Wonnerup Coastal Reserves Management Plan

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City of Busselton

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Executive Summary

The Wonnerup Coastal Reserves Management Plan (WCRMP) has been developed in order to facilitate cost-effective and best practice management of 140 ha of coastal reserves in Wonnerup. The WCRMP takes into consideration the high ecological, cultural and social values of these coastal reserves and provides a sound basis to allow for the future protection and enhancement of these values.

Preparation of the WCRMP involved consultation with members of the local community and key stakeholders, including through:

- Establishment of, and regular meetings with a project Steering Committee (**Section 2.2**) which included representation from local and state government departments, NRM organisations and local community groups;
- Letters to local residents advising of the Plan preparation and identifying opportunities to comment;
- Installation of signage at key locations throughout the Wonnerup Coastal Reserves inviting the community to provide feedback on the draft plan;
- A beach walk session on site with local residents to discuss the key values and concerns throughout the Wonnerup Coastal Reserves;
- Receipt of written submissions from local residents that were not able to attend the beach walk session; and
- A public comment period for the draft plan, including invitation to a community open forum to review the Plan recommendations and provide comment.

The WCRMP outlines the ecological, cultural, social and economic values of the Wonnerup Coastal Reserves. Key values identified within the Plan are outlined in **Section 5** and include:

Ecological Values

- Areas of important Threatened Ecological Community;
- Areas of Western Ringtail Possum habitat; and
- Areas of shore bird and water bird nesting habitat.

Cultural Values

- Potential skeletal remains of Aboriginal persons; and
- Three areas where shipwrecks are suspected to be located.

Social Values

- Dog walking;
- Off-road vehicle (ORV) access to the beach;
- Horse-riding on the beach;
- General beach recreation (i.e. walking, swimming, etc.);
- Bush walking;
- Scenic / natural amenity;
- Boat launching; and
- Fishing.

Economic Values

- Commercial fishing.

Based on the outcomes of the consultation and following review of available background information about the Wonnerup Coastal Reserves, a number of recommendations were made. The most significant recommendations included:

Tenure

- City of Busselton (CoB) to review the management status of Unallocated Crown Land (UCL) and road reserve vesting to allow effective implementation of required management.

Access & Amenity

- Formalise and direct pedestrian access to the beach through dune areas with fencing and revegetation works;
- Install education and interpretive signage at key locations to educate key users groups on appropriate beach behaviour (i.e. do not drive on dune vegetation);
- Reinforce existing management of ORV access, which currently excludes unauthorised vehicles on the Wonnerup except Coastal Reserves, except on the beach between the Wonnerup Boat Ramp and the mouth of the Vasse-Wonnerup Estuary; and
- Implement a staged approach to management of ORV beach access to Wonnerup Beach from the Boat Ramp, East to the Vasse-Wonnerup Estuary mouth. Staged management includes option for beach closure should community behaviour not improve.

Biodiversity

- Undertake targeted revegetation works to enhance biodiversity values and stabilise the dune system;
- Undertake targeted weed management, particularly around carpark areas, along road verge and walking trails; and
- Implement feral animal control program for cats and foxes, particularly within Captain Baudin Reserve for protection of native fauna (i.e. water birds and Western Ringtail Possums).

Cultural Heritage

- Minimise ground disturbing works in areas of suspected Aboriginal burial grounds;
- Describe Noongar history, events and beliefs with interpretive signage and artwork at key locations throughout the reserves; and
- Describe Shipwreck history with interpretive signage at key locations through the reserves.

Monitoring and Education

- Educate key user groups access in the beach, including development of beach access codes of conduct for ORV users, horse-riders and commercial fishers;
- Implement a community / indigenous monitoring program to better understand how, when and why beach is being utilised. This will provide a basis for future management decisions; and
- Optimise monitoring and surveillance through community engagement programmes to improve understanding of beach usage and enhance future regulation.

Acronyms & Abbreviations

Acronym	Definition
AP	Access Point
BOM	Bureau of Meteorology
CoB	City of Busselton
DAFWA	Department of Agriculture and Food, Western Australia
DoTE	Department of the Environment
DoT	Department of Transport
DoP	Department of Planning
DoW	Department of Water
DER	Department of Environment Regulation
DPAW	Department of Parks and Wildlife
EPBC	Environment Protection and Biodiversity Conservation
GeoCatch	Geographe Bay Catchments Council
IBRA	Interim Biogeographic Regionalisation for Australia
WCRMP	Wonnerup Coastal Reserves Management Plan
PNP	Peron Naturaliste Partnership
RA	Revegetation Area
SWALSC	South West Aboriginal Land and Sea Council
SWCC	South West Catchments Council
TEC	Threatened Ecological Community
UCL	Unallocated Crown Land
VETWG	Vasse Estuary Technical Working Group
WAPC	Western Australian Planning Commission
WT	Walk Trail
WONS	Weed of National Significance

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1. Introduction

1.1. Background

The Wonnerup Coastal Reserves Management Plan (WCRMP) has been developed in order to facilitate cost-effective and best practice management of 140 ha of coastal reserves in Wonnerup. The WCRMP takes into consideration the high ecological, cultural and social values of these coastal reserves and provides a sound basis to allow for the future protection and enhancement of these values.

The majority of the Wonnerup Coastal Reserves represent one of the last remaining foreshore areas within the City of Busselton (CoB) that has not previously been addressed within a Foreshore Management Plan.

The Wonnerup coastline has high environmental, cultural and social values; however these values are under threat from increasing ad-hoc public use. The WCRMP provides the CoB (together with other local coastal management organisations) with a sound basis from which to prioritise and implement management actions relating to the area. Planning for management in this area provides greater protection of all values within the coastal zone, while facilitating recreational and tourism access.

1.2. Objectives and Outcomes

1.2.1. Objectives

The primary aim of the WCRMP is to provide sustainable and comprehensive management recommendations for the Wonnerup Coastal Reserves that the CoB can implement over time, with consideration of timing, cost and allocation of appropriate resources.

The objectives to achieve this include:

- Protect the natural environmental values in the area and enhance these values through sustainable management decisions;
- Manage community use and access in the area through comprehensive review of existing uses and consultation, and provide sustainable recommendations and priorities;
- Review current relevant documentation relating to coastal processes and hazards to make better management decisions and recommendations;
- Identify all values of the coastal zone, to allow for their greater protection and enhancement by providing access to the coast; and
- Identify engagement and education opportunities with key user groups to ensure long-term sustainable recreation and tourism.

1.2.2. Outcomes

The WCRMP has been prepared in order to give rise to the following outcomes:

- Better management of the environmental values of the Wonnerup Coastal Reserves through management of social and cultural values in a balanced and sustainable manner;
- Defined objectives and trigger points to set yearly priorities for future management decisions for the area;
- Review budgetary and resource constraints using funding and in-kind support that can be adopted by Council to undertake future appropriate and informed management decisions for the Wonnerup Coastal Reserves, and where possible provide order of magnitude costs for

recommendations to more accurately set targets;
- Review all values of the area and proposes strategies to ensure these are protected and enhanced for the enjoyment of all; and
- Provide flexibility in implementation program to address new priorities as identified as the need arises.

