is restricted to Wilson (90 ha), Mondrain (810 ha) and Westall (70 ha) islands. These populations are stable but are considered vulnerable to disturbance. Care needs to be taken to prevent introductions of predators (including domestic dogs) or herbivores (particularly rabbits) to these islands (Pearson and Kinnear 1997). Other potential threats include wildfire, which may burn out entire island populations (Burbidge 2004a). For example, Mondrain was almost entirely burnt in 1802 by Matthew Flinders and his crew, 60% burnt in 1944, and 90% burnt in 2002 (see section on *Fire*). Fortunately the rock-wallabies survived these fires and numerous animals were observed on the island after the 2002 fire (Pearson *et al*. 2004). However, fire still remains a potential threat, and is likely to be a major determinant of species distribution on the islands (D. Pearson pers. comm. 2005) (see section on *Fire*). A recovery outline for the Recherche rock-wallaby is included in the *Action Plan for Australian Marsupials and Monotremes* (DEH 1996).

Chuditch
Chuditch mostly occur in the south-western jarrah forests, but they also persist in the drier mallee woodland areas to the east of the forests, including those found in the planning area (CALM 1994). Previously found in Cape Le Grand and Cape Arid national parks within the planning area (as evidenced by cave deposit sub-fossil records), the chuditch was reintroduced into the Thomas River area in Cape Arid National Park in 1998 and 1999. These individuals have since produced offspring, although no animals have been trapped since 2002. Further surveying will occur in late 2006.

Chuditch den in hollow logs, earth burrows and tree hollows. Threats include competition and predation by foxes and feral cats, illegal shooting and poisoning, epidemic disease, land clearing, habitat alteration through the removal of suitable den logs, and road traffic (CALM 1994).

Birds
There are records of 230 bird taxa within the planning area, with more than 180 taxa within Cape Arid National Park alone. By comparison, the Stirling Range National Park and Fitzgerald National Park support 140 taxa and 170 to 180 respectively). Cape Arid National Park is also the eastern limit of distribution for 10 Western Australian taxa including the western ground parrot, scarlet robin (*Petroica multicolor*), western spinebill (*Acanthorhynchus superciliosus*) and red-eared firetail (*Stagonopleura oculata*).

The Recherche Archipelago Nature Reserve is an important breeding site for migratory species and many breeding seabirds. Halse *et al*. (1995) recorded 359 sooty oystercatchers (*Haematopus fuliginous*) within the Recherche Archipelago in 1993, the second highest count for a single locality in Australia. Several petrels and albatrosses also frequent the planning area, including the threatened wandering albatross (*Diomedea exulans*) and the northern giant-petrel (*Macronectes halli*), which is listed as vulnerable under the EPBC Act.

Threats to these species mainly involve long-line fishing. There is a recovery plan for albatrosses and giant petrels (Environment Australia 2001c).

Migratory shorebirds are commonly found in the wetland and coastal areas of the planning area such as Lake Gore Nature Reserve, Lake Mortijinup Nature Reserve and beaches of the coastal nature reserves and national parks. Twenty-three of the 36 identified migratory shorebirds in the Draft Wildlife Conservation Plan for Migratory Shorebirds (DEH 2005b) occur within the planning area.

Australasian Bittern

One of Australia's most at risk waterbirds, the Australasian bittern has declined markedly over the last 50 years (Marchant and Higgins 1990, Jaensch 2004). The preferred habitat of the Australasian bittern includes shallow vegetated freshwater or brackish wetlands such as sedgelands. The Australasian bittern has been recorded in Cape Le Grand and Cape Arid national parks and in the proposed additions in between (reserve 28170 west of Cape Le Grand Road and in the unallocated Crown land adjacent to Alexander Nature Reserve).

The main threats to the bittern are salinisation or drainage of wetlands, as they have narrow habitat preferences and are more sensitive to overall habitat loss than many other wetland species (Garnett 1992, Garnett and Crowley 2000). Inappropriate fire regimes, which destroy fringing vegetation, can also reduce habitat suitability (Marchant and Higgins 1990).

Recherche Cape Barren Goose

The Cape Barren goose breeds on islands from the Bass Strait to the Recherche Archipelago. They are grazing birds and are usually found on beaches, rocky prominences and grassed areas or, when breeding, in low scrub (Department of Fisheries and Wildlife 1972).

There are two subspecies of Cape Barren geese, with the Recherche subspecies occurring in Western Australia. It appears to be genetically different from the eastern subspecies, is slightly larger and has different coloured plumage. The eastern subspecies has recovered well from the pressure of hunting and recent estimates suggest there are approximately 12 000-13 000 in Bass Strait and a further 3000-4000 in South Australia (Burbidge *et al*. 1993). In contrast, the Recherche subspecies is considered to have been naturally rare, with a historic population of only 1000 birds. As such, it is considered vulnerable[15].

The Cape Barren goose occurs in the planning area in the Recherche Archipelago Nature Reserve, as well as occasionally on beaches in Cape Arid National Park, Cape Le Grand National Park and Stokes National Park in summer. Surveys in the Recherche Archipelago have been few, and mostly only for part of the area. In 1991, concerns were raised that there might be less than 200 birds left following drought and high summer temperatures. In 1992, a survey of 56 islands revealed 232 geese on 35 islands (200 birds) and one mainland site (Six Mile Hill, 32 birds) (Haberley 1992, Shaughnessy and Haberley 1994). Subsequently, the first comprehensive survey was conducted in 1993, where the population was estimated to be 631 birds amongst 75 islands and rocks of the Recherche Archipelago (612 birds), two locations on the mainland (Cape Arid National Park and on a farm near Pink Lake) and also on Red Islet, 200 km to the west (Burbidge *et al*. 1993, Halse *et al*. 1995). The islands with the highest counts were those with a large proportion of grassy or herbaceous vegetation such as Cull Island[16] (70 birds), Daw Island (39), Round Island (31) and Wickham Island (31). Halse *et al*. (1995) concluded that, apart from the 1991 decline, the population had remained stable for the last 50 years but that additional surveys were required to confirm long-term population trends.

Potential threats include the introduction of predators to its breeding islands. Natural events such as hot summers, drought and climate change may also have a profound effect (Halse *et al*. 1995, Garnett and Crowley 2000, Burbidge 2004b).

[15] International criteria suggest that any taxa with less than 1000 adults should be considered 'vulnerable' to extinction (IUCN 1994).

[16] The vegetation on Cull Island is thought to be correlated to the long period of grazing by sheep and goats, as well as frequent fire prior to reservation as a nature reserve. Goats are still present on Cull Island (see section on *Introduced Animals*).

Peregrine Falcon

The peregrine falcon (*Falco peregrinus*) is a specially protected species that has been sighted in Cape Le Grand National Park and the Recherche Archipelago Nature Reserve. The peregrine falcon is not restricted to a particular habitat and can be found on islands, along coastal cliffs as well as in woodlands and open grasslands. Peregrine falcons are easily disturbed so access to nesting areas should be restricted during the breeding season. This could be achieved by way of a 'closed area' notice or temporary control area under the Conservation and Land Management Act and regulations.

Malleefowl

Within the planning area, malleefowl occur in the northern part of Cape Arid National Park and some adjacent areas. Preferred habitat is tall mallee, low woodland or acacia scrub (Benshemesh 1999, Burbidge 2004b). Part of the unallocated Crown land to the west of Cape Arid National Park, identified as a potential addition the planning area, includes this type of habitat (the southern part of the unallocated Crown land is western ground parrot habitat, see below).

Abundant leaf litter found in long unburnt vegetation is preferred for nesting (Benshemesh 1999, Garnett and Crowley 2000). Fire can render habitat unsuitable for up to 15 years before, and maximum population densities are attained only after 40 years (Benshemesh 1999). Fragmented populations (leading to inbreeding and infertility), increased fire frequency and predation by foxes are the main threats facing malleefowl on the conservation estate (Benshemesh 1999, Garnett and Crowley 2000, and Burbidge 2004b). The chicks are easy prey for foxes, as the parents leave the mound before the chicks hatch, and even though the chicks can fly within hours of climbing out of the mound, they rely mostly on camouflage for protection.

Carnaby's Black Cockatoo

The threatened Carnaby's black cockatoo occurs in eucalypt woodlands, shrubland, and hakea and banksia heathlands. Flocks of Carnaby's black-cockatoo sometimes forage as far east as the planning area within the coastal heathlands of Lake Shaster Nature Reserve, Stokes National Park, Cape Le Grand National Park and Cape Arid National Park.

Threats to the species include loss of feeding habitat close to breeding habitat (through native vegetation clearance, fire and *Phytophthora*), loss of breeding hollows, competition from other hollow-nesters (including other birds, possums and feral bees) and poaching. A recovery plan has been prepared for Carnaby's black cockatoo (Cale 2003).

Western Ground Parrot

The threatened western ground parrot is a cryptic ground-dwelling parrot with a fragmented distribution. The area of occupancy is small and only four isolated populations are known, with three of these within the planning area; two within Cape Arid National Park and one within Nuytsland Nature Reserve (Garnett and Crowley 2000, Newbey *et al*. 2006). The other known population is within Fitzgerald River National Park to the west of the planning area. Preferred habitat is floristically diverse low coastal heathlands of various fire ages between 15 and 35 years, with the densest populations occurring in the older post fire vegetation (Watkins 1985).

The total number of birds for 1990 was estimated to be 378, which included an estimate of 75 for the Poison Creek Road site in Cape Arid National Park (Watkins and Burbidge 1992). Recent estimates suggest that total numbers may now be below 250 (Burbidge and Comer 2003). A number of major fires in Cape Arid National Park, which together with other events such as flooding, increased predation following the fires and the chuditch translocations, may have impacted on western ground parrot populations in the park (Watkins 1985, McNee 2000). After no confirmed sightings in the park since 1989 (Burbidge 1999, McNee 2000, Danks 2003), a 2003 western ground parrot survey discovered two populations at the Poison Creek Road area and also at the Telegraph and Pasley tracks area (Danks 2003, McNee and Newbey 2003, Newbey 2004). Another population was also located at the Point Malcolm Track area of Nuytsland Nature Reserve in 2003, and later confirmed in 2005 to be at least 19 western ground parrots, the first record for the reserve and the most eastern population recording (McNee and Newbey 2003, Newbey 2004, Newbey *et al*. 2006).

Within the planning area, there have also been sightings of the western ground parrot in Lake Shaster Nature Reserve, Cape Le Grand National Park, the part of Reserve 28170 which is proposed to be added to Cape Le

Grand National Park (pers. comms. cited in McNee 2000 and McNee 2001), and the unallocated Crown land proposed to be added to Alexander Bay Nature Reserve (Storr 1987). There is also an unconfirmed sighting in the unallocated Crown land west of Cape Arid National Park near Balladonia Track. This area is a potential addition to the planning area and has been identified as suitable habitat for western ground parrots (area to the north of the unallocated Crown land is malleefowl habitat). Long unburnt vegetation in these areas, and also in Stokes National Park, may be potential western ground parrot habitats, and even if further surveys do not find western ground parrot populations in these areas, their absence may be due to insufficient numbers of western ground parrots to colonise them, rather than some deficiency in the habitat (Cale and Burbidge 1993).

Extensive wildfire is the major threat to this species, coupled with predation by foxes (Burbidge 2004b). Previous management recommendations for western ground parrot habitat in Cape Arid National Park have been total fire exclusion and buffer burning, in particular between the populations and granite hills to the south-east, as these are foci for lightning strikes (Burbidge *et al*. 1989, Burbidge *et al*. 1997). It is still unknown what age of vegetation can support western ground parrot without there being any older vegetation nearby. Therefore, further assessment is required to when western ground parrots re-invade burnt areas. Also under the Western Shield program, baiting for predator control began in Cape Arid National Park in 1996.

The influence of *Phytophthora* on heath vegetation may also be a potential threat (Watkins and Burbidge 1992, Cale and Burbidge 1993) however, the effects of such vegetation changes are still unknown. For example, the loss of large *Banksia* shrubs may actually improve the western ground parrot habitat in some areas, as it may increase the dominance of other plant species that the ground parrot feeds on (Burbidge *et al*. 1997).

An interim recovery plan has been in place for the western ground parrot since 1997 (Burbidge *et al*. 1997).

Reptiles

There are records of 57 reptile taxa within the planning area. Of particular significance are the Recherche dugite and the carpet python. The former occurs on Boxer and Figure of Eight islands in the Recherche Archipelago Nature Reserve—because the subspecies is an island endemic and occurs in low numbers it is considered vulnerable. The carpet python is present in *Banksia* and eucalypt woodlands in the planning area from Lake Shaster Nature Reserve to Cape Arid National Park, and occurs on Mondrain and North Twin Peak islands in the Recherche Archipelago Nature Reserve. Due to habitat clearing and degradation it has declined over much of south-western Australia, and it is now specially protected to try and deter people from poaching it from the wild. Predation by foxes may also be a threat. The carpet python is also listed as priority 4 as it has been identified as in need of monitoring. A subspecies recovery outline has been prepared by the Australian Nature Conservation Agency (Cogger *et al*. 1993).

Priority Fauna

The Department also identifies 'priority' fauna requiring additional survey and/or research to determine their true conservation status. There are 13 priority species of vertebrate fauna within the planning area, including one priority 3, 11 priority 4 and one priority 5 species. These are:

- Priority 3; southern death adder (*Acanthopis antarcticus*);
- Priority 4: western brush wallaby (*Macropus irma*), Australian bustard (*Ardeotis australis*), grey falcon *Falco hypoleucos*), little bittern (*Ixobrychus minutus dubius*), square-tailed kite (*Lophoictinia isura*), eastern curlew (*Numenius madagascariensis*), freckled duck (*Stictonetta naevosa*), hooded plover, carpet python (*Morelia spilota imbricata*); and
- Priority 5: woylie (*Bettongia penicillata ogilbyi*), tammar wallaby (*Macropus eugenii derbianus*), quenda (*Isoodon obesulus fusciventer*).

Threats to some of the priority mammal and bird species include fox predation, altered fire regimes, competition from introduced herbivores, and loss of habitat and fragmentation/alteration.

The hooded plover is a priority species of note, it is low in numbers and is a ground-nesting plover that breeds on coastal beaches and on the edges of salt lakes within the planning area. Breeding sites within the

planning area include: Thistle Cove in Cape Le Grand National Park, and Yokinup Bay and Thomas River mouth and beach in Cape Arid National Park. Sites where 20 or birds have been sighted include Barker Inlet (Nature Reserve 26885), Carbul, Gidon and Kubitch lakes (potential additions to the planning area/Lake Gore Nature Reserve), Lake Gore, near Cape Pasley in Cape Arid National Park, and near Israelite Bay within Nuytsland Nature Reserve (Raines 2002).

The hooded plover eggs and flightless hatchlings are at risk from introduced predators, domestic dogs, and pedestrian and vehicular traffic (see section on Recreational Use – Recreational Driving and Motorbiking) (Garnett and Crowley 2000, Raines 2002, Baird and Dann 2003). Those that breed on the beach rely on the tidal zone for feeding for approximately 2 months between eggs being laid and the young fledging (Singor 1999). Buick and Paton (1989) showed that the use of ocean beaches for off-road vehicles in South Australia potentially reduced the reproductive output of hooded plovers, as the equivalent of 81% of artificial nests on the beaches were being run-over during the incubation period. Pedestrian or vehicle use on the beaches within the planning area may have already caused breeding hooded plovers to avoid many suitable areas within the planning area.

Hooded plovers also inhabit salt lakes, and Lake Gore within Lake Gore Nature Reserve is considered to be the single most important drought refuge site in Australia for hooded plovers, with sightings of up to 1555 birds (see section on Habitats – Wetlands) (ANCA 1996, Newbey 1996, Singor 1999, Raines 2002). However, recent flooding of the Lake Gore wetland system (see section on Soil and Catchment Protection) has altered the suitability of the site and significantly reduced the numbers using the lake (Raines 2002).

Possible Reintroductions of Threatened Fauna

Species once recorded in the planning area (including sub-fossil records) that could be considered for reintroduction include:

- black-flanked rock wallaby, tammar wallaby, southern dibbler (*Parantechinus apicalis*), white-tailed dunnart (*Sminthopsis granulipes*), ringtail possum (*Pseudocheirus* sp.), and the western mouse (*Pseudomys occidentalis*) in Cape Arid National Park;
- heath rat (*Pseudomys shortridgei*) in Cape Le Grand National Park; and
- woylie (*Bettongia penicillata*) in Cape Le Grand National Park, in Cape Arid National Park and on several islands of the Recherche Archipelago.

All translocation proposals need to accord with the Department's *Policy Statement 29 – Translocation of Threatened Flora And Fauna* in conjunction with draft *Policy Statement 9 – Conserving Threatened Species and Ecological Communities*, *Policy Statement 33 – Conservation of Endangered and Specially Protected Fauna in the Wild*, *Policy Statement 44 – Wildlife Management Programs* and *Policy Statement 50 Setting Priorities for the Conservation of Western Australia's Threatened Flora and Fauna*.

Habitats

Granite Outcrops and Mountains

Granite outcrops support microhabitats and soil moisture regimes that provide a refuge for many species whilst the surrounding environment is subjected to dramatic climatic changes, which may have facilitated genetic divergence and speciation (Hopper *et al*. 1997). There is a large number of flora that are endemic to the granite outcrops in the south-west and many species occur as disjunct populations or are restricted to granite outcrops. For example, Hopper *et al*. (1997) determined that 16% of orchids and 24% of eucalypts on south-west granites are endemic. The deeper soils surrounding granite outcrops favour larger woody perennials and a high number of these species are obligate seeders (i.e. plants that are killed by fire and recruit only from seed) (Hopper *et al*. 1997, Hopper 2000).

Granite outcrops also support a high proportion of the threatened flora, with 10% of the State's threatened flora (1998 data) found on granite outcrops (Brown *et al*. 1998). The near coastal hills including Mississippi Hill within Cape Le Grand National Park, and Mt Ragged within Cape Arid National Park are identified as refugia for threatened flora such as the prickly honeysuckle (CALM 2003a).

The main threats to granite communities are frequent fires, invasive weeds and dieback caused by *Phytophthora* (Hopper *et al*. 1997). Recreation can also result in vegetation loss, soil compaction and loss of water infiltration. This increases water run-off and hence the potential for erosion.