1.3. Legislative & Policy Framework

In preparation of this plan a number of the local and state government policies and guidelines were considered. These included:

Legislation

- *Wildlife Conservation Act* (WC Act) (1950); and
- *Environmental Protection and Biodiversity Conservation Act* (EPBC Act) (1999).

State Planning Policies and Guidelines

- *Coastal Planning and Management Manual – A community guide for protecting and conserving the Western Australian coast* (WAPC, 2003).
- *State Coastal Planning Policy Guidelines, Section 9, Coastal Plan Requirements (WAPC, 2013); and*
- *Western Australian Planning Commission (WAPC) State Planning Policy No. 2.6 State Coastal Planning Policy (WAPC, 2013).*

Local Policy and Planning Documents

- Reserves Vegetation Protection Policy (CP240) (CoB, 2007);
- Coastal and Foreshore Facilities Asset Management Plan (CoB, 2012);
- Foreshore Management Plan Lots 5 and 25 Forrest Beach Road, Wonnerup (Accendo, 2013); and
- Local Planning Scheme No. 21 including the Coastal Management, Wetland and Landscape Value areas (CoB, 2014).

1.4. Location of Reserve

The Wonnerup Coastal Reserves are located within the CoB suburb of Wonnerup, adjacent to Geographe Bay (**Figure 1-1**). They are approximately 7.5km in length and include 140 hectares (ha) of dunal and coastal vegetation. The Wonnerup Coastal Reserves vary greatly in width from approximately 30 metres to 350 metres at the widest point in Lesueur Reserve. They extend from Port Geographe in the west to the City of Busselton / Shire of Capel Boundary in the east, and are bordered by Geographe Bay to the west and Layman Road and Forrest Beach Road to the east (**Figure 1-1**).

1.5. Vesting and Purpose

Vesting and purpose of the Wonnerup Coastal Reserves are shown on **Figure 1-1**. These include:

- R22952 (C Class, Camping and Recreation);
- R5217 (A Class, Camping and Recreation);
- R385 (A Class, Camping and Recreation); and
- R39193 (C Class, Recreation and Foreshore Protection).

The Wonnerup Coastal Reserves also include a small section of road reserve and Unallocated Crown Land (UCL) that are to be vested with the CoB. This UCL land that is intended to be vested in the CoB may be subject to being claimed for vesting with the Noongar Booja Lands Trust under the state settlement of

native title resulting from an ILUA agreed with South West Aboriginal Land and Sea Council (SWALSC) under the South West settlement of native title that signed by the state on the 8th June 2015. Consultation with SWALSC will be required regards this matter.

The Wonnerup Coastal Reserves also include a small section of road reserve and Unallocated Crown Land (UCL) that are to be vested with the City of Busselton. The Wonnerup Coastal Reserves are bordered by local roads and privately owned land, ranging from residential land with a mixture of densities to the west and land zoned for conservation or agriculture to the east.

1.6. Landuse

The Wonnerup Coastal Reserves are currently used for typical coastal activities such as walking, swimming, fishing, horse-riding, beach launching of small boats and recreational off-road vehicle (ORV) use. Commercial fishers also operate from the beaches and have licences to allow access for this purpose. In the past, sections of the Wonnerup Coastal Reserves were also mined for mineral sands (Webb *et al*., 2009).

Figure 1-1 Location and Tenure

2. Methodology

Preparation of the DRAFT WCRMP involved the following four discrete tasks:

1. Compilation and desktop review and mapping of all relevant background information pertaining to the existing environment, use, threats and management of the Wonnerup Coastal Reserves;
2. Consultation with key stakeholders, including some representation from the local community to identify community values, concerns and aspirations for the Wonnerup Coastal Reserves;
3. Collation and synthesis of the information gathered in each of the above tasks for inclusion in the WCRMP; and
4. Development of recommendations and management actions for the future management of the Wonnerup Coastal Reserves.

Further information regarding each of the above tasks is provided below.

2.1. Desktop Review & GIS Mapping

The desktop review period was used to identify and summarise the issues to be addressed within the WCRMP. The review included compilation, synthesis and mapping of relevant information regarding the natural and cultural features of the Wonnerup Coastal Reserves. In addition to past management plans, other planning and policy documents (i.e. as identified in **Section 1.3**) and relevant technical studies (e.g. flora surveys), searches were also made using the following online databases:

- The Western Australian (WA) Department of Parks and Wildlife (DPAW) *Naturemap* tool;
- The Commonwealth Department of Environment, *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool; and
- The WA Department of Aboriginal Affairs, Aboriginal Heritage Inquiry System Search tool/

2.2. Stakeholder and Community Consultation

Preparation of the WCRMP involved consultation with some members of the local community and key stakeholders. In order to direct this consultation, the CoB established a project Steering Committee which included representation from the:

- CoB;
- Traditional Owners;
- South West Aboriginal Land and Sea Council;
- Commercial and Recreational Fishers;
- DPAW;
- Department of Planning (DoP;
- Department of Transport (DoT);
- FAWNA;
- Peron Naturaliste Partnership (PNP);
- South West Catchments Council (SWCC); and
- Wonnerup Residents Association.

One of the initial activities undertaken by the project Steering Committee involved the development of 'Stakeholder and Community Consultation Strategy' to guide the required consultation. The consultation activities required for the preparation of this Plan were undertaken in accordance with this Consultation

Strategy and also in consideration of advice and guidance provided by the Steering Committee members. The stakeholder and community consultation included:

- Establishment of, and regular meetings with a project Steering Committee (**Section 2.2**) which included representation from local and state government departments, NRM organisations and local community groups;
- Letters to local residents adjacent to the Wonnerup Coastal Reserves advising of the Plan preparation and identifying opportunities to comment;
- Installation of signage at key locations throughout the Wonnerup Coastal Reserves inviting the community to provide feedback on the draft plan;
- A beach walk session on site with local residents to discuss the key values and concerns throughout the Wonnerup Coastal Reserves;
- Meetings with key relevant stakeholders such as Geocatch, SWCC, Port Geographe Residents Association and also a waterbird specialist from DPAW;
- Receipt of written submissions from local residents that were not able to attend the beach walk session;
- A consultation session with SWALSC and local traditional owners; and
- PENDING: A public comment period for the draft plan, including invitation to a community open forum to review the Plan recommendations and provide comment.

The findings of the Community and Stakeholder Consultation are captured within the Consultation Summary Report, which is included as Error! Reference source not found.[1]. These findings are also aptured within the Stakeholder Values and Management Concerns presented in **Section 5** and incorporated in to appropriate management actions outlined in **Section 6**.