Wetlands

There are numerous significant wetlands within the plan area. The Lake Gore System (over 4000 ha) is a Ramsar wetland that has international importance for wetland birds. It is a good example of a system of saline coastal lakes of varied depth and salinity. The Ramsar site includes the entire area of Lake Gore Nature Reserve, and the eastern part of Nature Reserve 26885. Quallilup Lake within Reserve 30672 is proposed to be added to the Ramsar site (Environment Australia 2001a). Other lakes that have the potential to be added to the Ramsar site include Gidong, Kubitch and Carbul lakes (unallocated Crown land identified as potential additions to the planning area). These lakes are part of the 1500 ha nationally important wetland system also designated around Lake Gore. Only part of nationally important designated area is within the planning area.

Lake Gore supports up to 1600 hooded plovers (priority 4), approximately one third of the global population. Twenty thousands banded stilts (*Cladorhynchus leucocephalus*) have also been observed at Lake Gore, almost 10% of the global population. The lake is important for moulting birds during spring/summer, such as the Australian shelduck (*Tadorna tadornoides*), a significant migration stop-over area for migratory shorebirds, and as drought refuge for thousands of other waterbirds.

Surveys of the area have recorded 55 species of waterbirds within the system including 18 listed under international treaties and eight species that were breeding at Lake Gore. The highest number of waterbirds recorded at the lake was 29 273 in March 1988. Whilst bird counts have not reached these numbers since, the annual use of the lake of individual waterbirds probably still exceeds 20 000.

Threats to the system include vegetation clearing and agricultural use in the upper catchment causing salinisation, excessive inundation and increased nutrient loads in the water bodies and weeds. Sediment cores taken from Lake Gore indicate that deposition/siltation of the lake has increased 50 times since European settlement (see section on *Soil and Catchment Protection*).

The nearby Mortijinup Lake System is also of national importance (Environment Australia 2001a). The system comprises Lake Mortijinup Nature Reserve and part of Reserve 24486 (currently proposed to be added to Lake Mortijinup Nature Reserve). It is a good example of a system of relatively undisturbed coastal lakes of south-western Australia. It is a major breeding area for the little black cormorant (*Phalacrocorax sulcirostris*) and a regionally significant drought refuge area for the freckled duck (*Stictonetta naevosa*). Threats to the system include salinisation of inflow, excessive inundation of wooded swamps due to clearance in the catchment, and frequent fire.

Other coastal wetlands of subregional significance (e.g. Lake Shaster, Quallilup Lake, Mainberup Swamp and Ewart's Swamp) are subject to the same types of threats as those listed above.

Riparian Zones

Riparian zones are ecologically and hydrologically linked to water bodies and often provide key corridors for small mammal and bird dispersal. Protection and restoration of riparian vegetation is important in maintaining river and where applicable, connecting wetland, health. River fringing vegetation and floodplains often provide a filtering mechanism, filtering out sediment, nutrients and other pollutants.

The average condition of riparian vegetation within the Recherche subregion was assessed in 2002 to be 'degraded' with a trend of 'declining' (NLWRA 2002). Riparian zones within the subregion identified include Lort River, Young River, Oldfield River and Dalyup River. Threats include vegetation clearance, fragmentation, grazing, feral animals, weeds, increased salinity, altered hydrology, pollution and broad acre farming (CALM 2003a). It is proposed to add the Lort and Young river corridors to the conservation estate (Appendix 2). The Oldfield River corridor south of South Coast Highway will also be considered as part of the management planning process.

Riparian vegetation within the Lake Gore wetland system is also highly degraded, and 54% of the floodplain vegetation is affected by shallow watertables and inundation (T. Massenbauer pers. comm. 2005).

Islands

The islands of the Recherche Archipelago provide refugial habitat for terrestrial fauna and relictual populations of mammals once widespread on the mainland such as critical weight mammals. The threatened Recherche subspecies of the Cape Barren goose only breeds on islands of the Recherche Archipelago, with Cull Island being the main breeding island for the bird. The islands also provide habitat for the threatened black-flanked rock-wallaby (the only island population of the wallaby south of the Pilbara), the Recherche rock-wallaby (endemic to the Recherche Archipelago), tammar wallaby (priority 5) and various species of reptiles including the threatened Recherche dugite (endemic to the Recherche) and the specially protected carpet python (also priority 4).

The islands also provide haul-out and breeding sites largely free from interference for marine fauna[17] such as the New Zealand fur-seal and Australian sea-lion (both specially protected, see section on *Native Animals – Mammals*). Pinniped breeding and haul-out sites are considered 'critical habitat' for continuation of these species (Lee and Bancroft 2001). However, human disturbance is still a threat at some island colonies, particularly during the breeding season.

Islands also provide important breeding sites for birds such as the little penguin (*Eudyptula minor*), shearwaters and petrels.

Intertidal Zones

The flat shallow intertidal rocky shores and platforms of the islands and the coastline form important feeding grounds for the oystercatchers, shorebirds and marine and terrestrial raptors (e.g. osprey and sea eagles). Many of these are protected by international agreements such as JAMBA, CAMBA and the Bonn Convention. Threats include marine pollution, vehicle use along beaches and introduced predators, particularly domestic dogs.

Fragmentation

Conservation of biodiversity in developed environments requires measures that will maintain connectivity for species, communities and ecological processes at multiple scales (Watson and Wilkins 1999). Despite the size of many of the national parks and nature reserves within the planning area, secure linkages with other areas of remnant vegetation are required to provide fauna with:

- migratory routes;
- access to areas containing seasonally variable food and other resources; and
- escape and recolonisation routes, especially relevant in terms of large wildfires and potential long term climatic impacts of global warming.

The South Coast Macro Corridor project has identified a network of potential major vegetated corridors that would provide a link from west to east across the coast, and from the coast into the inland regions. Within the planning area, the coastal macro corridor is significant. An example of a section of this corridor is the linkage between Mullet Lake Nature Reserve and Cape Le Grand National Park. Other smaller corridors of native vegetation (e.g. Lort and Young river corridors) are also worthy of further study/assessment (Watson 1991).

The draft management plan will help to identify key corridors of natural vegetation, for example where reserve management by the Department or local government/other agencies, in association with co-operative efforts of landowners, would contribute to the long-term viability of the corridors and the biota that are dependant on them.

[17] It is important to consider the terrestrial management of these marine fauna in the context of human activities, commercial operation, weed and fire regime management.

Climate Change

It is increasingly accepted that "climate change"[18] is a real threat to many protected areas and their biodiversity values. Potential impacts to biodiversity within the planning area may arise from:

- changes in animal and plant physiology, productivity and growth;
- changes in life-cycle timing – events triggered by environmental cues may be altered and may break coupling of life cycles and interaction between species; and
- changes in species distribution and abundance – a 3 °C change in mean annual temperature corresponds to a shift in isotherms of approximately 300 to 400 km in latitude (in the Temperate zone) or 500 m in altitude (Howden *et al*. 2003, Hughes 2003).

This may further lead to the following indirect impacts on biodiversity:

- an increase in species extinctions as a direct result of physical stress or via interactions with other species (Pouliquen-Young and Newman 2000, Howden *et al*. 2003);
- a decrease in ecosystem diversity;
- a contraction in the range of native species; and
- an impact intensification of other non-climatic stresses such as predation by introduced animals, the spread of environmental weeds, salinisation, changes in hydrology and habitat fragmentation (Pouliquen-Young and Newman 2000).

For example, climate change impact studies on the two subspecies of black-flanked rock-wallaby in the Recherche Archipelago, showed that these populations would disappear under a global temperature increase of just 0.5 °C (Pouliquen-Young and Newman 2000).

Species most likely to be affected by climate change are those:

- with narrow temperature or low temperature requirements;
- narrow geographic ranges that are closely associated with local environmental conditions (Hughes 2003);
- those dependent on relatively high rainfall habitats; and
- those which are unable to evolve *in situ*.

Integrating the results of climate change impact studies within current conservation strategies at the regional, community and species level could help improve the survival of species and ecosystems, and decrease their vulnerability to climate change (Watson 2005). At the regional level, conservation strategies include preserving vegetation corridors (see section on *Fragmentation*), increasing the conservation reserve system, and species recovery programs. At the area level strategies include improving resilience by increasing and refining existing management actions against other threats (such as disease control, introduced predator and weed control, and fire management). At the species level, collecting seed and captive fauna breeding programs provide a fall-back mechanism for long-term species survival and potential reintroduction projects.

Environmental Weeds

There are approximately 100 taxa of introduced plants recorded within the planning area. The reserves with the highest number of weeds recorded are Cape Arid National Park (49), Woody Island Nature Reserve (31), Cape Le Grand National Park (27) and Recherche Archipelago Nature Reserve (26). This is reflective of disturbance, but also of survey effort within the planning area.

Fifty-one of the known introduced plants in the planning area have been rated by the *Environmental Weed Strategy of WA* (CALM 1999) as having high or moderate impact. On a local scale, weeds impacting the most within the planning area are African boxthorn (*Lycium ferrocissium*), Victorian tea tree (*Leptospermum laevigatum*), bridal creeper (*Asparagus asparagoides*) and *Freesia* spp.

Bridal creeper is the most widespread of the weeds within the planning area, found from Lake Shaster Nature Reserve to Nuytsland Nature Reserve. It is also rated a Weed of National Significance because of its

[18] Climatic change has come about as a result of global warming, caused by increases in the concentrations of greenhouse gases such as carbon dioxide, methane and nitrous oxide (IPCC 2001, Hughes 2003). 'Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases' is a key threatening process listed under the EPBC Act (Environment Australia 2001b).

invasiveness, potential to spread, and the economic and environmental impacts (State Weed Plan Steering Group 2001). Significant infestations within the planning area include:

- Stokes National Park (five main infestations with a combined area of 150 ha);
- Moir Homestead (25 ha);
- the Thomas River Valley, the Ranger's residence and Thomas River campsite within Cape Arid National Park; and
- Israelite Bay (50 ha), Point Malcolm and along the old telegraph line within Nuytsland Nature Reserve.

Physical removal of bridal creeper is not effective unless all the rhizomes are dug up and destroyed, and spraying of chemicals can affect non-target species. Since 2000, biological control agents, including the bridal creeper rust (*Puccinia myrsiphylli*) and a leafhopper (*Zygina* sp.), have been introduced at various locations across the region. Initial results are promising, with new infestations being controlled each year.

Victorian tea tree has demonstrated its potential impact in the Warrenup Lake system in Nature Reserve 26885 where, following a wildfire, *Banksia* spp. are being out-competed by regenerating tea tree seedlings. Control is extremely labour intensive (cut and paint stumps) which is ineffective at a landscape scale. The infestation at Warrenup Lake system is the major concern within the planning area, however there are also sporadic infestations at Stokes National Park, Lake Gore Nature Reserve and Cape Le Grand National Park.

In the west of the planning area, weed invasion from neighbouring farmland is an issue (e.g. tagasaste [*Chamaecytisus proliferus*] spreading into Stokes National Park). Weed invasion along property boundaries is a common problem in agricultural landscapes, and is exacerbated by disturbance events such as fire.

Compared to the mainland reserves, environmental weeds infestations on the islands are uncommon, with Western Australian Herbarium records indicating that approximately 90% of the islands are weed-free. Those islands that were settled and/or still visited have most weeds (e.g. Woody Island). Past European settlement on Cull Island is responsible for the domination of African boxthorn on the island.

Introduced and Other Problem Animals

The red fox, feral cat and rabbit are the most common and widespread introduced animals within the planning area. Since 1996, the national parks[19], Lake Shaster Nature Reserve, nature reserves 27888 and 26885 (between Stokes National Park and Lake Gore Nature Reserve) and part of Nuytsland Nature Reserve have been part of the Western Shield fauna recovery program. Aerial baiting for foxes is currently carried out four times a year under this program. Research is also underway to develop an effective bait for feral cats. Myxomatosis, and more lately calicivirus, aids in the control of rabbits although the Department undertakes no direct control work.

Starlings (*Sturnus vulgaris*) have been sighted within 2 km of Lake Shaster Nature Reserve and Stokes National Park and are declared agricultural pests. The Department of Agriculture and Food is responsible for the control of this species.

The majority of the island reserves do not have any introduced animals. Burbidge (2004a) listed nine islands within the Recherche Archipelago (including Woody Island) as having records of introduced mammals, and 58 (including Investigator Island) as not. Most occurrences of introduced animals on the islands are the result of European settlement on the islands. Prior to attaining nature reserve status, some of the islands (including Charley, Figure of Eight, Observatory, Cull, Thomas and Woody) were used to graze sheep and goats, a practice that continued up until the 1940s and 1950s. However, the only livestock that now remains on the islands is a flock of goats on Cull Island, originating from an introduction in 1935. This population has been allowed to persist following opposition by the local community to proposed eradication in the mid 1980s. There are currently approximately 40 to 50 goats on the island. It is thought that grazing/browsing by goats is responsible for the maintenance of large grassy areas on the island, which supports the significant number of threatened Cape Barren geese found on the island (see section *Native Animals – Birds*). Future management should ensure that the grassland habitat is maintained if there is any proposed decrease in goat numbers. Sterilisation of goats and the maintenance of a single sex population is a possible management option.

[19] Only part of Cape Arid National Park is in the Western Shield program.

The ship rat (*Rattus rattus alexandrinus*) is present on Woody Island. Depending upon the season, its population tend to fluctuate. Apart from being responsible for damage to the tourist facility infrastructure it is also suspected of being responsible for the decline of the relictual populations of ash-grey mouse (*Pseudomys albocinereus*) on the island. Recent attempts to locate the ash-grey mouse on the island have been unsuccessful.

The western grey kangaroo (*Macropus fuliginosus*) was introduced onto Woody Island Nature Reserve, presumably by island users, in the 1970s. Some damage has subsequently been caused to the island's understorey vegetation. The Department currently does not consider numbers a problem but will consider future management as part of the planning process.

On occasion, individual western grey kangaroos at Lucky Bay in Cape Le Grand National Park become a nuisance to visitors and are translocated elsewhere in the park. This situation has arisen from visitors feeding animals, leading to aggressive behaviour from kangaroos seeking food. An education program using signage and Ranger contact with visitors, discouraging this activity, has been instigated.

Diseases

Plant Diseases

Plant diseases can have major impacts on vegetation communities by changing species composition, decreasing plant cover, and decreasing litter fall, which can, in turn, impact on fauna by removing food sources and destroying habitat and shelter. Plant disease knowledge is still rudimentary with much more work required on distribution, pathology, susceptibility and environmental processes that may facilitate spread.

Phytophthora dieback (mostly *P. cinnamomi*), aerial canker and *Armillaria luteobubalina* are the major disease threats to the vegetation of the planning area. Pattern of disease spread, in particularly *Phytophthora* dieback is strongly related to the native vegetation community and other site factors such as the presence of watercourses, waterlogged soil, tracks and roads, with infestation being most common where human activities have taken place in the absence of a disease hygiene regime.

West of Esperance, reconnaissance for *Phytophthora* spp. has been limited to fire breaks and tracks within Lake Shaster Nature Reserve and Stokes National Park. Most of the drainage lines for Lake Shaster Nature Reserve originate outside the reserve, which limits the capability of the Department to minimise *Phytophthora* spread through the reserve. For example, the disease appears to have spread into the reserve from the roadside along Springdale Road. In addition to *P. cinnamomi*, *P. citricola* and *P. cryptogea* have been recorded within Stokes National Park.

East of Esperance, there has been more extensive surveying within Cape Le Grand and Cape Arid national parks but limited within Nuytsland Nature Reserve. There appears to be limited impact of *P. cinnamomi* in areas with calcareous soils but a very high impact in areas with acidic soils such as those around granite outcrops in Cape Le Grand National Park and Cape Arid National Park.

Within Cape Le Grand National Park, the Proteaceae community within the scrub heath vegetation west of Dunn Rock, has been extensively affected by *P. cinnamomi*. In contrast, the eastern part of the national park has fewer roads and appears to be largely free of impacts from the pathogen.

Significant damage has also been caused by *Phytophthora* to vegetation communities within Cape Arid National Park (Shearer 1994, Bellgard *et al*. 1995, Smith and Grant 2000), including about 50% of the near-coastal area. Susceptible vegetation includes vegetation bordering granite outcrops, in drainage lines, on hillslopes and in a *B. speciosa* dominated community west of Mt Arid (Brandis *et al*. 1985, Smith and Grant 2000). The impact of *P. cinnamomi* on red swamp banksia (*B. occidentalis*) along drainage lines in the park is so severe that it may become an example of a once common species becoming locally threatened by infection (B. Shearer pers. comm. 2005).

Nature Reserve 27087 between Cape Le Grand and Cape Arid national parks currently does not have any record of *P. cinnamomi* infestation, but the risk of introduction is high as the adjacent unallocated Crown land is infested.

In May 2000, the Israelite Bay Track within Nuytsland Nature Reserve was surveyed and no impact of *Phytophthora* was found (B. Shearer pers. comm. 2005). However, due to the presence of disease-susceptible Proteaceae vegetation, surveying of areas from Point Malcolm to Israelite Bay should be a priority for the reserve.

There is no evidence of *Phytophthora* spp. on any of the islands within the Recherche Archipelago, although no reconnaissance or sampling has been undertaken.

Application of phosphite to protect *Phytophthora* infected vegetation is generally used for threatened species and communities only, as it is not cost effective to treat large areas. Landscape-scale management to protect areas from the pathogen include:

- containing the spread of the disease at the boundaries of existing infestations;
- minimising the rate of spread/establishment of new infestations by controlling the vectored spread (e.g. by humans or feral animals); and
- restricting access.

Various canker pathogens, mainly on Myrtaceae and Proteaceae, are widely distributed throughout south-western Australia, although little surveying has been done within the planning area. *Botryosphaeria ribis* infection has debilitated stands of *B. speciosa*, a common species in the planning area, in association with climatic stress along the south coast (Shearer 1994).

Armillaria luteobubalina, is a native pathogen that mainly occurs in coastal dune vegetation and forested areas (Shearer 1994). In coastal areas of the south-west, *A. luteobubalina* occurs on the calcareous sands of the Holocene dune system (Shearer *et al*. 1997). Within the planning area, *A. luteobubalina* occurs along the coast from Stokes National Park as far east as Cape Arid. Records of occurrence include the Rossiter Bay Bird Sanctuary area within Cape Le Grand National Park and Barrier Anchorage Track within Cape Arid National Park.

The native fungi *Omphalotus nidiformis* is also affecting *Banksia* spp. in the Thomas River area, which will impact on recruitment and the visual amenity at the campsite.

The planning process will consider management to limit the spread and introduction of *P. cinnamomi* and other plant diseases such as *Armillaria*. Unfortunately options for management of aerial canker are limited as the disease is spread by wind.

Animal Diseases

A wide range of pinniped diseases have been diagnosed from post-mortems of sea-lion and fur-seals in Western Australia (Mawson and Coughran 1999). One of the major diseases is tuberculosis (*Mycobacterium tuberculosis*) in Australian sea-lions and New Zealand fur-seals. However, it is unclear whether tuberculosis has always been endemic in sea-lion and fur-seal populations or if the disease was introduced from cattle (Cousins *et al*. 1993).

Fire

Large wildfires have burnt large parts of the planning area in recent years. There have been 15 wildfires (caused by lightning) in the planning area in the period between 2002 and 2005, totalling 145 312 ha (May 2005 data). The current summer season has seen a large number of fires (between October and December 2006), which have affected the following existing and proposed reserves:

- Stokes National Park near Moir Homestead, North and South Camps (400 ha);
- Reserve 24486 proposed to be added to Mortijinup Nature Reserve (10ha);
- Cape Le Grand National Park in several areas including south west of the Ranger station, the Hellfire Bay and Thistle Cove area (130 ha), Mt Le Grand, and Dunns Rock;

- unallocated Crown land in the Alexander Bay area;
- Cape Arid National Park in several locations including Thomas River (5900 ha), Poison Creek Road (2000 ha); and
- Middle Island within Recherche Archipelago Nature Reserve.

Recreation sites (i.e facilities, infrastructure, signs, amenity) and walk trails have all been affected in these above reserves and some sites will remain closed until further notice.

There have also been fires within the areas identified as a potential addition to the planning area such as part of Reserve 28170 adjacent to Cape Le Grand National Park, and a large 60 000 ha fire within the unallocated Crown land west of Cape Arid National Park.

Impacts of large intense wildfires on the planning area include:

- loss of specialised habitat for some species, including threatened taxa (e.g tree-hollow woodlands and long-unburnt heath);
- loss of age class diversity across the landscape;
- reduced chance of immigration (and hence replacement of species) due to reserve isolation;
- increased opportunities for weed invasion including from surrounding agricultural lands;
- short-term loss of migratory pathways; and
- threats to life and property both within and adjacent to the planning area.

Setting clear fire management objectives for the conservation of biodiversity, and for the protection of other values such as life and property, is fundamental in the development of fire management plans. Factors to be taken into account when developing the fire management plan for the planning area include:

- habitats for threatened fauna species such as the western ground parrot and chuditch habitats in Cape Arid National Park;
- areas where rare and other conservation flora occur within the planning area;
- locations of TECs and significant vegetation associations;
- ecological requirements of the flora and vegetation (e.g. mallee heaths which should not be burnt at less than eight year cycles due to the length of time required to replenish the seed store);
- recent fire history;
- areas of high landscape value;
- recreation sites[20] and infrastructure within the reserves; and
- areas adjoining private property.

Most of the fire management in the planning area (apart from the islands) has been based on maintaining firebreaks and low fuel areas (created by burning buffer strips) as well as either prescribed burning or no planned burn areas within core areas. However, a more mosaic prescribed burning, such as implemented in the south-west forested areas, may be preferable to minimise broadscale wildfires (especially in Cape Arid National Park) and the feasibility of this should be investigated through the planning process. The mosaic prescribed burning concept would provide a spatial and temporal diversity of burnt and unburnt areas by varying the season of burn, frequency and intensity of fire based on vital attributes and life histories of fire sensitive taxa and vegetation communities (Burrows and Friend 1998).

The islands of the Recherche Archipelago usually have longer fire-free periods than the mainland, however there is at least one wildfire event on one of the islands in the archipelago each year (K. Tiedemann pers. comm. 2006) and they are at risk of being completely burnt out in a single wildfire event. For example, it was estimated that prior to a wildfire on Middle Island in 1972/73 that burnt half the vegetation over a two-month period, it had been 170 years since the previous fire (Brown *et al*. 1984, Weston 1985). More recently a wildfire on Middle Island ignited by lightning, burnt from October 2006 to January 2007. Whilst ground crew at the beginning of the wildfire event made efforts to try and extinguish the fire, the fire reignited in the peat beneath the soil and ended up burning most of the island. Similarly, a wildfire in 2002, presumed to be the first fire in 58 years, burnt about 90% of the vegetation of Mondrain Island (Pearson *et al*. 2004). Whilst

[20] Fire can remove shade vegetation and make recreation sites less attractive in the short to medium term.

a number were killed, the Recherche rock-wallaby survived the 2002 Mondrain fire as sufficient large patches were left unburnt. However, other species were greatly affected including nesting seabirds such as the fleshy-footed shearwater (*Puffinus carneipes*) and slow moving reptiles such as the southern death adder (priority 3). The long-term impact of the 2006/2007 fire on Middle Island's fauna and vegetation is yet unknown.

Whilst lightning strikes on the islands are a natural event, Hopkins and Harvey (1989) concluded that intervention is justified and any wildfire on an island reserve should be promptly contained to ensure that no island is burnt completely by a single fire. In most cases, it is currently not feasible for the Department to respond to wildfire on the islands due to distance, time and often lack of safe landing sites for vessels[21]. This means that, in general, whole islands may burn in one wildfire event, populations of threatened flora and fauna can be severely impacted, and islands may be exposed to erosion and increased weed invasion due to loss of native vegetation. Examples of significant fires on the islands include the 1972 and 2006/2007 Middle Island and the 2002 Mondrain Island fires, as mentioned above, as well as a fire in 1983 which completely burnt Sandy Hook Island, burning out all the rockeries with many adult seabirds caught in their burrows.

It is presumed that since the majority of the islands were separated from the mainland at around the same time and yet display different patterns of fauna distribution, that fire is likely to have caused, or been related to, occasional extinctions (perhaps linked to subsequent drought) on the islands (D. Pearson pers. comm. 2005). For example, two subspecies of rock-wallabies are found on only four of the islands, tammar wallabies are found on Middle and North Twin Peak islands only, and carpet pythons are only found on Mondrain and North Twin Peak islands. Other reptiles, such as dugites, death adders and crowned snakes, also have unusual patterns through the islands.

In addition to wildfire caused by lightning, there is an increased risk of fire from humans on some islands (e.g. particularly Woody and Middle islands).

While there are real practical and safety limitations to fighting fires on islands (and in remote areas), the planning process will consider management options to do so, where conservation values are known, or presumed to be high. This includes islands such as Figure of Eight, Boxer, Wilson, Mondrain, North Twin Peak, Middle and Salisbury islands (D. Pearson pers. comm. 2005). There have been operational issues in the past preventing the use of water bombers to fight wildfires on the islands due to availability, cost and the risk of flying over the ocean.

Woody Island has a high level of infrastructure and the protection of these assets will also need to be considered during the planning process.

With the vast expanses of land covered by the planning area, another crucial issue for fire management is cooperation between the Department, volunteer bushfire brigades, the local community and the Fire and Emergency Services Authority.

MANAGING OUR CULTURAL HERITAGE

Indigenous Heritage

Aboriginal People of the Planning Area

In *Aboriginal Tribes of Australia*, Tindale (1974) records the inhabitants within the western part of the planning area as being known as the *Wudjari*, and *Njunga* along the coastal strip east to Point Malcolm, and inland for 50 km. East of Young River, the *Njunga* had become a separate tribe from the *Wudjari* as they had begun to practice circumcision, yielding to the pressure of their eastern neighbours, the *Ngadjunmaia* (the *Ngadjunmaia* had both circumcision and subincision).

Alternate names for the *Wudjari/Njunga* include: *"Nunga, Njungar, Nyungar, Nonga, Yunga, Yungar, Njungura…"* (Tindale 1974).

[21] Wildfire response is also an issue for remote areas more than 100 km from Esperance.

Helms (1896) also notes of the inhabitants of the area:

> *"The Yunga is a coastal tribe, the centre of their district being about Esperance Bay. The extent of their territory to the east and west I could not correctly ascertain, but they claim the ground inland to about 40 or 50 miles from the coast".*

According to Veth and Moore (1989) the Aboriginal people themselves describe the area from the Young and Lort rivers emptying into Stokes Inlet, in the west, to Thomas River in the east, as "one country" and note that within this country there traditionally lived about four family groups.

The *Ngadjunmaia* inhabited the coastal area east of Israelite Bay with the *Ngadjunmaia,* and the *Wudjari/Njunga* disputing the territory between Point Malcolm and Israelite Bay. The *Njunga* are believed to have had more in common in terms of linguistic and cultural practices (such as dress and ceremony) with the south-west Aboriginal tribal groups or 'South West cultural bloc', than with the *Ngadjunmaia* who could be considered part of the 'Desert cultural bloc' (Smith 1978, Smith 1993).

Regional surveys suggest that Aboriginal groups were rather small and dispersed across the coast from Young River to past Cape Arid. Large groups were rare, and when present were closely connected to permanent water sources (Veth and Moore 1989). From examining archaeological sites, similar patterns of Aboriginal land use in the region are expected to have occurred over the last 13 000 years, with no increase in population levels either when new stone tools were developed or when increases in site occupation are noted in many other regions of the arid zone (Veth and Moore 1989).

The initial contact between south-west Aboriginal people and Europeans was followed by expansion of European settlements, displacement of Aboriginal people from their traditional lands as European farmers cleared and settled the country and townships and stations became the focal point for Aboriginal living, alteration of Aboriginal traditional life and population decimation as a result of introduced diseases. Contact with Europeans occurred first with maritime explorers, followed by overland explorers and then by surveyors and settlers. The explorer Eyre mentions first contact with the Aboriginal people from the Esperance area "*they had never seen white people before the Mississippi anchored there*" (Eyre 1845), and then within the next 100 years many Aboriginal tribes dispersed or disappeared from their traditional lands. Daisy Bates records that "*between Esperance and Eucla, there were not half a dozen natives along the coast*" and "*the original groups had almost gone, trekking north to the goldfields*" (Bates 1938).

As a consequence of the movement from their traditional lands, Aboriginal people constituted a new identity in the south-west, dependent on shared features of their cultural traditions but based on a much broader area than appears to be traditional. Aboriginal people from the south-west of Western Australia now generally describe themselves, their country and their language as '*Nyungar*' (or variations thereof[22]).

Aboriginal Heritage Sites

There are 132 Aboriginal heritage sites[23] known within the planning area (122 in existing conservation reserves and 10 in proposed conservation reserves within the planning area) (Register of Aboriginal Sites September 2006 data). However, registered sites probably only represent a small proportion of the actual sites within the planning area.

Site density is highest on, and adjacent to large granite outcrops and their catchments and is lowest on the gently undulating, homogenously vegetated coastal plains (Veth and Moore 1989). Compared with elsewhere in the south-west, there are few sites in the Esperance area. These are mostly not stratified and are characteristically small, with generally fewer than 350 artefacts, with 'large' sites of more than 1000 artefacts approximately every 250 km^2 (Smith 1993). This can be compared with sites in the Jerramungup region

[22] The word 'Nyungar' can be spelt in numerous ways. The spelling in this form should be seen to encompass Noongar, Nyoongar, Noongah and Nyungah spellings.

[23] Aboriginal heritage sites can be categorised as archaeological and/or ethnographic sites. Enthographic sites include: places for current ritual or ceremony, caches of ceremonial objects, sites with mythological associations, or sources of stone, ochre, plants or animals which are known or used. Archaeological sites are often enthographic sites as well, and include the physical remains of Aboriginal culture, both before and after European settlement. Archaeological sites include shelters, fish traps or weirs, stone or ochre quarries, stone artefact production areas, shell middens, seed grinding patches, engravings, paintings, marked trees and burial sites.

where there is at least one large site every 11 km^2 and the Swan Coastal Plain, which has one large site every 20 km^2.

Within the western portion of the planning area, there are 11 known archaeological and ethnographic sites. This includes eight sites within Stokes National Park at Margaret Cove, Stokes Inlet and Fanny Cove including artefact scatters, a camping area, an ochre quarry and a mythological site. There are burial sites along the length of both Young and Lort rivers south of the South Coast Highway within both Stokes National Park and the river corridors proposed to be added to the conservation estate. Graves and the bones of their ancestors are of particular significance to Aboriginal people. Both Young and Lort rivers also had acted as "highways" for Aboriginal people in this area, as they followed them up inland for winter. Apparently, in winter the old people liked to camp in the "corners" of the rivers, where the rivers bend, so that there was water on three sides of the camp (Veth and Moore 1989). Consequently there may be a concentration of sites associated with habitation in these areas. There is also an artefact scatter and a historical camping area near Young River Bridge. There is also an artefact scatter within Nature Reserve 26410.

Within Cape Le Grand National Park, there are 54 known archaeological and ethnographic sites including 11 quarries, and stone artefacts and tools at Cheetup Hill, Frenchmans Peak and Le Grand Cave. There is also evidence that Aboriginal people occupied caves in granite outcrops dating back 2400 years at 'Smiths Block' in Cape Le Grand National Park (Smith 1993, Barefoot and Kalotas 2004). This area has been recommended by the Goldfields Land and Sea Council as an appropriate day use site (with a cultural interpretation emphasis) and as a trail-head for a heritage walk (see section on *Recreational Use – Walking*) (Barefoot and Kalotas 2004). From the proposed day use area, the features of *Mandoowoornup* Man can be seen on the distant granite headland adjacent to Mt Le Grand. '*Mandoowoornup*' is the Nyungar name for the Cape Le Grand area, and looking out to sea, *Mandoowoornup* Man protects Cape Le Grand and adjacent beaches. The high rocky places of Cape Le Grand are also believed by the Esperance Nyungar to be the domain of the *Wudatji* or little hairy men. These small, human-like beings are mischievous creatures that can provide protection, but are also known to be malevolent, particularly to children, and inhabit places of spiritual importance to the Esperance Nyungar (Barefoot and Kalotas 2004). Frenchmans Peak, known as *Mandooboornup,* also had mythological significance to the Esperance Nyungar, and involves a story of an eagle and two boys.

Between Cape Le Grand National Park and Cape Arid National Park there are no known sites within the two nature reserves in the planning area, however there are eight archaeological sites known within the unallocated Crown land (as well as numerous sites within the Shire reserves at Whartons Beach, Alexander Beach and Kennedy's Beach). These include chert and quartzite quarries, which are easily disturbed and damaged by vehicles driving over the surface, crushing and relocating artefacts. Damage to these sites by vehicles has already been recorded (Smith 1984). Of note is the quartzite quarry within the unallocated Crown land which is the only known quarry of this material in a 100 km square, and is possibly the source of artefacts in this material which have been found over a wide distance (Smith 1984).

There are 40 known archaeological and ethnographic sites within Cape Arid National Park mostly associated with granite outcrops and inland hills, but also with river systems, coastal dunes, sand hills and wetlands. Sites include three man-made structures, numerous stone artefact scatters, four chert quarries, a hunting place, a lizard trap, an engraving, a shell midden, and one burial site at Pine Hill.

In the unallocated Crown land west of Cape Arid National Park (a potential addition to the planning area) there are two archaeological sites including a rock shelter, rock art featuring hand stencils, and stone artefacts at Boyatup Hill.

There are five known archaeological sites within Nuytsland Nature Reserve including artefact scatters and a quarry. Tooklejenna Rocks in particular has small flake fragments and formal tools at a capped gnamma hole[24]. There is also anecdotal evidence of a site at Point Culver (R. Reynolds pers. comm. 2006) although this is east of the planning area.

[24] Gnamma holes are holes in rocks used by Aboriginal people to collect water, natural features can be used and then made deeper by fire or other means.

There are 14 known Aboriginal sites within the Recherche Archipelago Nature Reserve, nine of which occur on Middle Island. The remainder of the sites include an engraving on Barrier Island and artefact scatters on Gulch, Owen and Stanley islands. The cultural significance of Middle Island is quite high with gnamma holes and approximately 350 artefacts present, mainly around granite outcrops such as Flinders Peak (Dortch and Morse 1984). Most of these artefacts date back to the late Pleistocene – middle Holocene epochs, when the Recherche Archipelago was part of the mainland 9000 to 11 000 years ago. Although Middle Island is just over 8 km from the present mainland coast, there is no enthohistorical evidence for any kind of Aboriginal watercraft in the south-west (Dortch and Morse 1984). Some of the artefacts also date back to the nineteenth and early twentieth centuries during the time that sealers camped on the islands with their Aboriginal guides/workers (e.g. the Sealers' Camp at the western end of Lake Hillier on Middle Island)

In some locations, access may need to be controlled to these sites within the planning area, and/or interpretation provided to promote the cultural significance of the sites and provide education.

Caring for Country and Cultural Use

Aboriginal people have particular interests in ensuring the long-term protection and conservation of cultural and natural values associated with the planning area because of their previous occupation and cultural obligation to 'care for country'. For example, prior to Cape Le Grand National Park being established (as can probably be said for most of the reserves within the planning area) the Esperance Nyungars would regularly come to the area for hunting, fishing and camping. Various fauna species were used for food, skins and medicinal purposes. Numerous plant species were also used for food, seasoning, firewood, grooming purposes, medicinal purposes and as cooking utensils (Barefoot and Kalotas 2004). Aboriginal people within the south-west used to frequently burn the bush, known as 'firestick farming', to flush animals out for hunting, to provide new growth to attract animals and to regenerate vegetation.

The local communities from Esperance and surrounds are seeking to increase their involvement within the planning area, to maintain their traditional ties with the land and to ensure that their culture is passed onto future generations (see section on *Indigenous Involvement in Management*). Aboriginal people are also interested in visiting and using the area more often for traditional practices which may include camping, hunting, fishing, collection of bush tucker and medicinal materials and the holding of ceremonies (see section on *Traditional Hunting and Gathering*).

Non-Indigenous Heritage

The Esperance Coastal Reserves are part of Australia's European heritage as many of the explorers passed along this section of the south coast, charting, naming, taking flora and fauna specimens and sheltering adjacent to many of the islands and headlands of the reserves. The south coast of Western Australia was first charted in 1627 by Dutch captain Francois Thyssen in his vessel the *Gulden Zeepaard*. Later expeditions include those led by Frenchman Admiral Bruny D'Entrecasteaux in 1792 on *L'Esperance* and *La Recherche* as well as by the Englishman Captain Matthew Flinders on the *Investigator* in 1802.