2.3. Information Synthesis

Information gathered during the desktop review and consultation phases was collated and summarised to form the chapters and content of the Management Plan. During this stage, the Wonnerup Coastal Reserves were separated into seven spatial nodes to assist in prioritising and directing management actions throughout the reserves.

2.4. Recommendations

Recommendations were developed in consultation with the COB and the Steering committee and were based on the outcomes of the desktop review and community and stakeholder consultation.

Draft recommendations were presented and discussed with the Steering Committee on the 9th July 2015. Final recommendations are presented for each node (**Section 6**) with a strategy and action plan (including action table and map) to clearly define the action, location, timing, cost and responsibility for implementation.

[1] Note Consultation Summary Report is included with final Plan only.

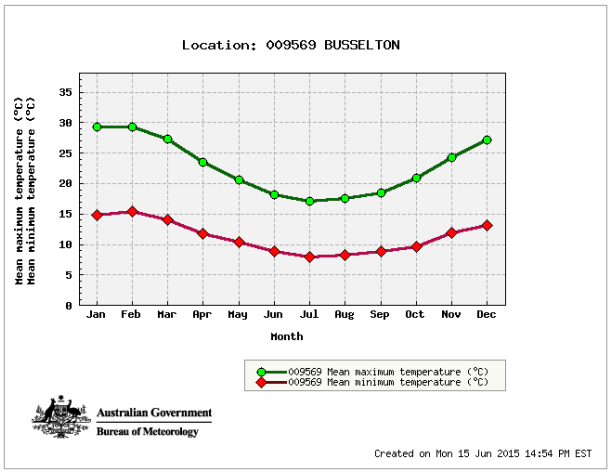
3. Natural Environment

3.1. Climate

The Wonnerup Coastal Reserves experiences a dry Mediterranean climate comprised of mild wet winters and hot dry summers (DoW 2010). Mean (1998-2011) annual rainfall in the Wonnerup Coastal Reserves is approximately 705mm, with the majority falling between May and September (**Figure 3-1A**). The highest rainfall is experienced in July (~153mm) whilst the lowest is typically recorded in February (~7mm) (**Figure 3-1A**).

Mean maximum temperatures in the Wonnerup Coastal Reserves, range from 29.3°C in January and February to 17.1°C in July. Whilst mean minimum temperatures range from 15.5°C in February to 8°C in July (**Figure 3-1B**).

A)



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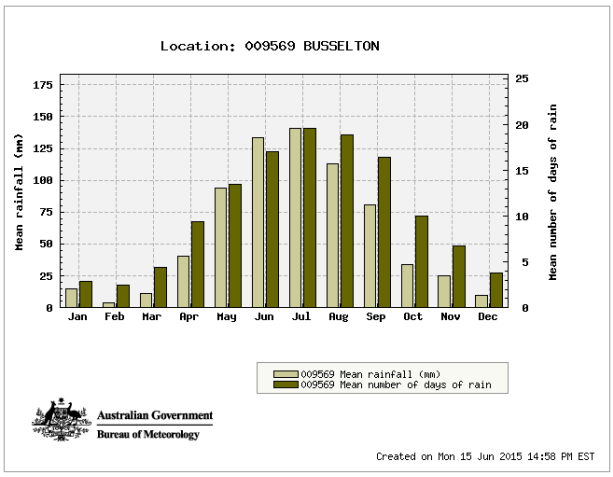


Figure 3-1 A) Mean daily temperatures (° C) (1998-2011) (BOM, 2015). B) Mean rainfall (mm) and mean (1998-2011). (BOM, 2015)

3.2. Topography, Landform and Soils

The Wonnerup Coastal Reserves is located on the western edge of the Swan Coastal Plain, along the south-eastern shores of Geographe Bay. The Wonnerup Coastal Reserves are primarily comprised of low relict foredunes and gently undulating beach ridge plane with deep uniform calcareous sands (**Figure 3-2**). These dunes have been further described as the 'Geographe Bay Quindalup Dunes' and are characterised by elevations of less than five metres and widths up to one kilometre (Webb *et al.*, 2009).

The Wonnerup Coastal Reserves also includes riparian portions of the Vasse - Wonnerup Estuary and the Deadwater, which consist of low-lying depressions that are often underwater in winter and can be quite saline in summer (**Figure 3-2**).

3.3. Wetlands

The Wonnerup Coastal Reserves abut, and include portions (i.e. the Deadwater) of the Vasse-Wonnerup Wetlands, which are a RAMSAR listed 'Wetland of International Importance'. The Vasse-Wonnerup System is also identified as an EPP Wetland and is therefore protected through the application of the *Environmental Protection (Swan Coastal Plain Lakes) Policy (EPP) 1992.*

In addition to providing significant habitat for frogs, reptiles, fish and small mammals, the Vasse-Wonnerup system is also utilised by over 30,000 water birds every year. In order to better protect the significant natural values of this unique system, the Vasse Estuary Technical Working Group (VETWG) was established in 1997 and are currently in the process of reviewing management objectives and targets as a basis for the ongoing management of this system.

The mouth of the Vasse-Wonnerup Estuary is a highly mobile dune system that is periodically opened between the Vasse-Wonnerup Estuary and Geographe Bay, allowing salt water intrusion into the estuary. It is likely that future management recommendations for this system, proposed by VETWG, will include consideration of the frequency and manner of opening the estuary mouth, together with optimising floodgate operations to ensure the appropriate water quality management regime for the estuary. The management of this system has therefore been considered outside the scope of this management plan.