In the 1800s, the sealers and the whalers came to the area to hunt. However, the seal industry collapsed in the 1840s due to unsustainable harvesting. Southern right whales were also hunted to near extinction along this coastline in the 1800s. The sealers and whalers often took up quarters on the islands of the Recherche. Middle Island in particular, was used by early European settlers for seal and whale processing and for salt mining as evidenced by remains of a tramline and other artefacts and ruins. There are three shipwrecks known adjacent to the island, the *Belinda* (wrecked in 1824), the *Mary Ann* (wrecked in 1876) and the SS *Penguin* (wrecked in 1920). Numerous other shipwrecks exist within or adjacent to the planning area. However, much of the shipwreck remnants on beaches, such as *Dunster Castle* on Dunster Castle Bay at Stokes National Park, have been disturbed. There is other evidence of non-indigenous occupation and usage of the Recherche Archipelago including remnants of sealing and pastoral infrastructure on Woody, North Twin Peak, Cull and Goat islands.

Pastoral activity began in the area in the late 1800s although extensive clearing and agriculture in the region did not commence until much later. The Dempsters had a pastoral lease near Stokes Inlet in 1863 and the Moirs were granted a pastoral lease around Stokes Inlet in 1873. Moir Homestead, near Fanny Cove in

Stokes National Park is jointly vested with the National Trust of Australia and the Director General[25] of the Department. A conservation plan was prepared for the homestead area in 2000 and stabilisation works were undertaken in 2003. Wildfire has already removed many of the wooden features and equipment that were at the site.

Other heritage buildings and ruins of early pastoral activities exist within the planning area at Lake Shaster Nature Reserve, Cape Arid National Park (Pine Hill north of Mt Ragged, and Hill Springs Homestead and "Gabtoobitch" near Mt Arid) and Nuytsland Nature Reserve (Tooklejenna Rocks).

Graves of early pioneers and settlers are present throughout the planning area including that of a member of the Flinders' expedition—Midshipman Charles Douglas, who died of survey—who is buried on Middle Island. Other graves are located at Moir Homestead, and Hill Springs, Pine Hill and Poison Creek in Cape Arid National Park.

Remnants of the Overland Telegraph Line, built between 1877 to 1927, are evident in Cape Arid National Park and Nuytsland Nature Reserve. The easement alongside this telegraph line forms one of the major tracks in this area.

There are two huts remaining within the planning area: Dogger's Hut along the Rabbit Proof Fence in Reserve 7580 and Cahill's Hut at Barrier Anchorage in Cape Arid National Park. These huts need assessment of heritage value so appropriate management can be recommended in the management plan (see section on *Recreational Use – Overnight Stays*). Telegraph Hut at Telegraph Track in Cape Arid National Park was destroyed by the 1982 wildfire.

There are two former Public Works Department dams within Smiths Block in Cape Le Grand National Park. A heritage trail is proposed to pass near these structures (see section on *Recreational Use – Walking*).

Active management is required to prevent further degradation of the heritage sites (e.g. from wildfire, erosion, weeds, and/or souveniring) within the planning area, including controlling access and interpretation to promote their significance.

MANAGING VISITOR USE

It is recognised that the conservation reserve system has the capacity to provide a significant portion of the growing demand for outdoor recreation and tourism, in particular 'nature-based' tourism. This in turn contributes to the social, psychological, physical and economic wellbeing of the community. The Department manages the majority of the coastline from Starvation Boat Harbour to the Nullarbor, and consequently is responsible for the provision of a significant proportion of coastal recreation opportunities in this area (although the shires of Ravensthorpe and Esperance also manage several coastal recreation sites, see *Appendix 3*). The management plan will significantly influence how the local community and visitors to the region are able to enjoy the coastline and direct many recreational activities associated with the coast. This management planning process therefore needs to provide a broad range of recreational opportunities—taking into account those existing on, or proposed for Shire reserves, so as to complement them rather than duplicate them—whilst protecting the values of the conservation reserve system. Also importantly, the community needs to be kept informed on how they can be involved in 'having their say' in the process (see section on *Working with the Community*).

The existing conservation reserves within the planning area are longstanding, with most reserved for conservation since the late 1960s and early 70s and, in some cases, as early as 1948. Only one of the proposed additions in the planning area involves an existing recreation site (informal). Therefore in terms of managing visitor use, this planning process will be more about formalising existing recreational use and addressing some of the issues that exist within the present conservation reserve system.

There are 31 recreational sites in the planning area west of Esperance and 27 east of Esperance (see section on *Recreational Use*), which have been developed by the Department, or have arisen from informal use. The

[25] The office titled "Director General" of the Department refers to the "CEO" as defined in section 3 of the Conservation and Land Management Act.

distances between sites and from ranger stations prevent frequent servicing of all these facilities[26]. Four rangers are stationed in three of the national parks—Stokes National Park, Cape Le Grand National Park and Cape Arid National Park—and there is one mobile ranger and (usually) one seasonal ranger to assist during summer[27]. While the management of Woody Island is assisted by the on-site presence of commercial operators, recreational use of other islands is difficult to manage due to their remoteness.

Of the 60 recreation sites throughout the planning area, 35 are located within national park tenure and the remainder within nature reserves. While the purpose of national parks provides for recreational use consistent with the proper maintenance and restoration of the natural environment, the purpose of nature reserves is principally to conserve flora and/or fauna, with recreation permissible where it is consistent with promoting the study of indigenous flora and fauna. Despite this more restrictive purpose, coastal nature reserves in the planning area are regularly used in summer to gain access to the coast for fishing, surfing, swimming and camping.

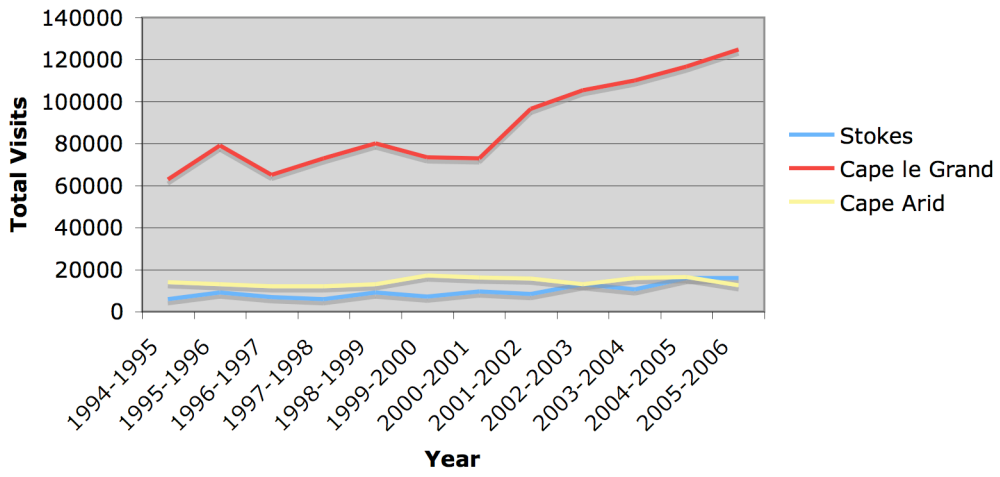
To overcome any perceived conflict between purpose and use, it is proposed to review the tenure of existing reserves and suggest changes as appropriate. This may mean that some areas of nature reserve are changed to a tenure that allows for more active recreation[28] or the recreational activities are managed to an appropriate level for nature reserves. Similarly, the tenure of Woody Island Nature Reserve needs to be reconsidered. It currently has a dual purpose of 'Conservation of flora and fauna, and recreation and tourist development', and thus may be more appropriate as a national park or conservation park.

Recreational Opportunities

Visitor Numbers and Trends

In 2005/2006, there were an estimated 184 401 visits to the planning area, 153 262 to the national parks (Figure 1). However, there is a need to obtain more accurate numbers from beach-accessed sites within the planning area and also to the nature reserves.

Figure 1. Visitor Numbers to the National Parks



Cape Le Grand National Park receives the highest visitation of the reserves in the planning area with an estimated 124 742 visits in 2005/2006. Even taking into account the increased number of reporting locations within the park, it appears there has been a steady increase since 1994/1995, when 63 000 visits were recorded. Increasing demand for nature-based recreation will continue to be a major issue over the next 10 years. For example, there is an expected increase in visitor numbers due to the development of the 'Rav8' Ravensthorpe nickel project and the subsequent rise in the population of the area. Workers and their families

[26] This includes maintaining a ranger presence, servicing facilities and access routes, as well as being able to regulate activities (campfires, littering, new camp sites being pushed into vegetation and domestic dogs being brought into the reserves) undertaken in the area.

[27] Volunteer campground hosts are also often stationed at Cape Le Grand National Park during summer.

[28] Taking into account that other tenures may also allow multiple uses such as mining exploration and development.

are likely to be housed mainly in Ravensthorpe, Hopetoun and Esperance and will be likely to visit the planning area.

Stokes National Park, Woody Island Nature Reserve and Cape Arid National Park receive far fewer visitors in 2005/06 in comparison to Cape Le Grand (15 939, 14 667 and 12 581 visits respectively). Unlike Cape Le Grand National Park, visitor numbers to these reserves have remained relatively stable for as long as visitor numbers have been recorded.

Incremental Creep and Recreational Opportunity Spectrum

The Department aims to provide visitors with a wide range of nature-based recreational experiences across the whole planning area, taking into account the opportunities provided in adjacent areas, rather than providing a similar experience at all sites. As the planning area is large, the whole area will be considered strategically to provide the widest range of recreational opportunities appropriate, rather than look to one park to provide the full range. The regional management plan (CALM 1992) has previously set the scene for Cape Le Grand National Park to be the more developed national park in the area, with Stokes and Cape Arid national parks to be the more remote and undisturbed areas. However, that is not to say that only developed experiences will be available in Cape Le Grand National Park.

Typically, as the use of natural areas increases, conditions change until the character of the setting has been modified to a point where it no longer has the attributes that originally attracted people to the area. In addition, sites may be progressively hardened and expanded to meet the demands of increased visitation, thus also changing the initial attributes. Some sites within the planning area have already been hardened and expanded, however there are still many more remote sites, which may 'creep' to the developed end of the spectrum, if appropriate planning is not put in place.

Therefore, to maintain/develop an appropriate recreational opportunity spectrum across the planning area, the planning process may designate 'visitor management settings' or similar across the planning area. These settings provide guidelines to the level of access, facilities and experience that are to be expected by the visitor, or can be developed within the setting for the life of the plan. Accompanying strategies would have to be developed during the planning process in order to avoid incremental creep to the more developed settings. This may include, for example, management controls such as a booking system to maintain appropriate experiences at the designated low-key sites.

Wilderness

There is a growing awareness from within the community and the scientific world that wilderness areas support values that should be protected from the impacts of modern technological society. The International Union for Conservation of Nature and Natural Resources (IUCN, the World Conservation Union) defines wilderness as a:

> *"…large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition".*

The National Wilderness Inventory (NWI) uses a quality index rating of zero to 20, with 20 being the highest quality. Based on the NWI and the Department's Policy Statement No. 62 *Identification and Management of Wilderness and Surrounding Areas*, a 'wilderness area' is an area that has a wilderness quality rating of 12 or greater and meets a minimum size threshold of 8000 ha in temperate areas or 20 000 ha in arid and tropical areas. The main points from the wilderness policy to note include:

- use of mechanised transport is not permitted within wilderness, except for emergency or essential management operations, or reasons of cultural importance;
- any existing vehicle tracks and constructed walk trails within wilderness that are not required for emergency and essential management purposes will be closed;
- constructed walk trails, signs, track markers and toilets will not be provided in wilderness;
- wherever possible, ground disturbing activities for fire management (such as construction and maintenance of access roads, firebreaks, fuel-reduced buffers, and water points) will be conducted outside of wilderness;

- prescribed burning within wilderness may be carried out for the protection and maintenance of biological values and processes as determined through the management plan;
- appropriate fire protection strategies according to established standards will be implemented in areas that surround wilderness where life, property and natural resource values may be threatened;
- education and/or recreation expeditions will be permitted within wilderness, however commercial recreation and tourism is not permitted within wilderness (Conservation and Land Management Act leases and licences cannot be issued for wilderness classified under section 62 of the Act); and
- management of wilderness and surrounding areas will be consistent with the principles in the Malimup Communiqué[29].

The NWI data for the reserves indicate that large areas within Cape Arid National Park and Nuytsland Nature Reserve meet wilderness criteria. There has not been an assessment of the reserves west of Esperance, but areas of 8000 ha would be limited. This planning process will identify candidate wilderness areas in the draft management plan for public comment.

Visitor Access

Access to the reserves is mostly by vehicle (car and motorbike) and boat, although some areas within the reserves are accessible via walk trails and along beaches. Most access is by spur roads off either the South Coast Highway/Springdale Road for the reserves west of Esperance and off Fisheries Road/Merivale Road for the reserves east of Esperance. Many parts of the planning area are accessible by driving along the beach—for example Le Grand Beach can be accessed along the beach from Esperance usually between September and April and is a popular alternative approach to Cape Le Grand National Park. However, beach access often complicates the collection of entry fees to the parks.

Most access roads and tracks within the planning area are to beach destinations where sight seeing, swimming, fishing and camping are the main activities.

There is a Departmental managed airstrip within the planning area at Nuytsland Nature Reserve near Israelite Bay, used mostly for wildfire suppression and rehabilitation activities. However, some small private planes are known to occasionally land at this strip to visit the nearby Israelite Bay Telegraph Station (National Trust managed). There are also airstrips to the north of Cape Arid National Park near the Tagon Road and Merivale Road junction and on private property at Point Malcolm within Nuytsland Nature Reserve.

State and Local Government Roads

In the western part of the planning area, the *Ravensthorpe/Esperance and Jerramungup: Strategic blueprint for the future* (SMEC 2002) has proposed, without being specific about an alignment, a tourist road from Hopetoun "*along the coast*" to Esperance. This appears to refer to the existing two-wheel drive Southern Ocean Road east from Hopetoun to Starvation Boat Harbour, then on to the existing two-wheel drive Springdale Road (which follows the coast approximately 4 to 6 km inland) to Stokes National Park. However, this proposed tourist road is not identified by Main Roads WA as a priority within the region, and Springdale Road is only a 'review' proposal in the *Roads 2020 Regional Road Development Strategy – Goldfields Esperance Region* (MRWA 1997). The proposed road may increase visitation to the planning area, increasing demand for facilities and services and impacting on conservation values if not properly managed. Further consultation with the shires is required to examine the likelihood of this road and to ensure an appropriate alignment is selected.

In the eastern part of the planning area, the *Roads 2020 Regional Road Development Strategy – Goldfields Esperance Region* proposes that Fisheries Road:

- from Esperance to Condingup is upgraded to a 7 m wide sealed road (high priority);
- from Condingup to Tagon Road is upgraded to 7 m wide sealed road (medium priority); and
- from Tagon Road to Baring Road is upgraded to a gravel road (low priority).

[29] The Malimup Communiqué was developed between indigenous communities, government authorities and non-government environmental groups in May 1998 at Malimup Springs in Western Australia. It is concerned with indigenous people and the management of areas reserved/zoned as wilderness, primarily within national parks, or other lands reserved for conservation or recreational purposes.

There are no proposals to upgrade Fisheries Road east of Baring Road—the Cape Arid National Park and Nuytsland Nature Reserve end—as this traverses national park and *"…any proposal for upgrading this section of the road should be deferred due to the likely significant environmental and management impacts*" (MRWA 1997). However, this section of Fisheries Road is unsealed four-wheel drive road and the existing alignment contains sandy stretches and many deep boggy areas after heavy rain events. There is minimal maintenance of the track and seasonal closures are rare. This current management of this stretch of Fisheries Road is an issue for the planning area in that:

- there is ongoing deterioration of the track, posing a potential risk to park visitors;
- numerous detours through vegetation have been established around the boggy areas;
- there is a detrimental visual impact—as there are up to a dozen detours at some sites; and
- there is a high risk of introducing *P. cinnamomi* to surrounding vegetation from this track.

Whilst it may still be desirable to maintain four-wheel drive access through Cape Arid National Park and Nuytsland Nature Reserve, negotiation with the Shire of Esperance is required through this planning process to decide on the best management of this stretch of Fisheries Road. Options may include adding the road reserve to the conservation reserve system.

The concept of an Esperance – Balladonia link, including the proposed upgrading the western end of Fisheries Road, is recommended for review (and further study) by MRWA (1997). As the link would include upgrading Parmango and Balladonia roads to provide a through link from Esperance to the Eyre Highway, increased visitation may be expected in the Cape Le Grand and Cape Arid national parks if the upgrade proceeds.

Merivale Road between the intersections of Kirwins Road and Cape Le Grand Road, and Jim Ovens Road and Orleans Bay Road, is proposed by Main Roads WA to be upgraded to a 6 m wide sealed road as medium and low priorities respectively (MRWA 1997). This upgrade will provide better access for visitors to both Cape Le Grand and Cape Arid national parks.

MRWA (1997) also propose as a high priority that Cape Le Grand Road, from Merivale Road, is upgraded to a 6 m wide sealed road to cater for an increase in visitor traffic to the national park.

There are some unused road reserves within the planning area, which are not required (e.g. within Lake Shaster Nature Reserve, Cape Le Grand National Park and Cape Arid National Park). These road reserves are not yet cleared, have significant conservation values, and consequently should be recommended for addition to the conservation reserve system. Other tracks do not follow the alignment of the surveyed road reserve such as Gora Track in Cape Arid National Park.

Departmental Managed Access Roads/Tracks

The majority of access within the planning area is via Departmental-managed access roads and tracks. Most of the coastal reserves have similar issues with regards to access within the reserves: that is, many of the access roads/tracks require rationalising, realigning, seasonal closure or upgrading in order to:

- provide safe access;
- avoid duplication;
- minimise environmental degradation such as erosion, disease spread;
- to direct visitors away from inappropriate informal camping areas;
- to prevent being closed by mobile sand dunes; and/or
- to maintain all year access (currently not available due to tides, flooding and/or waterlogging).

These issues apply in particular to coastal recreation sites within nature reserves, national parks that have remote recreation sites that are managed infrequently, and the proposed additions to be added to the conservation estate.

Some additional tracks may need permanent closure, if recreation sites are to be closed[30] or moved. The planning process will need to assess all the existing access tracks throughout the planning area in order to present an access strategy within the draft management plan that is consistent with the provision of a range of recreational opportunities.

A four-wheel drive by-pass to Fanny Cove has been created at Stokes Inlet to stop severe degradation of estuary edges along the current eastern access track. The permanency of this track needs to be considered in the management planning process. The current arrangements mean that previous vehicle access from Stokes Inlet north around the inlet to Fanny Cove is no longer possible. Access to Fanny Cove now is via South Coast Highway and Farrells Road, which passes through Nature Reserve 27888. The old alignment around the inlet to Fanny Cove provides an opportunity for a day walk around the inlet when water levels are low (see section on *Recreational Use – Walking*).