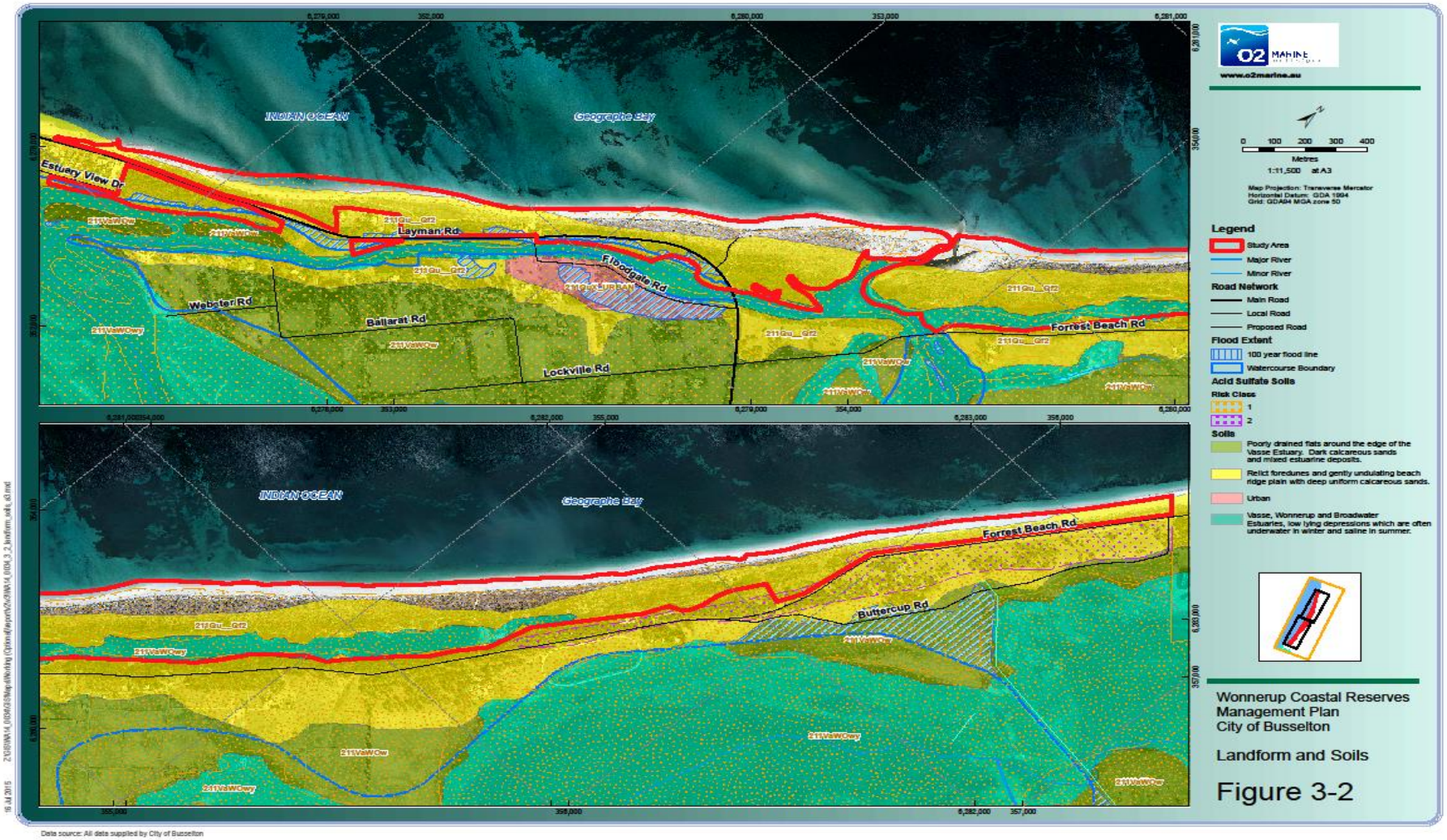
3.4. Coastal Processes

The Wonnerup Coastal Reserves lie adjacent to Geographe Bay, which is a unique feature on the Western Australian coastline, due to its northerly aspect and the fact that it is largely protected by Cape Naturaliste, from prevailing south-westerly seas and swell. Within Geographe Bay, sediment transport generally occurs along the shoreline from west to east and is driven by nearshore currents generated from both local seas and swells refracting around Cape Naturaliste. The sediment transport is also influenced by transverse sandbar migration and to some extent the presence of coastal infrastructure on the coast, such as the coastal structures associated with Port Geographe Marina and canal development.

In the past, the beach at Wonnerup has experienced significant changes associated with natural coastline movement and the original Port Geographe development. Given the recent coastal structure reconfiguration at Port Geographe, the DoT is currently implementing a comprehensive Environmental Management and Monitoring Plan. The aim of this document is to better understand the impact (if any) of the newly reconfigured coastal structures at Port Geographe on the natural coastal processes and how best to manage against any potential environmental impacts from these newly reconfigured coastal structures in the areas adjacent to Port Geographe.

Given that monitoring and management of coastal processes within the Wonnerup Coastal Reserves are being addressed through other management mechanisms, the management of issues associated with coastal processes are considered to be outside the scope of this Plan. As such, no recommendations for further monitoring of coastal process have been made within this Plan.

Figure 3-2 Landform & Soils



3.5. Vegetation and Flora

The Wonnerup Coastal Reserves lie within the Swan Coastal Plain Bioregion and the Swan Coastal Plain Sub-region as described within the Interim Biogeographic Regionalisation for Australia (IBRA) (Thackway & Cresswell, 1995). The vegetation is representative of the Drummond Botanical District of the Swan Coastal Plain as defined by Beard (1990), which is comprised of the Quindalup Dune System and is characterised by plants tolerant of highly alkaline, poorly developed soils (Tingay & Associates, 2000).

Three vegetation complexes are identified as naturally occurring within the Wonnerup Coastal Reserves (**Figure 3-3**), including:

- Quindalup dry (Qd): Coastal dune complex consisting mainly of two alliances, the strand and foredune alliance and the mobile and stable dune alliance;
- Quindalup wet (Qw): Tall shrubland of golden wreath wattle (*Acacia saligna*), peppermint (*Agonis flexuosa*) and open heath on depressions amongst recent dunes in the subhumid zone; and
- Quindalup (Qwy) Mixture of closed scrub of Melaleuca species and fringing woodland of flooded gum (*Eucalyptus rudis*).

The 'Quindalup wet' vegetation complex is considered to be poorly represented on the Swan Coastal Plain, with less than 28% of its pre-European extent remaining (Webb *et al*., 2009).

3.5.1. Vegetation Type and Condition

Webb *et al.* (2009) describes four broad vegetation types and associated flora species, which are present within the Wonnerup Coastal Reserves:

- **Geographe Dune Plant Community – Fore-Dune:** Comprised of coastal weed species such as: *Pelargonium capitatum*, *Euphorbia paralias*, *Cakile maritima* and *Ammophila arenarius*. Native species commonly found include the shrubs: *Acacia cochlearis*, *Scaevola crassifolia* and *Acanthocarpus preissi*, the grass *Spinifex longifolius* and the sedges *Lepidosperma gladiatum* and *Ficinia nodosa*;

- **Geographe Dune Plant Community – Consolidated Dune:** Comprised of relatively uniform vegetation, dominated by an overstorey of *Agonis flexuosa*, over a shrub layer of *Spyridium globulosum*, *Hibbertia cuniformis*, *Leucopogon parviflorus*, *Acacia littorea*, *A. cochlearis*, and *Pimelea argentea*, over a sedge layer of *Lepidosperma gladiatum*, grass species *Austrostipa flavescens* and the herb, *Dichondra repens*. The weed *Lagurus ovatus* is also common;

- **Geographe Coastal Wetland System – Water Fringing Plant Communities:** A fringing wetland vegetation community that is comprised of an overstorey of *Melaleuca rhaphiophylla*, *M. viminea* and *Eucalyptus rudis* often with *Melaleuca cuticularis* and occasionally *Banksia littoralis* and *Agonis flexuosa*. The understorey includes shrubs such as *Hakea varia*, *Acacia saligna*, *Adriana quadripartita*, *Melaleuca incana* and *Myoporum capparoides*; the herbs *Samolus repens* and *Lobelia alata* and a dense sedge layer of *Gahnia trifida* and *Baumea juncea*. This community commonly intergrades with vegetation of the Quindalup Dunes and *Spyridium globulosum*, *Acacia littorea* and *Lepidosperma gladiatum* can be occasionally found as components of this community as is the case along the riparian fringes of Captain Baudin Reserve; and

- **Geographe Coastal Wetland System – Inundated Wetland Plant Communities:** Occurs in low lying areas where seasonal inundation occurs in the Qwy vegetation complex, such as within the Deadwater. It is characterised by an herbaceous Chenopodiaceae plant community dominated by *Halosarcia* and *Sarcocornia* species.