Visitors to Reserve 24486 (proposed nature reserve) are leaving tracks connecting water bores (drilled for exploration) and pushing off into intact vegetation. This will need consideration during negotiations with the Water Corporation for management of the reserve as a nature reserve. Promotion to the community of the nearby (Esperance) shire-managed Off Road Vehicle Reserve may help protect Reserve 24486 from vehicle damage.

Many of the beaches of the coastal reserves are accessed by vehicles. Although this allows access for remote recreation opportunities and is greatly valued by many visitors, it can impact on migratory shorebirds including the sanderling (*Calidris alba*) and red-necked stint (*Calidris ruficollis*), the hooded plover (see section on *Native Animals – Birds*), and other nesting shorebirds such as the sooty and pied oystercatchers (*Haematopus fuliginosus* and *H. longirostris*). At high tide, some vehicles drive along the foredunes, damaging the dune and vegetation systems. Driving along the beach can also be a visitor risk issue with beach driving conditions changing quickly with soft sand being like quicksand in some areas and drop offs formed by creeks draining to the ocean in winter. Also a regular complaint in visitor satisfaction forms is the visual impact of vehicles on beaches. All the same, changing any beach access within the planning area would be a highly sensitive issue with many visitors, who have traditionally driven onto and along beaches to access camping sites, to fish, and to sight-see. For example, the trip to Le Grand Beach via Wylie Bay along the beach from Esperance is extremely popular.

However, as discussed above, there are significant environmental and/or safety concerns with continued vehicle access to some beaches within the planning area and these should be addressed during the planning process. Suggestions of location where beach access could be reviewed during the planning process include:

- Lucky Bay Beach in Cape Le Grand National Park;
- Rossiter Beach in Cape Le Grand National Park;
- the western end of Victoria Harbour in Cape Le Grand National Park;
- Tagon Bay in Cape Arid National Park; and/or
- between Cape Pasley in Cape Arid National Park and Bellinger Island in Nuytsland Nature Reserve.

Even if the management plan does not recommend specific closures of beaches to vehicle use, there may be a need to develop criteria to enable management decisions to temporarily close beaches to vehicles, to protect the conservation and recreation values as well as to minimise visitor risk, during the life of the plan.

As the standard of vehicular access within Cape Le Grand National Park has increased, four-wheel drive use in the Cape Arid National Park – Nuytsland Nature Reserve area has also increased as people seek more remote experiences. This is compounded by visitors going to these reserves to seek solitude from more crowded campsites, to avoid visitor fees and to get away from authority. Several tracks have been recently pushed through the vegetation to the beaches. If other beach driving opportunities within the planning area are restricted, this may further increase use in this area.

[30] Some recreation sites may be closed as are a duplication of a recreational experience nearby, are not compatible with the purpose of the reserve, or are inappropriately located (see section on *Recreational Use – Camping and Day Use*).

There is an opportunity to create a new four-wheel drive 'Heritage Track' that links areas of historical interest in Cape Arid National Park. These areas include Gabtoobitch ruins, Hill Springs and the old telegraph line. This could use the network of former and existing alignments of four-wheel drive tracks.

Jenamullup Creek Road ('Gabtoobitch' Track) in Cape Arid National Park is currently closed due to risk of disease spread and is currently only used for management purposes. This track could be upgraded to year-round four-wheel drive access or seasonally opened to provide an alternative route to Barrier Anchorage and a preferred start point for climbing Mt Arid (on the western side). There is also a possibility of creating a new campsite along this track (see section on *Recreational Use – Camping*). However, the risk of disease spread along with the impact on the spectrum of recreational opportunities in this area will need to be taken into account.

Upgrading four-wheel drive tracks to two-wheel drive access could aid in preventing the spread of disease as well as provide additional recreational opportunities to visitors who do not have four-wheel drive vehicles. However, it is most likely that the majority of the four-wheel drive access within the planning area will remain. Tracks that could be upgraded include Jorndee Creek Track and the current access track for climbing Mt Arid from the eastern side within Cape Arid National Park. However, Cape Arid National Park currently represents a more remote national park experience, and improving two-wheel drive access may not be desirable, also an alternate route to climbing Mt Arid may be developed.

There are limited suitable materials available for road-building in the national parks (with respect to composition, and impacts on conservation values and visual amenity). This fact, combined with the long distances involved, leads to a high cost of building and maintaining roads. It is planned to upgrade access to Rossiter Bay in Cape Le Grand National Park to bitumen as has been done for other access roads within the western part of the park. However there may be instances where some roads become too costly to maintain, and should be either upgraded to bitumen or allowed to revert to unsurfaced (natural) tracks.

Boat Access

Starvation Boat Harbour to the west of the planning area provides boat-launching facilities. There are no specific boat launching facilities provided within the planning area but the majority of the coastal beaches in the planning area can be accessed from the water by boat and other watercraft. There are many informal areas where recreational boats can be launched over the beach (e.g. at Le Grand beach and Lucky Bay within Cape Le Grand National Park. Commercial fishermen also regularly use the beaches for launching boats (e.g. within Nuytsland Nature Reserve and Cape Arid National Park). Some bays are only accessible by water (e.g. "O'Briens Bay", "Smiths Beach" and "New Island Bay" in Cape Le Grand National Park) and there may be an opportunity to provide different overnight experiences in these areas (see section on *Recreational Use – Built Accommodation*). However strong swells and winds can create difficult boat access in some areas.

Landing on most islands of the Recherche Archipelago is difficult and visitation is generally low (except Woody Island where a commercial tourist operation already exists). There is good access to Middle Island, and it is a popular anchorage, providing safe landing from boats. Unlike other islands in the Recherche Archipelago, Middle Island has a fragile fore dune system. A boardwalk was installed to protect the island from impacts of low level visitation and this was proving successful, however the boardwalk was destroyed in the 2006/07 wildfire and will need to be rebuilt. Islands most likely to receive visitation due to their location, landing options and recreational interest are: Investigator, Figure of Eight, Cull, Remark, Sandy Hook, Wilson, Mondrain, North Twin Peak and Daw islands. Boat (and/or helicopter) access to Figure of Eight Island and Cull Island may be required to service the unmanned beacons, which include two automated light stations, and one automated weather station.

Recreational Use

Four-wheel Driving and Motorbiking

Many of the visitors to the planning area use four-wheel drive vehicles to access recreation sites and also to have a four-wheel drive recreational experience. Over180 000 new sports utility vehicles (four-wheel drives) were sold in Australia during 2005 (nearly 20% of all vehicles), up 4.2% from 173 087 in 2004, 150 578 in 2003 and 138 064 in 2002 (Chamber of Automotive Industry 2006 figures). The WA 4WD Association

states that there are almost 200 000 four-wheel drives registered in Western Australia alone. Based on these figures, demand to use the planning area for recreational four-wheel driving is likely to increase.

While the Department acknowledges four-wheel driving as a legitimate activity on the conservation estate, and encourages visitors to explore the remote areas of the State, four-wheel drive vehicles and motorbikes can impact the values of the planning area (see section on *Visitor Access – Departmental Managed Access Roads/Tracks*) when driven inappropriately. These impacts include habitat destruction, spread of dieback and braiding of tracks around difficult areas, leading to damage of vegetation and soil loss.

All vehicles within land managed by the Department must be registered under the *Road Traffic Act 1974,* and all drivers must possess a current driver's licence. The relevant road rules, such as not driving under the influence of alcohol or drugs and not using excessive speed, also apply. Any vehicle registered under the *Control of Vehicles (Off-road Areas) Act 1978* is not permitted to operate on Departmental-managed lands except under exceptional circumstances with permission from the District Manager (such as four-wheel drive bikes that can facilitate disabled access).

Despite this, many unlicensed off-road vehicles, including four-wheel motorbikes, trail bikes and occasionally dune buggies, are used in parts of the planning area (e.g. Lake Shaster Nature Reserve, Reserve 24486, Reserve 28170, Whartons Beach and Victoria Harbour within Cape Le Grand National Park and unallocated Crown land in the Alexander Bay area). These vehicles frequently drive off-track through sensitive vegetation and dune systems causing environmental damage and posing a risk to visitors.

Walking

Existing walking trails within the planning area are described in Table 1.

TABLE 1. Existing Walking Trails in the Planning Area

Park/Reserve	Walk	Length (return except where otherwise noted)		Class(es) 1 – 6*
		km	hours	
Stokes National Park	Stokes Inlet Heritage Trail**	4.3	1.5	2
Cape Le Grand National Park	Frenchman's Peak	3	2	4
	Coastal Trail – *Le Grand to Hellfire Bay* (one-way)	6	2-3	4
	Coastal Trail – *Hellfire Bay to Thistle Cove* (one-way)**	4.5	2-2.5	4
	Coastal Trail – *Thistle Cove to Lucky Bay* (one-way)	2.5	1	2
	Coastal Trail – *Lucky Bay to Rossiter Bay* (one-way)	6	2-3	3
	Le Grand Heritage Trail	1	0.75	3
	Bird Sanctuary	0.4	0.25	2
Cape Arid National Park	Boolenup Nature Trail**	4	2	2
	Len Otte Nature Trail**	1	1	2
	Tagon Coastal Trail**– *Thomas River to Tagon Beach*	7	4	3
	Hill Springs Walk Trail	0.4	0.5	2
	Mt Arid Summit Walk	2	2	4
	Mt Ragged Summit Trail	3	3	4
Woody Island Nature Reserve	Woody Island Summit Trail	1.8	1	2
	Twiggy's Landing Trail	0.4	0.6	3
	Skinny Dip Bay Trail	0.5	0.6	3
	Mac's Jetty Trail	0.25	0.3	3
Recherche Archipelago Nature Reserve – Middle Island	Heritage Trail via Lake Hillier**	0.5	0.6	2

* Based on Australian Standard AS 2156.1 (2001) for Walking Track Classification

** These walk trails have been impacted by Nov/Dec 2006 wildfires

Some additional bushwalking opportunities[31] within the planning area have been identified early in the planning process and include:

- an extension of the heritage trail at Stokes National Park, west of the inlet, to the foredunes (3.5 km along an unused road) for a scenic lookout and then possibly to the beach to provide access when the inlet water levels are high;
- a day walk around Stokes Inlet to Fanny Cove;
- a heritage trail within Smiths Block in Cape Le Grand National Park (~6 km of which the first 450 m is to be well formed and provide universal access, and the remainder Classes 2 and 3);
- a loop heritage walk from the existing coastal walk trail in Cape Le Grand National Park, Lucky Bay to Thistle Cove (~4 km);
- an eastern approach (via Poison Creek Road) to climb Mt Arid within Cape Arid National Park;
- a loop walk trail in the Thomas River area within Cape Arid National Park to link with the old Telegraph Line alignment;
- a loop walk from Boolenup Nature Trail to Thomas River;
- an extension to the Len Otte Nature Trail to Thomas River;
- an extension to the Tagon Coastal Trail looping back to Thomas River; and
- a walk trail to climb Flinders Peak on Middle Island in the Recherche Archipelago Nature Reserve[32].

The issues of soil compaction, erosion, waste disposal, the introduction and/or spread of weeds and plant diseases will all need to be addressed.

Safety problems associated with long distance hikes include the threat of wildfire, steep and uneven terrain, bees, snakes, dehydration and/or becoming lost or injured. Effective signs, visitor information programs and self-registration forms are ways of addressing these types of issues.

Horse-riding

Horse-riding is usually not permitted in national parks and not permitted in nature reserves. However there has been a suggestion from interest groups to designate horse trails within the national parks and/or organise a permit system to allow horse-riders access to the planning area. Although a local horse-riding group organised a long-distance trek through Cape Arid National Park in 2006, there is not much history of recreational horse-riding use in the planning area. However, early settlers used parts of the area for droving livestock.

Boating

Canoeing or kayaking is possible at Torradup Inlet, Stokes Inlet and Young River within Stokes National Park, Barker Inlet within Nature Reserve 27888, Lake Quallilup within reserve 30672, and Thomas River within Cape Arid National Park. Motorised boating occurs in the larger water bodies. The beaches along the coast are also used for launching boats.

Recreational Fishing

Many of the visitors to the planning area undertake recreational fishing along the coastline and within the inlets and estuaries along the coast. Issues associated with recreational fishing include proliferation of access tracks, disturbance to shoreline vegetation, conflict with commercial fisherman and those associated with ancillary activities such as camping, waste disposal and campfires. Also there are visitor risk issues as rock and reef fishers will often go to extreme lengths and take risks to access favoured fishing sites.

Abseiling and Rock Climbing

The rise in number of adventure companies in Western Australia has led to an increase in requests for access to areas, such as Frenchman Peak in Cape Le Grand National Park, for these activities. Although accreditation of instructors and limiting group numbers can be of benefit to ensure the safety of the participants, consideration should be made to whether these activities, on both a commercial and/or private

[31] These opportunities in part take into account the Nov/Dec 2006 fires in Stokes and Cape Arid national parks, which have provided added opportunities for new walk trails.

[32] Visitors to the island are already making their own way to the top of Flinders Peak along informal routes, however this is damaging vegetation, exacerbating erosion and has raised safety concerns.

basis are sustainable within the planning area and whether visitor risks can be sufficiently minimised. Abseiling activities are currently not permitted[33] within the planning area unless as a commercial operation—except for Frenchman's Peak within Cape Le Grand National Park where there has been a recommendation that for safety reasons even commercial operations should not be allowed at this site (Lodge *et al*. 2002).

Hang Gliding

There is infrequent use of the planning area for hang gliding, however Frenchman's Peak within Cape Le Grand National Park has been described by the Hang Gliding Association of Western Australia's website as a spectacular walk-up hang gliding site, although it is noted on the website that this activity is currently not permitted within the National Park. Demand for this activity within the planning area and potential impacts and safety concerns may be investigated during the planning process.

Wildlife Interaction

Human interaction with wildlife in the planning area such as Australian sea-lions and New Zealand fur-seals can pose a potential threat to visitors as well as disturbing the animals. These pinnipeds are protected from disturbance under section 16 of the Wildlife Conservation Act.

Western grey kangaroos can also become aggressive if fed by visitors and occasionally this is a problem at Lucky Bay and other beaches in Cape Le Grand National Park (see also section on *Introduced and other Problem Animals*).

Interaction with whales and pinnipeds in the waters off the planning area are regulated under the *Wildlife Conservation (Close Season for Marine Mammals) Notice 1998*. There are five commercial marine mammal interaction licences issued for vessels operating in the waters surrounding Esperance (see also section on *Commercial Tourism Operations*). This includes one vessel licensed for whale, dolphin, sea lion and fur seal watching tours and two further vessels licensed for whale watching. Whale watching is also a popular terrestrial recreational activity from Cape Le Grand and Cape Arid national parks. A whale watching platform and access to the beach at Thomas River may be considered to facilitate this.

Camping and Day Use

One of the main issues for the planning area is the need to address camping and day use. Most of the existing formal and informal camping areas within the planning area show signs of environmental degradation and require upgrading/formalising, relocation, or some other form of improved management. Informal camping areas include camping areas within the nature reserves and beach camping areas (e.g. between Barrier Anchorage and Point Jedacorrudup in Cape Arid National Park where foredune vegetation is being impacted).

A strategic assessment of recreation sites (both camping and day use) across the planning area is required to ensure that the number and style of camping areas and day use sites provide reasonable access to different recreational opportunities and that the environment is protected. This may mean in some areas:

- the conversion of camping areas to day use sites only;
- the provision of additional camping areas;
- the formalisation of camping areas; and/or
- guidelines to the level of development and facilities provided at an area.

Recent fires in Stokes and Cape Arid national parks have completely destroyed campsites in the Stokes Inlet and Thomas River areas respectively. There is also now opportunity to reassess these areas to improve or restructure the sites.

Appendix 3 includes details of the camping and day use sites within the planning area. There are also numerous caravan parks and campgrounds adjacent to the planning area provided by private enterprise or the local Shire. In some cases these provide opportunities for visitors to either stay in more developed settings, but still enjoy the values of the planning area. Future development and use of these adjacent caravan parks and campgrounds may have an impact on the planning area.

[33] Under the CALM regulations, lawful authority is required to undertake abseiling.

From summer to autumn, Lucky Bay within Cape Le Grand National Park is one of the busiest recreation sites in the planning area. This site includes both camping and day use facilities, and is currently over capacity and under increasing visitor pressure. The site is two-wheel drive accessible and is currently used by groups and individuals caravanning, vehicle camping or tenting year-round. Individual campsites are not defined and, in summer, day visitors can add up to 150-200 vehicles to the site. Options for management at Lucky Bay include:

- limiting the number of campers;
- seasonally restricting the type of camping experiences available;
- creating an additional camping area;
- improving site definition;
- separating day use from camping area;
- introducing a booking system; and/or
- allowing a suitable commercial operation incorporating on-site management.

In the past there have been suggestions that Middle Island could also be developed for overnight use. Such a development would have to be balanced against the high conservation significance of the island (habitat for threatened and priority fauna), protection of cultural sites and potential impacts by human disturbance (fire and/or introduction of weeds). The *Esperance Development Committee Report* (GEDC 1989) recommends that "*…Middle Island be preserved in its natural state and not subject to intense development for tourism*" and determined that any visitation should be restricted (due to the fragile nature of the landform and soils).

Little is known of the level of visitor use of other islands such as Investigator, Figure of Eight, Cull, Remark, Wilson, Mondrain, North Twin Peak or Daw or whether they are suitable for day use.

Campfires

Within the planning area, campfires (ground fires or fires in containers) are not permitted, either on the beach or in camping areas, except at Mt Ragged where campfires are permitted in the concrete fire rings in the camping area. Ground fires are not permitted in the Shire reserves between 1 November and 30 April inclusive.

While it is acknowledged that campfires are considered by many people to be an integral part of their camping experience, firewood collection has detrimental effects on the natural environment, including loss of vegetation cover and, consequently, a reduction of habitat. The area around fireplaces also suffer from vegetation loss and soil compaction, the accumulation of ash and the failure of overhead shade trees and groundcover to regenerate where there have been continuous campfires. Sites impacted by campfires and firewood collection can take many years to recover. Campfire escapes are also a source of wildfires, which can have devastating effects. Response times to campfire escapes within the planning area would be lengthy due to the travel time.