A detailed flora and fauna survey of the Wonnerup Coastal Reserves was not required as part of the preparation of this management plan. However, a site visit on the 28th of May identified that the condition of the vegetation across the Reserves generally ranged from 'Excellent to 'Degraded' based on the Keighery (1994) scale.

The areas of vegetation rated 'Good' to 'Excellent' were generally confined to areas of Peppermint Low Open Forrest in Captain Baudin (**Plate 3-1**), Wunda Buri and Lesueur Reserve, but also included the wetland and riparian vegetation along the fringes of the Vasse Wonnerup Estuary and the Deadwater. The samphire flats within the Deadwater were also generally considered to be in 'Excellent' Condition.

In contrast, the Geographe Dune Plant Community that dominates the incipient foredune vegetation present along the entire western portion of the Wonnerup Coastal Reserves was considered to be mostly 'Degraded', with the large areas dominated by coastal weed species (Refer to **Section 3.5.4**), such as Rose Pelargonium (*Pelargonium capitatum).* This was thought to be partly due to the recolonisation of weeds following completion of past sand-mining activities (Webb *et al*., 2009).

Plate 3-1 Peppermint Low Open Woodland in 'Good' condition within Captain Baudin Reserve.

3.5.2. Threatened or Priority Flora

An EPBC Protected Matters search of the Wonnerup Coastal Reserves identified eight threatened plant species (i.e. four listed as 'Vulnerable'; and four listed as 'Endangered') that were considered either 'likely to occur' or 'may occur' within the Wonnerup Coastal Reserves. These species are listed in **Appendix A**.

DPAW spatial records of protected flora in the vicinity of the Wonnerup Coastal Reserves, do not indicate the presence of any threatened or priority flora species within or immediately adjacent to the Wonnerup Coastal Reserves. However, it has been many years since any detailed flora investigations have been undertaken within the reserves.

Although no protected species have previously been identified with the reserves the significance of the Deadwater area was identified by DPAW as supporting the only known population of the *Eremophila glabra Subsp. albicans,* south of Bunbury, on the Swan Coastal Plain (Webb *et al*., 2009).

3.5.3. Threatened and Priority Ecological Communities

The Wonnerup Coastal Reserves are known to support areas of the 'Subtropical and Temperate Coastal Saltmarsh' Threatened Ecological Community (TEC) (**Figure 3-3**). This important community is listed as a Priority 1 (P1) in Western Australia and Vulnerable (VU) under the EPBC Act (1999) (**Appendix A**).

Although much of the Wonnerup Coastal Reserves are mapped as this TEC (**Figure 3-3**), the key characteristics of the TEC are particularly evident within the Deadwater and the riparian vegetation abutting the Vasse-Wonnerup Estuary in Lesueur Reserve (Error! Reference source not found.).

Plate 3.2 Saltmarch TEC vegetation in the background at Lesueur Reserve

Figure 3-3 Ecological Values

3.5.4. Weed Burden

Weeds are prolific throughout the Wonnerup Coastal Reserves, and include a number of aggressive species and Weeds of National Significance (WONS). Within the reserves, weed species were typically confined to areas surrounding walk trails, fire breaks and along road verges. Key weed species previously recorded within the Wonnerup Coastal Reserves include:

- Arum lily (Zantedeschia aethiopica);
- Bridal Creeper (*Asparagus asparagoides*)[2];
- Couch Grass (*Cynodon dactylon*) (Poaceae);
- False Onion Weed (*Trachyandra divaricate*);
- European Sea rocket (*Cakile maritima*)
- Hare's Tail Grass (*Lagurus ovatus*);
- Rose Pelargonium (Pelargonium capitatum);
- Pampas Grass (*Cortaderia selloana*);
- Petty Spurge (*Euphorbia peplus*);
- Plantago (*Plantago lanceolata*);
- Sea Spinach (*Tetragonia decumbens*);
- Sea Spurge (*Euphorbia paralias*);
- Wild Fumitory (*Fumaria capreolata*); and
- Wild Onion (*Asphodelus fistulosus*).

Although weeds are prolific throughout the Wonnerup Coastal Reserves, and in many locations are out-competing native understorey species, it is important to note the significant role that many of these weed species are currently providing in stabilising the dune system (e.g. *Tetragonia decumbens and Pelargonium capitatum)* (**Plate 3-2**). This is particularly evident in the foredune areas of Lesueur Reserve, Wunda Buri Reserve, Reserve 39193 and Lot 38. Removal of weeds in these areas could result in large areas of bare sand which will lead to erosion and ultimately dune destabilisation (Accendo, 2013).

Plate 3-2 Coastal foredune in Lot 38, that is dominated by weed species, which provide important dune stabilising vegetation.

[2] Bridal Creeper is the only Weed of National Significance (WONS) that has previously been recorded within the Wonnerup Coastal Reserves.

3.5.5. Dieback

The majority of the Wonnerup Coastal Reserves are comprised of calcareous soil types, therefore it is considered highly unlikely that *Phytophthora cinnamomi* (i.e. Dieback) will impact on the native vegetation within the Wonnerup Coastal Reserves. Dieback therefore does not represent a significant consideration for management in this plan.

3.6. Fauna

Over 100 species of fauna species are known to occur within the Wonnerup Coastal Reserves, including 91 birds, five mammals, five reptiles and one frog species (NatureMap, 2015) (**Appendix B**).

The value and condition of fauna habitat varies greatly throughout the Wonnerup Coastal Reserves. Although a detailed fauna survey was not undertaken in preparation of this plan, a site visit on 28th May 2015 identified the following broad habitat values throughout the Wonnerup Coastal Reserves:

- Riparian vegetation surrounding the Deadwater in Reserve 39193, and along the shore of the Vasse-Wonnerup Estuary within the Lesueur, Wunda Buri and Captain Baudin Reserves provides important nesting habitat for numerous species of migratory waterbirds as well as various other bird, frog and reptile species;
- Peppermint Low Open Forest throughout Captain Baudin Reserve, within areas of Wunda Buri Reserve and along the eastern edge of Reserve 39193, provides important habitat for the Western Ringtail Possum (*Psuedocherius occidentalis*);
- The dense dune vegetation in areas of Reserve 39193 provides suitable habitat for small mammals such as the Quenda (*Isoodon obesulus subsp. fusciventer*); and
- Dune vegetation throughout the Wonnerup Coastal Reserves also provides some areas of suitable habitat for shorebird breeding and nesting.

3.6.1. Conservation Significant Fauna Species

The Wonnerup Coastal Reserves provides suitable habitat for a number of conservation significant fauna species, including several small mammal species. Suitable habitat also exists for numerous migratory bird species. The protected fauna species identified by the DPAW *Naturebase* search, as occurring or likely to occur within the vicinity of the Wonnerup Coastal Reserves are summarised in **Table 3-1** in (**Appendix B**).

Table 3-1 Conservation Significant Fauna Species Identified within DPAW *Naturebase* Search (Appendix B)

Fauna Species	WC Act (1950) Status	EPBC Act (1999) Status
Mammals		
Bettongia penicillata subsp. ogilbyi (Woylie)	T[3]	Endangered
Isoodon obesulus (Southern Brown Bandicoot)	Priority 5	

[3] T = 'Rare or likely to become extinct'

Fauna Species	WC Act (1950) Status	EPBC Act (1999) Status
Isoodon obesulus subsp. fusciventer (Quenda)	Priority 5	
Pseudocheirus occidentalis (Western Ringtail Possum)	T	Vulnerable
Setonix brachyurus (Quokka)	T	Vulnerable
Birds		
Tringa nebularia (Common Greenshank)	IA[4]	Marine Migratory
Actitis hypoleucos (Common Sandpiper)	IA	Marine Migratory
Ardea ibis (Cattle Egret)	IA	Marine Migratory
Ardea modesta (Eastern Great Egret)	IA	Endangered
Botaurus poiciloptilus (Australasian Bittern)	T	Endangered
Calidris acuminata (Sharp-tailed Sandpiper)	IA	Marine Migratory
Calidris ferruginea (Curlew Sandpiper)	T	Critically Endangered; Marine Migratory
Calidris ruficollis (Red-necked Stint)	IA	Marine Migratory
Diomedea exulans (Wandering Albatross)	T	Vulnerable; Marine Migratory
Falco peregrinus (Peregrine Falcon)	S[5]	
Haliaeetus leucogaster (White-bellied Sea-Eagle)	IA	Marine
Limosa limosa (Black-tailed Godwit)	IA	Marine Migratory
Merops ornatus (Rainbow Bee-eater)	IA	Marine Migratory

[4] IA = 'Protected under International Agreement'

[5] S = 'Other specially protect fauna'

Fauna Species	WC Act (1950) Status	EPBC Act (1999) Status
Oxyura australis (Blue-billed Duck)	Priority 4	
Plegadis falcinellus (Glossy Ibis)	IA	Marine Migratory
Pluvialis squatarola (Grey Plover)	IA	Marine Migratory

Further, additional EPBC Act (1999) protected species that may be found within the Wonnerup Coastal Reserves are listed in **Appendix B.**

3.6.2. Other Fauna

Anecdotal evidence from DPAW, FAWNA and local Wonnerup residents suggests that the Wonnerup Coastal Reserves does support a small population of feral animal species, including rabbits, foxes and cats.

Foxes and domestic and feral cats pose a significant threat to local fauna species particularly small mammals (i.e. Western Ringtail Possum and Quenda) and birds. Typically, in a coastal, urban setting, where dogs are frequently walked off leash, a targeted trapping program is considered most appropriate to manage the fox and cat issues (Litoria Ecoservices, 2013). In addition, a community-wide public awareness campaign to educate the broader Busselton community about the threat that domestic cats pose to WRP should also be considered.

3.7. Fire History

No evidence of recent (i.e. within the last 10 years) fires was identified within or adjacent to the Wonnerup Coastal Reserves during the site visit on 28th May 2015.

The Geographe Bay Foreshore Management Plan (Coastwise, 2001) recognises fire as a low risk within the Busselton foreshore area. Furthermore, the CoB's standard policy and practice does not support prescribed burns in foreshore areas. This is considered a suitable management practice for the subject site particularly given the low fuel loads and the sensitive environment that is highly susceptible to erosion.

4. Cultural Environment

4.1. European Heritage

Today there is very little evidence of the European history of the Wonnerup foreshore remaining onsite. However, the area includes a number of sites of significant heritage value that need to be considered in preserving the heritage values of the area. The CoB's historic sites inventory identifies four historic sites recorded within the Wonnerup Coastal Reserves (**Figure 4-1**), including:

- The site of the *'Ballarat Timber Mill'*[6];
- The site of the *'Wonnerup Jetty*';
- The site of *'Disappearance of the Geographe Longboat - Chaloupe'*; and
- The site of the '*Deadwater Wreck'*.

An additional shipwreck in the area, not recorded in the CoB's historic site inventory has been suggested for the wreck of the 'Mary', a timber transport ship that was sunk at the end of the Wonnerup Timber Jetty in 1879. This is believed to be located adjacent to the current Wonnerup Boat ramp, approximately 140m offshore.

This shipwreck history of the Wonnerup Coastal Reserves is a particularly unique within the City of Busselton and represents a significant opportunity for interpretive signage at several key locations including, the Wonnerup Boat Ramp, the mouth of the Vasse-Wonnerup Estuary and near the Deadwater track.

4.2. Aboriginal Heritage

A search of the Aboriginal Site Register did not identify any 'Registered Heritage Sites' within the Wonnerup Coastal Reserves. However, the search did identify three 'Other Heritage Places' located within, and in the immediate vicinity of, the Wonnerup Coastal Reserves. These are shown on **Figure 4-1** and include:

- Cable Sands Skull (Skeletal Material/Burial) (ID: 4566) ;
- Wonnerup Busselton (Skeletal Material / Burial) (ID: 5863); and
- Forrest Beach, Busselton (Skeletal Material / Burial) (ID: 5522).