Significant degradation from illegal campfires can be seen at many campsites within the planning area, including tree stumps from felled trees, large fire scars and groves of Rottnest teatree (*Melaleuca lanceolata*) being opened up from firewood collection and smoke impacts (e.g. Pincers campsite at Lake Shaster Nature Reserve and Point Malcolm at Nuytsland Nature Reserve). Campground fringing vegetation is very important for providing shade and shelter and regeneration can be very slow (e.g. 1.5 m to 2 m in 14 years for Rottnest teatree at Fanny Cove campground after wildfire in 1992). This has the potential to completely alter recreational use of an area and put pressure on other camping areas/day use sites.

Fires on beaches and at informal site within the foredunes are especially prevalent within the planning area. Apart from the impacts of firewood collection, hot ash and coals from beach campfires can be a visitor risk, as burial does not preclude the material being unearthed and burning unwitting beach users.

The current observed impact of campfires and projected increases in visitation to the planning area requires action to reduce environmental impacts. Management options include education and interpretation materials on the impacts and risks of campfires, promoting the use of fuel stoves, and further provision of gas barbeques.

Built Accommodation

At present the only formal built accommodation within any of the reserves in the planning area is on Woody Island (see section *Commercial Tourism Operations* below). However, the Goldfields Esperance Development Commission (GEDC) has indicated that development of a 'wilderness lodge' somewhere along the Esperance coast is a high priority. Tourism WA has also identified that the development of 'national park lodges' in Cape Arid (e.g. Thomas River area), Cape Le Grand, and Fitzgerald River national parks and the Recherche Archipelago would fill major infrastructure gaps in the tourism market (Tourism WA 2003, 2004). Similarly, upgraded caravan facilities at Fitzgerald River, Cape Le Grand and Cape Arid national parks are viewed by Tourism WA as desirable. The recent Tourism WA Landbank initiative announced in June 2005 aims to identify 'investor ready' tourism development sites across the State. Tourism WA is seeking a Landbank site somewhere in the Esperance region, either on Esperance Shire estate or Departmental-managed land (Tourism WA 2006). Initial areas being investigated as potential Landbank sites include Esperance Shire reserve 518 at Thomas River and the Esperance Shire area at the Duke of Orleans Bay/Wharton Bay. Whilst both these initial options are not within the planning area, any development on these sites would entail significant recreational and interpretative activities within the planning area (see section on *Commercial Tourism Operations*). There is also the potential that the owners of the private property enclave at Point Malcolm in Nuytsland Nature Reserve may seek to establish an eco-tourism development on their property. This would also have implications for planning area.

The suitability of locations for these developments within the planning area may be considered through the management planning process and through discussions with the relevant bodies. Other built or semi-permanent accommodation such as eco-lodges or safari tents could also be considered at an appropriate location(s) within the planning area. However, suitable locations on private property or shire reserves adjacent/close to the national parks should also be considered as alternative sites for such developments, thereby minimising direct impacts such as provision of infrastructure and infrastructure corridors within the parks themselves. The assessment of recreation opportunities throughout the planning area may also guide where development such as built accommodation would be suitable and ensure that similar recreational opportunities are not unnecessarily duplicated. Built accommodation, such as cabins and chalets, is already available at Munglinup Beach Caravan Park near Lake Shaster Nature Reserve and at Orleans Caravan Park between Cape Le Grand National Park and Cape Arid National Park.

At Barrier Anchorage in Cape Arid National Park, commercial fishermen use Cahill's Hut (see section on *Non-Indigenous Heritage*) to stay in through the crayfish and abalone seasons. Options for this hut to be considered during the planning process include formalising lease arrangements, making the hut available to all visitors or specific user groups, maintaining the hut for interpretative/heritage purposes or removing the hut.

Commercial Tourism Operations

A commercial concession is a right granted, in consultation with the Conservation Commission, by way of a lease or licence for occupation or access and use (respectively) of an area of land or water managed by the Department. Commercial concessions can increase the range of recreation opportunities, facilities and services within the planning area. Commercial concessions must be consistent with the tenure and purpose of the reserve, the protection of its values and the objectives of the management plan.

There are many commercial tour operators within the planning area providing valuable services to visitors. There are 108 commercial operators licensed for Cape Le Grand National Park, 69 for Cape Arid National Park, 63 for Nuytsland Nature Reserve and 60 for Stokes National Park (Department January 2006 data). However, not all these operators necessarily run tours in the reserves. Commercial tours in nature reserves can generally only be permitted as a 'necessary operation', whereby the operator assists with the management of the reserve or collects information that can used in the preparation of a management plan.

For the Recherche Archipelago, commercial tourism is mainly focussed on Woody Island. This island is vested in the Conservation Commission as a stand-alone reserve and has a purpose of 'Conservation of Flora and Fauna, Recreation and Tourism Development' (see section on *Managing Visitor Use*). The current tourism developments are restricted to a defined lease area and comprise a large reception centre and kiosk, toilets and a campground with 32 semi-permanent safari tents, although associated activities such as

swimming and guided walks are located outside the lease area. Further development is approved within the lease area, such as the provision of cabins containing their own toilet, shower and kitchen facilities, as well as another campground.

There are also some commercial boat cruises throughout the waters of the archipelago providing whale watching, dolphin and seal tours (see section on *Recreational Use – Wildlife Interaction*) as well as underwater diving ventures in waters adjacent to islands. The Department has allowed a licensed operator to conduct day cruises to Middle Island for sightseeing and bushwalking activities, on a restricted basis, over the last 5 years. This should allow an assessment on the viability of Middle Island as a tourist destination, and the operational practicalities and impact on the island of commercial day use (see also section on *Recreational Use – Camping and Day Use*). The planning process should consider under what conditions commercial use would continue, if considered to be manageable, on the island. The Sail Training Ship Leeuwin also calls in annually at Middle Island. As Middle Island is part of a nature reserve, any visitor usage has to be consistent with the island's nature reserve status unless a change in tenure is considered.

There also may be other commercial opportunities, which will need to be managed appropriately to protect the values of the area. For example, bodies such as the Goldfields Esperance Development Commission and Tourism WA have suggested developments such as a "wilderness lodge" and other tourism infrastructure ventures for either within, or nearby the reserves (see section on *Recreation Use – Built Accommodation*). Therefore potential commercial operations within the planning area may include:

- built accommodation (e.g. wilderness lodges, semi-permanent safari tents);
- services such as a visitor centre, shop or kiosk/café (e.g. at Cape Le Grand National Park); and/or
- guided tours.

The management planning process needs to consider whether the option of commercial leases (e.g. for the campsite at Lucky Bay and at Le Grand Beach in Cape Le Grand National Park) would be warranted and/or beneficial. It is possible that as part of a commercial lease, approval for built accommodation would be sought.

If a Tourism WA Landbank[34] site is located near or within the planning area, then associated leases and licences would be required. The Tourism WA vision for the product development within the Landbank site includes outdoor based experiences such as walking, riding, water-based and interpretative activities centred on a range of quality eco-style accommodation options including high end eco lodges (Tourism WA 2006).

Visitor Risk Management

Visiting and enjoying the planning area can involve visitor risks either through interacting with the natural environment (e.g. wildfire, weather, tides and swells and/or hazardous animals) or from the activities pursued whilst in the natural environment (e.g. rock fishing, rock climbing, swimming and/or four-wheel driving). Developments and built infrastructure can also pose a risk to the visitor.

These risks can be compounded by the remoteness of an area, and many parts of the planning area are situated hours from the town of Esperance and may be outside of telecommunication range for many visitors.

As part of its visitor risk management program, the Department identifies hazards, assesses the risks posed by these hazards, implements risk mitigation measures and monitors implementation. As part of this program, all formal recreation sites are routinely audited to identify visitor risks. The management planning process will consider recent audits and what management arrangements and activities need to be implemented (e.g. increased interpretation) in the planning area.

Domestic Animals

Dogs, cats, horses and other domestic animals are not permitted into conservation reserves unless specifically allowed for in gazetted areas under the *Conservation and Land Management Regulations 2002*. The presence

[34] The Landbank project was created to ensure an adequate supply of low-impact tourism development sites met the future needs of the tourism industry in Western Australia. The Landbank initiative will make it easier for the right developer with the right development philosophy to invest in tourism accommodation development in this State. The development sites will have a range of feasibility studies, environmental analyses, planning processes and consultation conducted for them before they are released for development.

of dogs can disturb native fauna, introduce disease, spread weeds or cause a nuisance to other visitors, and the dogs may be at risk from fox baits.

There is an issue with dogs currently being taken into the existing conservation reserves within the planning area. Also as the Shire reserves along the coast adjacent to the reserves generally allow dogs, there is an issue with visitors to these reserves sometimes taking their dogs into the adjoining conservation reserves (e.g. at Whartons Beach and Victoria Harbour within Cape Le Grand National Park).

MANAGING RESOURCE USE

Traditional Hunting and Gathering

Under section 23 of the Wildlife Conservation Act, Aboriginal people are exempted from some of the provisions of the Act related to the taking of flora and fauna. Aboriginal people may take flora and fauna for food for themselves and their family from most Departmental-managed reserves (excluding nature reserves) with the consent of the Department.

Conditions associated with approval include:

- that the use of wildlife is sustainable;
- food taken is not sold;
- the activity does not impinge on the safety of others; and
- the activity is consistent with other land management objectives.

The Memorandum of Understanding signed between the Department and the Goldfields Land and Sea Council recognises the need to negotiate access for traditional hunting and gathering.

Waste Management

Waste Disposal

Visitation to the recreation sites within the planning area generates waste, including human waste. Issues associated with waste disposal in the planning area include the efficiency of waste removal and the impacts of waste on environmental quality (i.e groundwater pollution, air pollution and soil contamination). Inappropriate waste disposal from campsites can pollute the estuarine and marine environments[35] within the planning area.

Visitors are encouraged at many of the recreation sites within the planning area to take their rubbish with them when they leave. In other areas such as at Cape Le Grand National Park, facilities for sorting and recycling waste are available. This waste is disposed of in Esperance at the Shire managed waste disposal site. However, at more remote parts of the planning area, the Department uses a number of small refuse sites within the reserves to dispose of waste, including at Stokes National Park, Cape Arid National Park and Nuytsland Nature Reserve.

Management of sewage varies across the area. Sealed vault toilets are used at Stokes National Park, leach septic systems are in place at Cape Le Grand National Park, and sealed vaults and '44 gallon' drums (to be phased out) are used at Cape Arid National Park.

Marine Pollution

Activities within the Esperance Bay and boating and shipping within the Recherche Archipelago have the capacity to impact on the values of the planning area, in particular the coastal and island environments. This may be by way of pollutants from ship spills, anti-fouling paints used on ship hulls, and/or bilge pumping.

The biggest incidence of marine pollution in the planning area occurred in 1991, when the *Sanko Harvest* hit a reef 10 km south of Cape Le Grand National Park. Thousands of tonnes of fuel and fertiliser were released into the ocean (Lee and Bancroft 2001) and a stretch of coastline 30 km to the east and west of Esperance was partly or completely covered in oil, including nearly 25 km within Cape Le Grand National Park.

[35] There are proposals to create marine reserves for the waters of the Recherche Archipelago and also within Stokes Inlet (Marine Parks and Reserves Selection Working Group 1994).

Approximately 75 000 kg of oil soaked sand and hundreds of litres of oil were removed from the beaches and islands. Gales (1991) reported that 200 seals were affected by pollution, mostly newborn New Zealand fur seals aged between two weeks and two months. New Zealand fur seal pups were treated to remove oil from their fur on nearby Hood Island and Seal Rock. New Zealand fur-seals are more vulnerable to the effects of oil contamination than Australian sea-lions (Gales and Wyre 1999, Shaughnessy 1999) due to their reliance on clean fur for insulation. Pacific gulls (*Larus pacificus*) and other seabirds in the area were also treated to remove oil contamination of their feathers.

Marine Debris

Injury and fatality to vertebrate marine life (e.g. seals, other marine mammals and seabirds) caused by ingestion of, or entanglement in, harmful marine debris has been listed as a key threatening process under the Commonwealth EPBC Act (DEH 2003).

Mining

The planning area has high prospectivity for low-grade limestone resources that may be of interest to the agricultural and mining sectors. There are five exploration licences pending within the reserves (as of April 2005), three within Cape Arid National Park (E69/1499, E69/1495 and E69/1500) and two within Nuytsland Nature Reserve (E69/2014 and E69/2015). There is also a mining lease application (MLA 63/602) within one of the proposed additions to the conservation estate (Reserve 30672).

Under the *Mining Act 1978,* mining can be undertaken within the planning area in class 'C' reserves subject to the recommendations of the Minister for the Environment and the Conservation Commission, whereas in national parks and class 'A' nature reserves the concurrence of the Minister for the Environment and the consent of both Houses of Parliament is required. However, current Government policy is to prohibit mineral (and petroleum) exploration and extraction in national parks and class 'A' nature reserves. If applications were lodged before 10 February 2001 for access to national parks or nature reserves, they would be considered, but there would be no presumption of approval and, if approved, they would be subject to a net benefit to conservation concept.

Within the conservation estate only the exploration licences in Cape Arid National Park were applied for prior to 2001. These applications will require assessment by the Environmental Protection Authority under the *Environment Protection Act 1986*, concurrence of the Minister for the Environment and the consent of both Houses of Parliament. For approval, there would also have to be a net conservation benefit.

The mining lease application (lodged February 2005) on Reserve 30672 follows a granted prospecting licence. This application may impact on the proposed change of tenure to either a national park or a nature reserve. Further discussions with the Department of Industry and Resources may be required. The interest in lime within the proposed additions to the conservation estate may also impede some of the other proposed changes in tenure within the planning area.

Commercial Fishing

At present, commercial netting of fish is allowed by the Department of Fisheries in Stokes Inlet with restrictions (e.g. with a defined open season). Fisheries Management Paper 126 *The South Coast Estuarine Fishery: A discussion paper* (Pearn and Cappelluti 1999) puts forward four options for the management of commercial fisheries in Stokes Inlet, one of which was closure of the inlet to commercial fishing. Recfishwest and several other groups did not support the continued commercial netting access to Stokes Inlet (Fisheries Western Australia 1999). However, the *South Coast Estuarine Fishery Management Plan 2005* (Fisheries Western Australia 2005) still includes Stokes Inlet as part of the commercial fishing area.

Stokes Inlet is currently not within Stokes National Park, but its inclusion into the conservation reserve system is an option that will be addressed through the planning process (see sections on *Brief Overview of the Planning Area* and *Catchment and Soil Protection*). If the inlet were to be incorporated into the conservation reserve system then the issue of commercial fishing in Stokes Inlet would be examined further. Until then the management of commercial fishing is the responsibility of the Department of Fisheries. Torradup Inlet, which is within Stokes National Park, has been closed to commercial net fishing since 2001.

Several sites within Stokes National Park (at Fanny Cove and Margaret Cove) are used as a base for commercial fishing operations in adjacent offshore waters. Commercial fishing operations also use other sites within the planning area such as Nature Reserve 27888 (Barkers Inlet), Cape Arid (Barrier Anchorage, Thomas Fishery and Seal Creek) and Nuytsland Nature Reserve (near Point Malcolm and at Bellinger Island). These shore-based sites are used as campsites supporting the commercial fishing operations. Camping by commercial fishers is generally not problematic, but at most sites needs to be regulated to prevent conflict with recreational camping (e.g. possible separation of recreational and commercial fishing camping). This may be examined in the management planning process.

Aquaculture

Aquaculture is listed as one of the many threats to the Australian sea-lion under the conservation advice for listing of the sea-lion under the EPBC Act (DEH 2005a). Gales and Wyre (1996) also highlight that the potential increase in sea cage aquaculture in Western Australia may be a problem for pinnipeds. The action plan for Australian seals (Shaughnessy 1999) recommends that establishing fish farms near seal colonies or haul-out sites is to be avoided, due to the vulnerability of fish farms to attacks by seals which is influenced by their proximity to seal haul out sites (Pemberton and Shaughnessy 1993).

There has been interest shown in developing commercial aquaculture within the Recherche Archipelago, but to date no proposal has been successful, or progressed far in the environmental approvals process. However, it is likely that over the life of the plan that further aquaculture proposals will be raised for the Recherche Archipelago. A number of breeding and haul-out sites for pinniped species occur in the Recherche Archipelago and around the Esperance coast, and subsequently, the potential for interactions between pinnipeds and any proposed aquaculture operations is a possible issue.

Scientific and Research Use

The planning area, in particular the nature reserves, wetlands and islands is a focus for scientific study. There is still a lot of biological and cultural information of the reserves to be collected. Research activities by external agencies are supported where they contribute to the understanding of the natural, cultural or social values within the planning area. As part of the planning process, the need for a field research centre within the area may be considered.

Scientific and research activity involving disturbance of flora or fauna (including fossil flora or fauna) can only occur if it is in accordance with a licence issued under the Wildlife Conservation Act. Such licences will generally be subject to conditions, including that results are forwarded to the Department.

There have been incidences of disturbance of flora and fauna without a licence within the planning area, for example removal of seal skins of heritage value from a cave in the Recherche Archipelago Nature Reserve without permission—however this material was passed onto the WA Museum. Also when dead whales are washed ashore, souveniring can be an issue.

Public and Private Utilities and Services

There are no major public or private utility corridors currently within the reserves.

Beekeeping

There are seven current apiary sites within the planning area, six within Lake Shaster Nature Reserve and one to the north in unvested Crown reserve 25376 (proposed to become a nature reserve).

The Department's Policy Statement No. 41 *Beekeeping on Public Land* provides for general guidance for the management of apiculture on Crown land. This policy is currently under review. As part of current Departmental policy, a moratorium on new apiary sites in national parks and nature reserves has been in place since 1992. Under the draft policy the Department will maintain (and renew) current apiary site permits on all classes (tenures) of land, but permit no additional apiary sites on land currently or proposed to be reserved primarily for nature conservation purposes, until a management plan has been prepared. Therefore, the Department, through the management planning process for the Esperance Coastal Reserves, will consider whether access for beekeeping is either retained at the current level, increased, decreased or phased out based on appropriate environmental and management criteria. The management planning process will identify suitable areas for beekeeping whilst minimising the potential impacts of honey bees.

Water Extraction

There are no major public water supplies existing, or proposed within the existing national parks and nature reserves within the planning area. However, the Water Corporation has requested a joint Management Order with the Department over the whole of Reserve 24486. This reserve is proposed to be added to Lake Mortijinup Nature Reserve. Both Reserve 24486 and Lake Mortijinup Nature Reserve are part of a nationally important wetland system, which may be impacted upon by water extraction.