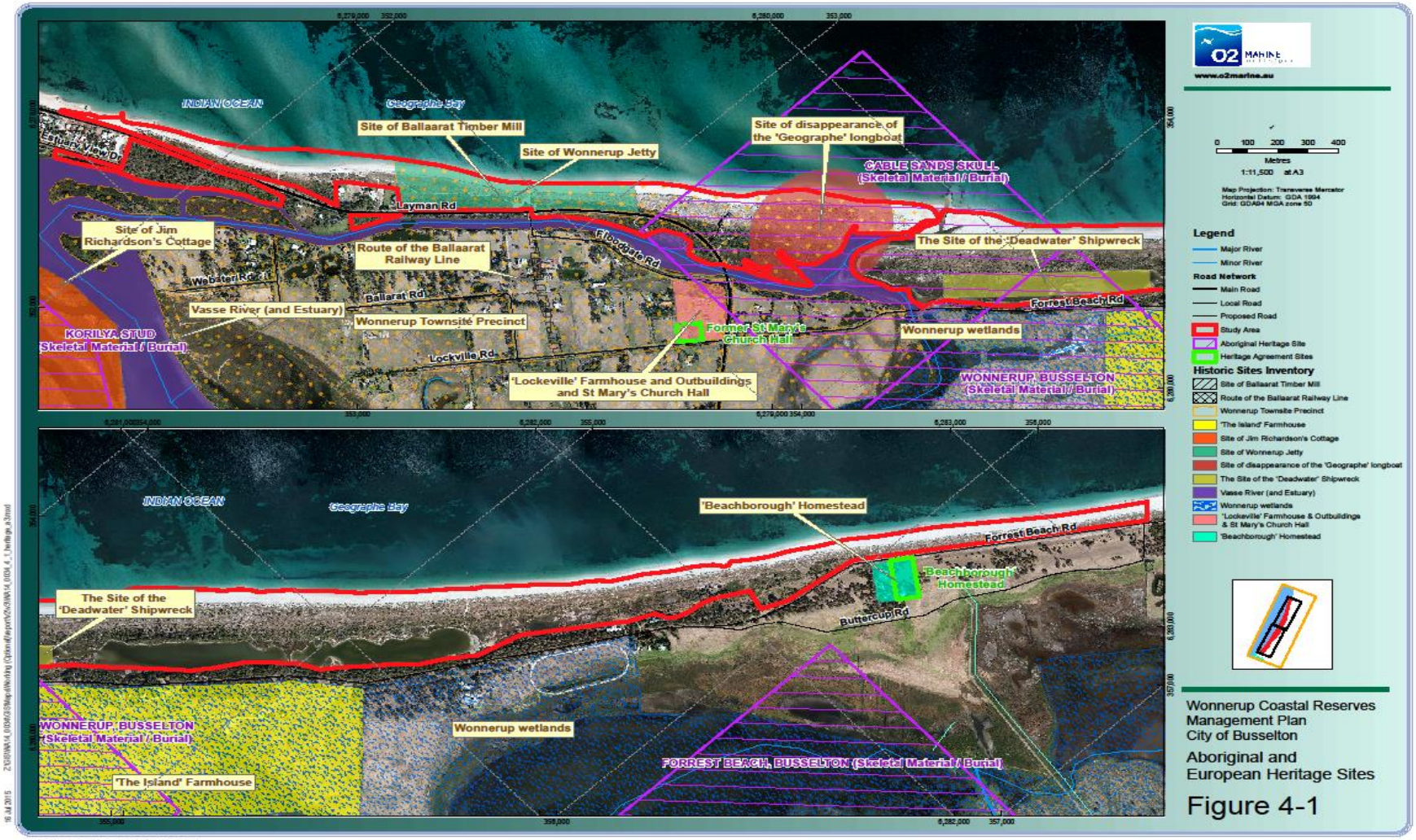
During preparation of the earlier Captain Baudin Management Plan in 2000, consultation with local Aboriginal people also identified the Captain Baudin Reserve as holding particular significance as it is believed to contain burial remains of Aboriginal person massacred along the Vasse Wonnerup Estuary around the time of European settlement (Alan Tingay & Associates, 2000).

Therefore, given the potential for the Wonnerup Coastal Reserves to contain burial remains, proposed recommendations in this plan have been made in an effort to keep ground disturbing works to a minimum.

[6] Note that discussions with local historians during the preparation of this plan, identified that the site of the 'Ballarat Timber Mill', as shown on Figure 4-1, is incorrectly recorded on the Western side of the Vasse-Wonnerup Estuary, where it was actually located on the Eastern site, near the end of Floodgate Road.

The CoB together with Brad Goode and Associates and O2 Marine facilitated a workshop with representatives of the local Aboriginal Community. The aim of this workshop was to ensure that the local Aboriginal Community's values and aspirations for the Wonnerup Coastal Reserves are protected and enhanced through implementation of the WCRMP.

Figure 4-1 Aboriginal & European Heritage Sites



4.3. Recreational Activities

The Wonnerup Coastal Reserves are currently used for typical coastal activities such as walking, swimming, fishing, horse-riding, beach launching of small boats and recreational off-road vehicle (ORV) use. Professional fishers also operate from the beaches and have licences to allow access for this purpose.

The area is utilised year round by local residents and seasonally by tourists visiting the area, primarily for beach fishing purposes. Many of the more remote carparks (i.e. at Forrest Beach and Lesueur Reserve) are also frequented by backpackers in mobile campervans for overnight stays.

At the time of preparing the WCRMP, the CoB Local Government Property Local Law (Shire or Busselton, 2010) specifies that ORV use is only permitted on the Wonnerup Beach from the Boat Ramp east to the Vasse-Wonnerup Estuary mouth. However, ORV also frequently access Forrest Beach from the Capel boundary west to the Estuary mouth and to a lesser extent, Wonnerup Beach west from the Boat Ramp.

Further information regarding the key stakeholder values, including specific locations for recreational activities undertaken within the Wonnerup Coastal Reserves are provided in **Section 5**.

5. Stakeholder Values and Management Concerns

As outlined in Section 2.2, key stakeholder values and management concerns were identified with input from the project steering committee and also during a community beach walk on 6th June 2015.

These values and concerns have been collated and summarised for seven management 'Nodes' across the Wonnerup Coastal Reserves, to enable identification of key issues and to facilitate the development of the management recommendations that follow in **Section 6**.

5.1. Node 1: Lot 38, Forrest Beach Road

The key values and management concerns that were identified for Node 1 by the community and key stakeholders are presented on **Figure 5-1** and listed below.

Plate 5-1 Existing unauthorised ORV access at Node 1 and example of inadequate signage.

Key values of Node 1 include:

Economic Values

- Commercial fishing.

Social & Cultural Values

- Possible aboriginal skeletal remains in dunes;
- Recreational fishing;
- ORV use on the beach[7] (**Plate 5-1**);
- Horse-riding on the beach; and
- Dog exercise beach.

Ecological values

- Isolated patches of WRP habitat; and
- Bird nesting in the coastal dunes.