Ewart's Swamp in Nature Reserve 27087 and Lynburn Washpool Swamp in Cape Arid National Park have both been used for drought relief purposes. Previously the Minister for Water Supplies and the Shire of Esperance have sought for these areas to be put into separate water reserves and excluded from the conservation estate. However, it was agreed that the management plan could provide for continued access to water. The Department has not refused any reasonable request for access to water in drought years, however approval will only continue to be given as long as the conservation values of the planning area are maintained.

Water to the ranger houses and recreation sites within the reserves is provided by rainwater tanks with some groundwater bores. Further infrastructure development is required to provide adequate potable water in some of the reserves as well as for fire control purposes.

Wildflower Picking

The collection of wildflowers or other plant parts can reduce the available seed stock and by reducing the numbers of flowers available for cross-pollination, may reduce genetic diversity. Driving into areas to pick wildflowers may lead to the spread of *Phytophthora* (see section on *Diseases*) and trampling can also result. In order to protect representative vegetation communities, section 99A(6) of the Conservation and Land Management Act prohibits the removal of flora and fauna from national parks and nature reserves.

Whilst not permitted, wildflower picking has been an issue in the past at Lake Shaster Nature Reserve including the removal of parts of the blue mallee (*Eucalyptus densa*) for floral arrangements.

INVOLVING THE COMMUNITY

Information, Education and Interpretation

The management planning process may consider how available resources can best be used to educate people about the conservation, cultural and (where appropriate) recreation values of the reserves. Education is a major factor in conserving the environment and enriching the experience of visitors. A visitor plan should be developed to outline the opportunities, themes, stories and sites appropriate for interpretation within the planning area.

Working with the Community

Community workshops have been held in Munglinup, Condingup and Esperance to provide community input into the management planning process, and further comments will be sought from the community on the draft management plan. An advisory committee has been established to facilitate community input into the planning process. The Esperance Parks and Reserves Advisory Committee is made up of several community members, with a wide range of skills and interests as well ex-officio representatives from Indigenous groups and the shires of Ravensthorpe and Esperance.

In addition to partnerships with Indigenous groups and the Esperance Parks and Reserves Advisory Committee, the Department is also keen to involve other community groups such as service groups, environmental, historical and recreational groups. Eventually, it may be useful for community 'Friends of' groups to be developed for at least the three national parks. Currently various groups and individuals assist with special projects in the reserves on a volunteer basis. Opportunities exist for further partnerships on projects with recreational bodies to assist with maintenance of infrastructure within the planning area.

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APPENDIX 1. Management Planning Area

The planning area comprises the following existing conservation reserves and proposed additions to the conservation estate (*in italics*):

Reserve	Name	Purpose	Gazetted Area (ha)
Reserves West of Esperance			
C7580	*Unvested Crown reserve*	*Rabbit Department*	*1605.1*
C32339	Lake Shaster Nature Reserve	Conservation of Flora and Fauna	10 504.5 (6183.3 west of Munglinup Inlet + 4321.2 east of Munglinup Inlet)
C25376	*Unvested Crown reserve*	*Timber and Water*	*91.4*
C26410	Munglinup Nature Reserve	Conservation of Flora and Fauna	150.1
C28168	Springdale Nature Reserve	Conservation of Flora and Fauna	25.5
A32590	Stokes National Park	National Park	9726.5
C32601*	Moir Homestead Reserve	National Park and Historic Building	16.2
A31763	*Unvested Crown reserve (Young River corridor)*	*Park and Protection of River and Foreshore*	*57*
Part of A31761	*Unvested Crown reserve (Lort River corridor)*	*Park and Protection of River and Foreshore*	*GIS area 65 Whole reserve is 809 (reserve continues approx. 22 km north of the South Coast Highway)*
C27888	Unnamed nature reserve (west of Barkers Inlet)	Conservation of Flora and Fauna	4615
C26885	Unnamed nature reserve (east of Barkers Inlet)	Conservation of Flora	5199.5
Part of C30672	*Unvested Crown reserve and adjacent unallocated Crown land*	*Preservation of Natural Vegetation and Ocean Foreshore*	*787.2 (704 and 83)*
A32419	Lake Gore Nature Reserve	Conservation of Flora and Fauna	792.4
Part of C24486	*Unvested Crown reserve*	*Flora*	*3490 Whole reserve is 12 764.5*
C19628	Dalyup Nature Reserve	Conservation of Flora and Fauna	57.1
A35557	Lake Mortijinup Nature Reserve	Water and Conservation of Flora and Fauna	486.3
C24953	Unnamed nature reserve	Conservation of Flora	42.5
		West Total	37 711.3
Reserves East of Esperance			
C22795, C44987	Cape Le Grand National Park	National Park, National Park	31 800.8 (31 578.2 + 222.6)
Part of C28170 -	*Unvested Crown reserve and adjacent unallocated Crown land Unallocated Crown land south of Alexander Nature Reserve*	*Use and Requirements of Government*	*GIS area 2691 (of 9170.4) and 60 GIS area 12 305*
C27087	Unnamed nature reserve	Conservation of Flora	37.7
C27086	Alexander Nature Reserve	Conservation of Flora and Fauna	807.1
A24047, A14234	Cape Arid National Park	National Park, National Park and Water	279 381.7 (278 120 + 1261.7)
Part of A27632	Nuytsland Nature Reserve (section to where scarp meets coast)	Primitive Area for Preservation and Study of Flora, Fauna, Geological and Anthropological Features	GIS area 231 492 (whole reserve is 625 343.6)
C41934	Unnamed (Lake Gilmour) nature reserve	Conservation of Flora and Fauna	6738
		East Total	565 313.3

Reserve	Name	Purpose	Gazetted Area (ha)
Island Reserves			
A36056	Investigator Island Nature Reserve	Conservation of Flora and Fauna	41
A22796	Recherche Archipelago Nature Reserve	Flora and Fauna	GIS area 7087.5 (no gazetted area)
C42379	Cull Island 5(1)(h) reserve	Conservation, Navigation, Communication, Meteorology and Survey	0.0405
A39435	Woody Island Nature Reserve	Conservation of Flora and Fauna, Recreation and Tourist Development	195
		Islands Total	7323.5
		Existing Total	589 196.4
		Proposed Total	21 151.7
		PLANNING AREA TOTAL	610 348.1

* Vested in the National Trust of Australia and the Executive Director of the Department

Numerically Ordered List of Reserves in the Planning Area			
Reserve	Name	Reserve	Name
-	*Unallocated Crown land south of Alexander Nature Reserve*	C28168	Springdale Nature Reserve
C7580	*Unvested Crown reserve*	*Part of C28170*	*Unvested Crown reserve and adjacent unallocated Crown land*
A14234	Cape Arid National Park	*Part of C30672*	*Unvested Crown reserve and adjacent unallocated Crown land*
C19628	Dalyup Nature Reserve	*Part of A31761*	*Unvested Crown reserve (Lort River corridor)*
C22795	Cape Le Grand National Park	*A31763*	*Unvested Crown reserve (Young River corridor)*
A22796	Recherche Archipelago Nature Reserve	C32339	Lake Shaster Nature Reserve
A24047	Cape Arid National Park	A32419	Lake Gore Nature Reserve
Part of C24486	*Unvested Crown reserve*	A32590	Stokes National Park
C24953	Unnamed nature reserve	C32601	Moir Homestead Reserve
C25376	*Unvested Crown reserve*	A35557	Lake Mortijinup Nature Reserve
C26410	Munglinup Nature Reserve	A36056	Investigator Island Nature Reserve
C26885	Unnamed nature reserve	A39435	Woody Island Nature Reserve
C27086	Alexander Nature Reserve	C41934	Unnamed (Lake Gilmour) nature reserve
C27087	Unnamed nature reserve	C42379	Cull Island 5(1)(h) reserve
Part of A27632	Nuytsland Nature Reserve	C44987	Cape Le Grand National Park
C27888	Unnamed nature reserve		

Summary of Potential Additions to the Management Planning Area within the Area Of Consideration

- four reserves north of Lake Shaster Nature Reserve: unvested Crown reserve 18030 and surrounding unallocated Crown land, unvested Crown reserve 29448, unvested Crown reserve 29447 and unvested Crown reserve 29446;
- Oldfield river corridor (unvested Crown reserves 31757 and 31758);
- four islands (unallocated Crown land) south of Lake Shaster Nature Reserve, including Honeymoon Island;
- Stokes Inlet (unallocated Crown land) within Stokes National Park;
- Gidong, Kubitch and Carbul lakes (unallocated Crown land);
- part of Reserve 28170 west of Cape Le Grand Road; and
- unallocated Crown land to the west of Cape Arid National Park.

Preliminary rationale for these have been discussed in the sections on *Management Planning Area*, *Brief Overview of the Planning Area*, *Biogeography*, *Catchment and Soil Protection*, *Vegetation Communities and Associations*, *Native Animals – Birds*, *Native Animals – Priority Fauna*, *Habitats – Wetlands* and *Indigenous Heritage – Aboriginal Heritage Sites*.

APPENDIX 2. Proposed Changes in Tenure for the Esperance Coastal Reserves based on the Regional Management Plan (CALM 1992)

Reserve	Current Tenure (Purpose)	Regional Management Plan (CALM 1992) Recommendations	Comments
Reserves West of Esperance			
Reserve C7580 east of the Rabbit Proof Fence	unvested Crown reserve (Rabbit Department)	Proposed to be added to Lake Shaster Nature Reserve (see R12 in Regional Management Plan)	This reserve provides a vegetation corridor between Lake Shaster Nature Reserve and Jerdacuttup Lakes Nature Reserve (west of the Rabbit Proof Fence). It also contains vegetation communities that have less that 15% of the pre-European coverage extant, as well as communities that are under represented in the conservation reserve system. The Shire of Ravensthorpe has interests in the Crown reserve for an extension of the Starvation Boat Harbour camping site (an existing Shire reserve). Also, there are lime exploration interests in the area, which may impact on the values of the reserve.
Lake Shaster Nature Reserve C32339, east from Munglinup Inlet	Nature reserve vested in the Conservation Commission (Conservation of Flora and Fauna)	Proposed to become part of Stokes National Park (E1a)	Users of the Esperance Shire campground and the privately owned caravan park at Munglinup Beach spill into Lake Shaster Nature Reserve east of Munglinup Inlet to fish, surf, camp (informal), four-wheel drive and bushwalk. District staff estimate between 1200 and 1500 people use the Washpool Road area. Further east is Pincer Point, which is popular for camping (informal), fishing and surfing. Therefore, national park tenure may be more appropriate given existing levels of recreation.
Reserve C25376	unvested Crown reserve (Timber and Water Reserve)	Proposed to become a nature reserve (E2)	This reserve includes vegetation communities under represented in the conservation reserve system.
Part of Reserve A31763	Unvested Crown reserve (Park and Protection of River and Foreshore)		Young River corridor. With the increased appreciation of the need for retention of native vegetation in the catchment, vesting of this river corridor as nature reserve should be considered. Part of the riparian vegetation within the corridor is under represented in the conservation reserve system and has less than 15% pre-European coverage extant.
Reserve A31761	Unvested Crown reserve (Park and Protection of River and Foreshore)	Proposed to become a nature reserve (E11)	Lort River corridor. As with Young River corridor, vesting of the Lort River corridor as a nature reserve should be considered. Part of the riparian vegetation within the corridor is under represented in the conservation reserve system.
Reserve C27888	Nature reserve vested in the Conservation Commission (Conservation of Flora and Fauna)	Proposed to become part of Stokes National Park (E12)	Located between Stokes National Park and unnamed Nature Reserve C26885, the values of this reserve should be assessed to redetermine appropriate tenure given that it is now recommended that Reserve C26885 remain a nature reserve.
Reserve C26885	Nature reserve vested in the Conservation Commission	Proposed to become part of Stokes National Park (E13)	Part of this reserve, together with Lake Gore Nature Reserve, has been recognised as a Ramsar wetland, so consideration should be given to the most

Reserve	Current Tenure (Purpose)	Regional Management Plan (CALM 1992) Recommendations	Comments
	(Conservation of Flora)		appropriate tenure to protect the values of the system.
Part of Reserve C30672	Unvested Crown reserve (Preservation of Natural Vegetation and Ocean Foreshore)	To be added to Stokes National Park (E14)	Consider as a nature reserve with reserves C27888 and C26885. Boundaries may need to be reconsidered to enable a link between Stokes National Park and Lake Mortijinup Nature Reserve. Lake Quallilup, within this reserve, is proposed to be added to the Lake Gore System – a Ramsar wetland site. Further negotiations will be required with the Department of Industry and Resources as the area has prospectivity for lime.
Part of Reserve C24486	Unvested Crown reserve (Flora)	To be added to Lake Mortijinup Nature Reserve (E15)	This reserve contains the groundwater catchment for the drinking water of Esperance townsite. The Water Corporation has requested a Joint Management Order with the Department over the whole of this reserve. As joint vesting is not possible under the Conservation and Land Management Act, consideration will be given to vesting the western section of Reserve 24486 with the Conservation Commission as a nature reserve with a purpose of 'Water and Conservation of Flora and Fauna'. This western section has high value vegetation that is not sufficiently represented within the conservation reserve system. Part of Reserve C24486, along with Lake Mortijinup Nature Reserve, comprises the nationally important wetland system—the Lake Mortijinup System. Water extraction from Reserve C24486 may have the potential to impact on the values of the Lake Mortijinup System. The eastern section of this reserve does not appear to be a suitable addition to the conservation estate.
Reserve C19628	Dalyup Nature Reserve vested in the Conservation Commission (Conservation of Flora and Fauna)	To be de-vested (E16)	It is now proposed to maintain this reserve as a nature reserve as further investigations of the reserve have found that heathland vegetation communities within the reserve are not well represented in the conservation reserve system.
Reserves East of Esperance			
Part of Reserve C28170 (2800 ha isolated section to the east)	Unvested Crown land (Use and Requirements of Government)	To be added to Cape Le Grand National Park (E25a)	This reserve contains important fauna habitats (such as black flanked rock wallaby habitat) and wetlands that would make it valuable as an addition to Cape Le Grand National Park. The Goldfields Land and Sea Council has expressed an interested in this land to be vested and managed by the Esperance Nyungar Aboriginal Corporation.
Unallocated Crown land linking Nature	Unallocated Crown land	To be added to Alexander Nature Reserve (E28a)	This reserve contains vegetation communities under represented in the conservation reserve system as well as part of a community that has less than

Reserve	Current Tenure (Purpose)	Regional Management Plan (CALM 1992) Recommendations	Comments
Reserve C27087, Alexander Nature Reserve and Cape Arid National Park			7.5% of the pre-European extent remaining. Public access to the Shire recreation and camping reserves at Alexander Bay and Kennedy's Beach through the new larger nature reserve would need to be retained. Pending further consultation with the Shire of Esperance one solution could be to survey and gazette the Alexander Bay and Kennedy's Beach roads, which would then be managed by the Shire of Esperance. The Goldfields Land and Sea Council has expressed an interested in this land to be vested and managed by the Esperance Nyungar Aboriginal Corporation.
Cape Arid National Park A14234 and A24047	National park vested in the Conservation Commission (National Park, National Park and Water)	Nil	The amalgamation of reserves A14234 and A23047 to form one reserve vested in the Conservation Commission for the purpose of National Park is being progressed by the Department of Planning and Infrastructure. The excising of a trigonometrical station site from A14234 and its creation as a section 5(1)(h) reserve with a management order issued to the Conservation Commission for the purpose of Conservation and Trigonometrical Station is being progressed by the Department of Planning and Infrastructure. The addition of Neridup Location 9 into reserve A24047 has been lodged with the Department of Land Information for registration.
Nuytsland Nature Reserve A27632	Nature reserve vested in the Conservation Commission (Primitive Area for Preservation and Study of Flora, Fauna, Geological and Anthropological Features)	To become national park (E32)	The western section (located mainly in the Esperance Shire) receives much more visitation than the eastern section. Between 2500 and 3000 visitors travel to this section of the reserve each year. Activities undertaken include beach fishing, camping (at least eight informal sites), swimming and sightseeing. Commercial tour operators also occasionally use the nature reserve. Therefore, the western section has been essentially managed in a limited capacity as a 'de facto' national park for many years. The eastern section of Nuytsland Nature Reserve extends almost to Eucla and is located mainly in the Dundas Shire, and includes significant karst/caves systems. The eastern section is proposed to remain as a nature reserve and will not be considered in the draft management plan. If the western section is to remain as Nature Reserve, then the purpose may be more appropriate as 'conservation of flora and fauna' (this is also true for the nature reserve as a whole).

Reserve	Current Tenure (Purpose)	Regional Management Plan (CALM 1992) Recommendations	Comments
Island Reserves			
Investigator Island Nature Reserve A36056	Nature reserve vested in the Conservation Commission (Conservation of Flora and Fauna)	Nil	
Recherche Archipelago Nature Reserve A22796	Nature reserve vested in the Conservation Commission (Flora and Fauna)	Nil	
Cull Island 5(1)(h) reserve C42379	Section 5(1)(h) CALM Act reserve vested in the Conservation Commission (Conservation, Navigation, Communication, Meteorology and Survey)	Nil	
Woody Island Nature Reserve A39435	Nature reserve vested in the Conservation Commission (Conservation of Flora and Fauna, Recreation and Tourist Development)	Nil	May be more appropriate as another tenure such as national park due to the level of recreation on the island.

APPENDIX 3. Existing Camping and Day Use Sites within or adjacent to the Planning Area

Low (L) 1 to 4 bays/informal sites and 1 to 20 people
Medium (M) 5-15 bays/informal sites and 25 to 100 people
High (H) 15+ bays and 100+ people

Reserve	Site Name	Camping (I informal F formal)			Day Use	Comments/Issues
		L	M	H		
Reserves West of Esperance						
Shire of Ravensthorpe reserve	Starvation Boat Harbour			F	DU	• Just west of the planning area. • Camping area includes caravan sites, toilets and boat launching facility. The day use site has gas BBQs. At times there are 400-500 people using the reserve. • Access to the site is via an unsealed two-wheel drive road. Motorbikes could feasibly access beach of Reserve 7580 from this point.
Lake Shaster Nature Reserve (west)[1]	Unnamed (1)	I				• Beach camping.
	Unnamed (2)	I				• Beach camping.
	Shark Hole	I				• Vehicle access to beach. • Majority of visitors beach fish, beach camp and occasionally bush camp.
Freehold	Munglinup Beach Caravan Park (private)	F				• Approx. 8 km north of beach. • Power provided and dogs are permitted.
Shire of Ravensthorpe	Munglinup Recreation Reserve		F			• 15 caravan bays with up to 100 visitors. • Toilets are provided.
Lake Shaster Nature Reserve (east)[2]	Darkies				DU	• Due to a wildfire in 2003, the site was closed to camping not to be reopened. • Visitors still access site to fish, surf, launch boats and commercial fishing (abalone diving).
	Darkies East				DU	• Visitors access site to fish.
	Christies		I			• The site is badly degraded and was also burnt in wildfire in 2003, so is closed for at least 3 to 4 years. Rottnest Island teatree, useful for shade, has been severely impacted from wildfire. This may not regenerate. • If site is to be used again in the future as a campsite, then will need 6-10 campsites located further inland from beach area. This campsite is close to a Shire managed campsite so it providing a duplicate experience. May be better suited to be a day use site only.
	Skippy Rock				DU	• Visitors access site to beach fish.
	Skippy Rock East				DU	• Visitors access site to rock fish. • Consider carpark upgrade. Mobile dune is encroaching on site.
	The Pincers (West)		I		DU	• Up to 5 or 6 groups with 25 to 30 people using pushed in areas under Rottnest Island teatree.

Reserve	Site Name	Camping (I informal F formal)			Day Use	Comments/Issues
		L	M	H		
Lake Shaster Nature Reserve (east) cont.	Pincers Central		I			• Issues with illegal group fires. • Campsite requires relocation away from beach and new road alignment to access site. • Up to 6 or 8 groups, using mostly camper trailers. Used when east and west sites are full. Located further inland, pushed in under Rottnest Island teatree. However has some more open flat areas, and could be developed to replace the east and west sites.
	The Pincers (East)		I		DU	• Up to 5 or 6 groups with 25 to 30 people using pushed in areas under Rottnest Island teatree. • Consider closing to vehicle access and maintaining as day use site only as part of rationalisation of campsites.
Stokes National Park	Margaret Cove	I				• Up to 20 people camp to swim, snorkel, dive and fish. Mostly used by local family groups. Some abalone fishers tow boats in to launch from here. • Access is through Lake Shaster Nature Reserve. Need to close one of the two access tracks, and upgrade remaining track on to the beach to an all-weather access or seasonally close.
	Torradup Estuary				DU	• Visitors use site for bird watching, fishing and canoeing.
	Skippy Rock (2)		F			• Campsite and car park recently redeveloped. Nine (3 large, 6 tent) camping bays. Picnic shelter, gas BBQ and two toilets. • Access is currently four-wheel drive, could consider two-wheel drive.
	Skippy Rock (2) Day Use West				DU	• Car park with approx. 10 bays.
	Skippy Rock (2) Day Use East				DU	• Hardened car park for approx. 10-12 cars. Picnic shelter, gas BBQ. • Path links to camping site toilets.
	Dunster Castle Bay				DU	• Has been closed to vehicle access since the late 1980s due to disease risk. Boat or foot access available for day use only. • No facilities.
	Stokes South and Fishermans Camp		F			• Site destroyed by Nov 2006 wildfire and will remain closed until further notice. Opportunity now exists to re-examine Stokes North/South campsites. • Previously used by recreational and commercial fisherman. Eight sites. Four gas BBQs, 2 toilets, drinking water.
	Stokes Inlet Mouth				DU	
	Stokes North		F		DU	• Site destroyed by Nov 2006 wildfire and will remain closed until further notice. Opportunity now exists to re-examine Stokes North/South campsites. • Previously a developed campsite, 6 bays with good facilities such as gas BBQs (2) and sealed vault toilet, but visitation was projected to increase to

Reserve	Site Name	Camping (I informal F formal)			Day Use	Comments/Issues
		L	M	H		
Stokes National Park cont.	Shoal Cape	I			DU	beyond capacity. Car park used for boats access for fishing inlet. • Water source required. A bore is required for drinking water and fire control. • Crowded area, upgrade camping area or consider as day use only.
	East Shoal Cape				DU	• Site used for fishing.
	Fanny Cove West				DU	• Day use site for surfing, has a concept plan for redevelopment.
	Fanny Cove		F			• Popularity of this site has dropped since the 1992 wildfire, which removed large stand of melaleucas in the campsite. Requires rehabilitation and upgrade. • Facilities include toilet, picnic shelter and tables.
Shire reserve 40943	Quagi Beach			F		• Approximately 20 bays, campfires allowed part of the year and dogs allowed. • There is vehicle access to beach and boat launching facilities. Site has the potential to expand.
Nature Reserve 27888[3]	Barkers Inlet	I				• If recreational use is to continue, consider moving campsite further inland or changing to day use.
Nature Reserve 26885[3]	Warrenup West	I				• If recreational use is to continue, change to day use only. Rehabilitation required.
	Warrenup Point				DU	• Issue with track duplication and difficulty in keeping the second track closed with bollards.
	Eastern side of Warrenup Point	I				• If recreation is to continue, change to day use only. • Deeply cut tracks present so rehabilitation required.
	Munroes	I			DU	• Issues with ground fires being lit and bollards being burnt. • If recreational use is to continue, change to day use only. • Rehabilitation and site design required. Possibly develop split level parking.
	Quallilup Beach				DU	• Site is accessed for fishing and surfing.
Crown reserve 30672[3]	Roses Beach				DU	• Vista point. Site accessed for fishing and wildlife viewing. • Unmanaged therefore, issues with ground fires and rubbish. • To remain day use.
Reserves East of Esperance						
Cape Le Grand National Park	Le Grand		F		DU	• Two-wheel drive sealed access. Well developed campsite, 14 bays (1 group tent area, 4 tent bays, 9 caravan/vehicle camping bays) accommodating 50-60 people, with ablution block, toilets, and camper's kitchen. Day use site has a barbecue. • Over capacity with camping spilling out to day use site. Options to be considered include expansion/duplication, limiting numbers, booking system

Reserve	Site Name	Camping (I informal F formal)			Day Use	Comments/Issues
		L	M	H		
						or commercial concession.
Cape Le Grand National Park cont.	Smiths Block				DU	• Access from Cape Le Grand Road. Has potential for formal campsite, perhaps built accommodation such as safari tents. • Proposed trail head for new walk.
	O'Brien's Beach	I				• Used frequently by yachts and other boats. • History of wildfires caused by camp fires.
	New Island Bay				DU	• Boat access only.
	Frenchman Peak				DU	• Two-wheel drive sealed access. Approx. 20 bays in car park. Needs enlargement and redesign of car park, picnic tables and toilet. Possible relocation of car park.
	Hellfire Bay				DU	• Two-wheel drive sealed access. Approx. 20 bays in car park. There is some use of the car park for vehicle camping. There is large shelter, gas BBQ, toilets and vista point.
	Thistle Cove				DU	• Two-wheel drive sealed access. Picnic tables and toilet to be considered.
	Lucky Bay			F	DU	• Two-wheel drive sealed access. High visitation, up to 300 people. Site is over capacity and no room for expansion. Day use areas have small car parks. As with Le Grand, options to be considered include expansion/duplication, limiting numbers, booking system or commercial concession.
	Rossiter Bird Sanctuary				DU	• Two-wheel drive unsealed access. Wildlife viewing, swimming and walking. Picnic table.
	Dunns Rock	I				• Informal beach camping causing some damage to vegetation and dunes. Beaches fires often lit. Could formalise camp site, however, there is an issue with Aboriginal significance of area. • Usually only one visit a week, so servicing and payment of entry fees and camping fees an issue here. • Hooded plovers at risk from vehicles on beach. • May require a car park for two-wheel drives.
	Victoria Harbour				DU	
	Cheyne Point				DU	
Shire reserve 41097	Whartons Beach				DU	• Lots of vehicles, dogs permitted. • Tourism WA is investigating this site as a potential Landbank site.
	Duke of Orleans Caravan Park			F		• Two-wheel drive access. Caravans, chalets. Over 1000 visitors during peak periods.
Shire reserve 39409	Alexanders	I				
Shire reserve 40772	Surf Caster's Hut			F		
	Kennedy's Beach			F	DU	

Reserve	Site Name	Camping (I informal F formal)			Day Use	Comments/Issues
		L	M	H		
Cape Arid National Park	Tagon Beach and Dolphin Cove				DU	• Two-wheel drive unsealed access. One car park for access to both day use sites, may need enlargement or relocation. • Toilet destroyed by wildfire in Dec 2006. • Opportunity for picnic table, shelter, interpretation.
	Thomas River		F			• Site destroyed by wildfire in Dec 2006 and is closed until further notice. Opportunity now exists to re-examine site. • Camp fees were previously not collected. • Two-wheel drive unsealed access. Previously 11 camping bays, 2 toilets, 1 gas BBQ. • Day use component may be required, dependent on MOU regarding Shire Thomas River day use site.
Shire reserve 518	Thomas River			F	DU	• A MOU has been agreed from 1 July 2005 to 1 July 2010 between the Shire of Esperance and the Department for the Department to manage the 104 ha Shire reserve. Most of the reserve is uncleared. • Recreation site requires redevelopment. Ideal for group camping, 12 camping bays including some large bays that hold 2 to 3 groups. Five picnic tables, 3 shade pergolas, a rainwater tank, a ground water tank, windmill, and 1 toilet. Visitation up to 150 people. • Under the MOU, the Department can charge camping fees to offset the operating costs. • Wood fires allowed in designated fireplaces only between May and Oct, however still issue with ground fires and collection of firewood. • Dogs are allowed in MOU, although should be kept on a lead due to 1080 baiting adjacent to shire reserve. • Tourism WA is investigating this site as a potential Landbank site.
Cape Arid National Park	Thomas River to Barrier Anchorage			I		• Camping is pushing into foredunes, may need to consider a formal campsite in this area – summer use only.
	Barrier Anchorage	I				• Up to 50 vehicles at a time. • Used for commercial fishing. • Fishing hut. No formal lease agreement. The future of this structure should be considered.
	Thomas Fishery	F				
	Jorndee Creek	F				• Has a site plan to increase site to 6 bays.
	Poison Creek	I			DU	• Camping is discouraged adjacent to river. Site is subject to flooding.
	Seal Creek		F			• Subject to flooding and a mobile sand dune is encroaching onto part of the campsite. This campsite may need to be relocated to a better location.
	East of Seal Creek	I				• Beach camping.

Reserve	Site Name	Camping (I informal F formal)			Day Use	Comments/Issues
		L	M	H		
	Pine Hill Mt Ragged	I F				• Water quality hazard at water hole.
Nuytsland Nature Reserve	Unnamed (3) opp. Bellinger Island Point Malcolm	I F				 • Requires toilet.
Freehold	Private Property enclave	I?				
Shire reserve 805	Israelite Bay	F				
Nuytsland Nature Reserve	Wattle Camp Point Culver	F	 F			 • Outside the planning area.
Island Reserves						
Woody Island Nature Reserve	Woody Island			F	DU	• Camping on commercial basis only. Approximately 5.8 ha leased on a 21-year basis from Jan 1999 with an option of a further 7 years. Development includes: jetty, boardwalk, visitors centre and café, caretaker's accommodation, 11 safari type tents on timber decks and 32 tent sites, 2 toilet blocks, camp kitchen, gas BBQs and diesel generator shed and an array of solar panels. A further camping area, which includes 4 tent sites, toilets and BBQ, and a number of cabins with their own toilet and kitchen, are proposed under the operator's master plan but have not been undertaken as yet. • The island is dual-purpose nature reserve, may be more appropriate to change to national park.
Recherche Archipelago Nature Reserve	Middle Island				DU	• Wildfire Oct 2006 to Jan 2007 has burnt most of the boardwalks and interpretation on island.

[1] Recreational use and access may be contrary to the purpose of a nature reserve and this will have to be taken into account by either changing tenure or limiting use.
[2] Recreational use and access may be contrary to the purpose of a nature reserve however it has been recommended to change tenure of this area to national park.
[3] Recreational use and access may be contrary to the purpose of a nature reserve, this reserve was proposed to be changed to national park in the *South Coast Regional Plan* (CALM 1992), but may now remain as nature reserve or in some cases be created as a nature reserve.

MAP 1. ESPERANCE COASTAL RESERVES

Shire of Dundas

Shire of Ravensthorpe

Shire of Esperance

Mardabilla IBRA sub region

Eastern Mallee IBRA sub region

Recherche IBRA sub region

Oldfield River

Young River

Munglinup River

Lort River

Munglinup

ESPERANCE

Cape Le Grand NP

Alexander NR

Cape Arid NP

Nuytsland NR

Lake Shaster NR

Stokes NP

Lake Gore NR

Woody Island NR

Investigator Island NR

Recherche Archipelago NR

SOUTHERN OCEAN

Key

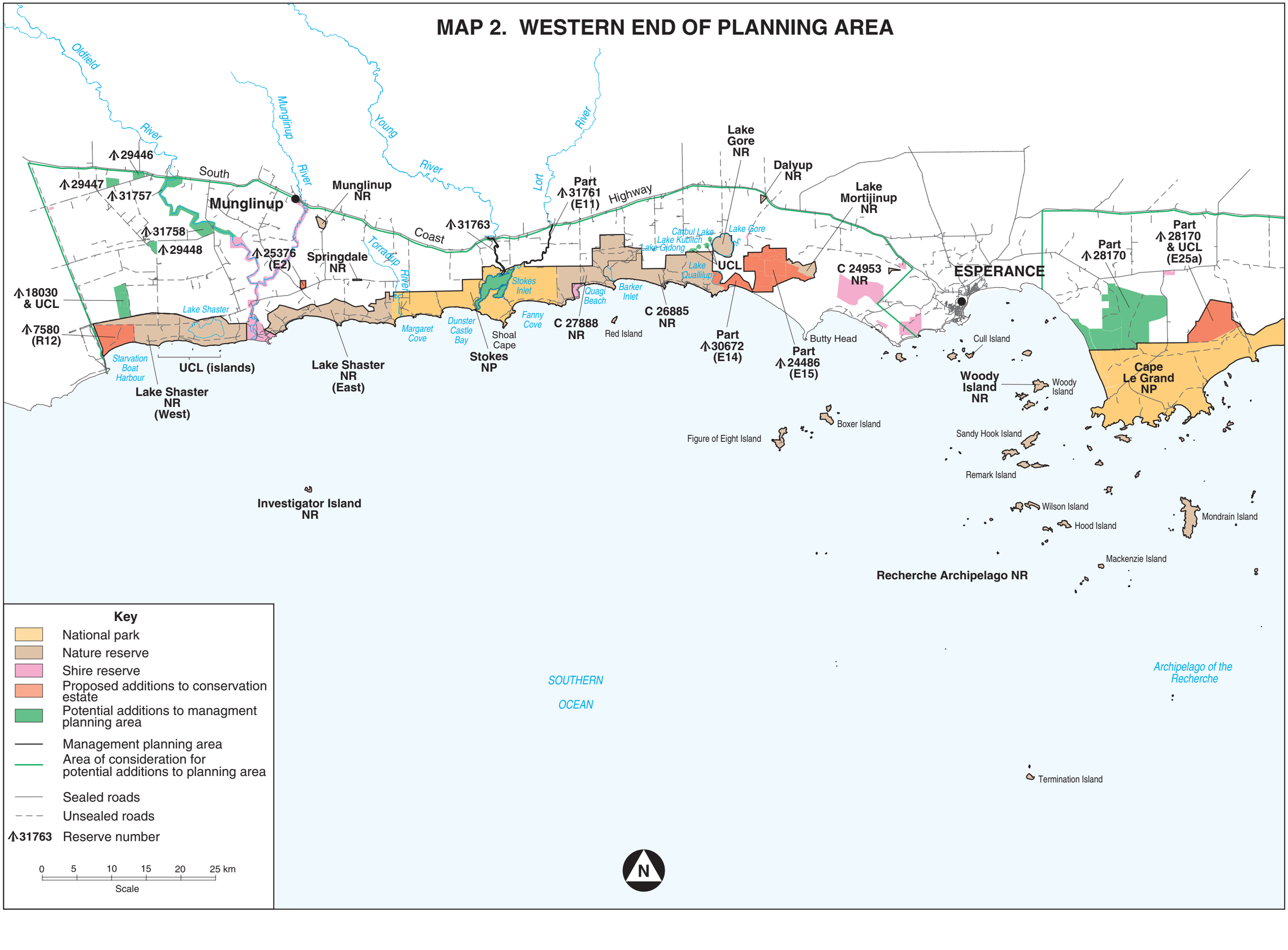
- National park
- Nature reserve
- Proposed additions to conservation estate
- Management planning area
- Area of consideration for potential additions to planning area
- Local Government Area boundary
- IBRA sub region boundary
- Sealed roads
- Unsealed roads

0 10 20 30 40 50 km

Scale

N

MAP 2. WESTERN END OF PLANNING AREA



Key

- National park
- Nature reserve
- Shire reserve
- Proposed additions to conservation estate
- Potential additions to managment planning area
- Management planning area
- Area of consideration for potential additions to planning area
- Sealed roads
- Unsealed roads
- 31763 Reserve number

0 5 10 15 20 25 km

Scale

N

MAP 3. EASTERN END OF PLANNING AREA

Key

- National park
- Nature reserve
- Shire reserve
- Proposed additions to conservation estate
- Potential additions to managment planning area
- Management planning area
- Area of consideration for potential additions to planning area
- Sealed roads
- Unsealed roads
- 31763 Reserve number

0 5 10 15 20 25 km
Scale

Point Culver 13 km
Scarp
Wylie
Pine Hill
C 41934 NR
Mt Esmond
Mt Dean
Russell Range
Nuytsland NR
UCL
Mt Ragged
Road
Balladonia
Gora Hill
Gora
Track
Cape Arid NP
Israelite Bay
Point Dempster
6 Mile Island
Tooklejenna Rock
Mt Baring
Fisheries
Road
Alexander NR
Part 28170
Fisheries
Road
Merivale
ESPERANCE
Part 28170 & UCL (E25a)
Road
C 27087 NR
UCL (E28a)
Thomas River
Telegraph
Track
Poison Creek
Point Malcolm
Spindle Island
Daw Island
Bellinger Island
Mt Pasley
Yokinup Bay
Duke of Orleans Bay
Alexander Bay
Sandy Bight
Woody Island NR
Frenchman Peak
Mt Le Grand
Dunns Rocks
Victoria Harbour
Rossiter Bay
Cape Le Grand NP
Cape Le Grand
Lucky Bay
Barrier Anchorage
Mt Arid
Cape Pasley
North Twin Peak Island
South Twin Peak Island
Cape Arid
Thomas Fishery
Stanley Island
Middle Island
Round Island
Mondrain Island
Recherche Archipelago NR
Draper Island
Archipelago of the Recherche
Cooper Island
SOUTHERN OCEAN
Salisbury Island
N