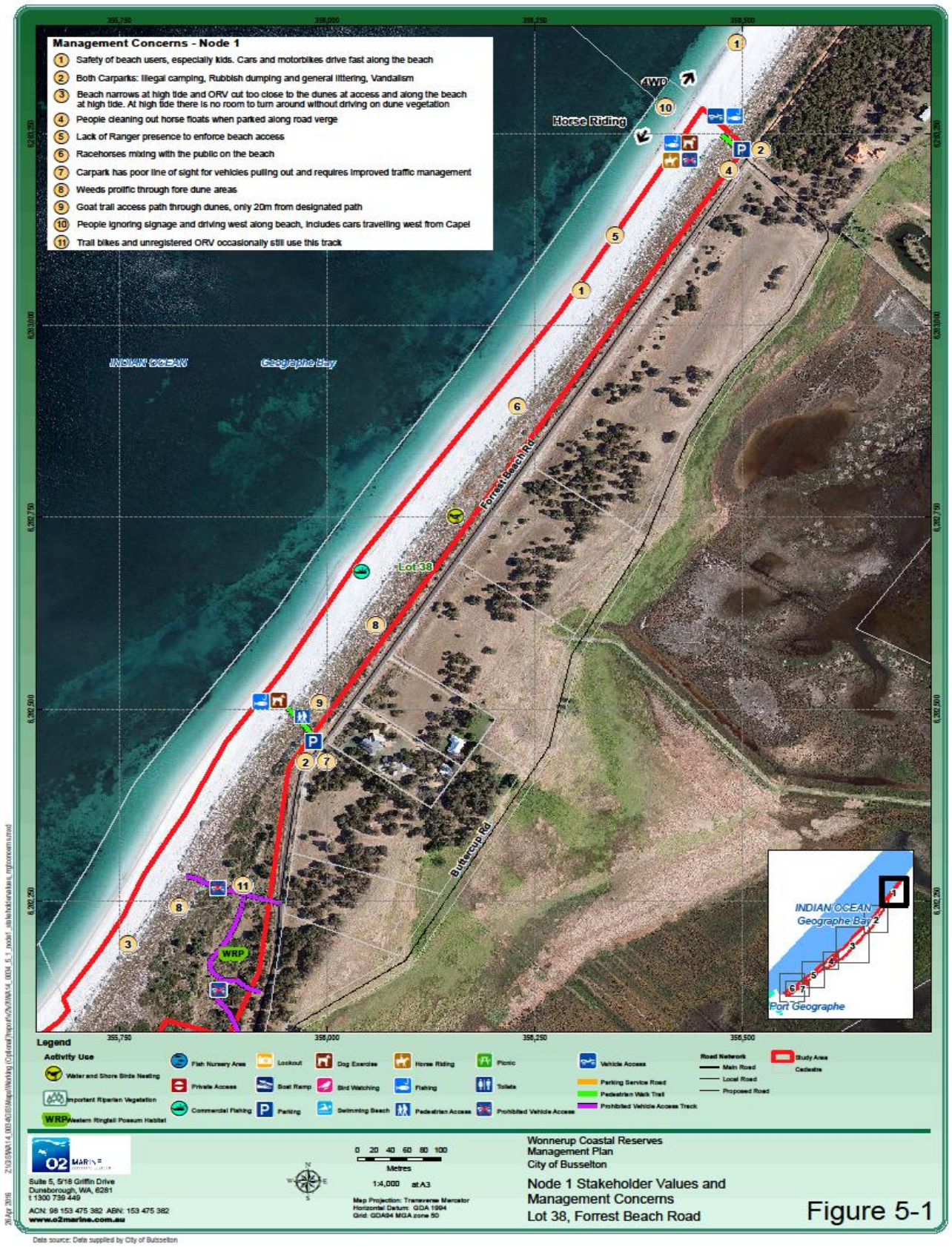
Key management concerns for Node 1 include:

- Unauthorised ORV access causes public safety issues, damage to vegetation causing dune fragmentation, and disturbance to wildlife;
- Unauthorised ORV on beach accessing beach from Shire of Capel;
- Unauthorised camping at car parks;
- Insufficient / Inadequate signage;
- Littering & vandalism;
- Private pedestrian access increasing dune fragmentation;
- Exposing aboriginal skeletal remains;
- Inappropriate toileting;

[7] It is important to note, that although ORV use was identified as a value, it is not currently permitted on the beach within Node1 (Plate 5-1).

- Weeds;
- Dune scarp damaged by storms; and,
- Insufficient surveillance and monitoring of unauthorised access.

Figure 5-1 Node 1 Stakeholder Values & Management Concerns: Lot 38, Forrest Beach Road



5.2. Node 2: Reserve 39193, Forrest Beach Road – Deadwater Track

The key values and management concerns that were identified for Node 2 by the community and key stakeholders are presented on **Figure 5-2** and listed below.

Key values of Node 2 include:

Economic Values

- Commercial fishing.

Social & Cultural Values

- Possible aboriginal skeletal remains in dunes;
- Recreational fishing on beach and around the Deadwater;
- Scenic area;
- Birdwatching;
- Bushwalking;
- ORV use on the beach[8];
- Horse-riding on the beach; and
- Dog exercise beach.

Plate 5-2 Damage to TEC Vegetation caused by Unauthorised ORV access along Deadwater track.

Ecological values

- TEC vegetation around Deadwater;
- Bird nesting habitat in coastal dunes and riparian vegetation surrounding the Deadwater;
- Deadwater is important migratory waterbird habitat;
- Deadwater is important fish nursery area; and
- WRP habitat exists along the road corridor adjacent to the Reserve.

Key management concerns for Node 2 include:

- Unauthorised ORV access causes damage to TEC vegetation (**Plate 5-2**);
- Inability for ORV to exit beach without causing damage to TEC vegetation;
- ORV getting bogged in TEC vegetation exacerbates damage;
- Insufficient signage;
- Littering;
- Vandalism;
- Dune fragmentation;
- Weeds;
- Dune blowouts caused by people parking on dune and turning around over the vegetation;
- Damage to Threatened Ecological Community;
- Disturbance to birds breeding habitat;
- Exposing aboriginal skeletal remains;
- Loss of biodiversity; and
- Insufficient surveillance and monitoring of unauthorised access.

[8] ORV access is not permitted on the Deadwater track or on Forrest Beach in Node 2.

Figure 5-2 Node 2 Stakeholder Values & Management Concerns: Reserve 39193, Forrest Beach Road – Deadwater Track

5.3. Node 3: Reserve 39193, Forrest Beach Road – Deadwater

The key values and management concerns that were identified for Node 3 by the community and key stakeholders are presented on **Figure 5-3** and listed below.

Key values of Node 3 include:

Economic Values

- Commercial fishing.

Social & Cultural Values

- Possible aboriginal skeletal remains in dunes;
- Recreational fishing on the beach and around the Deadwater (**Plate 5-3**);
- Scenic area;
- Birdwatching;
- Bushwalking;
- Boat launching at Vasse-Wonnerup Estuary;
- ORV use on the beach[9];
- Horse-riding on the beach; and
- Dog exercise beach.

Plate 5-3 Recreational fishing near Vasse-Wonnerup Estuary mouth.

Ecological values

- Threatened Ecological Community: Subtropical & temperate saltmarsh around Deadwater (**Plate 5-4**);
- Bird nesting habitat in coastal dunes and riparian vegetation surrounding the Deadwater;
- Deadwater is important migratory waterbird habitat;
- Deadwater is important fish nursery area; and
- WRP habitat exists along the road corridor adjacent to the Reserve.

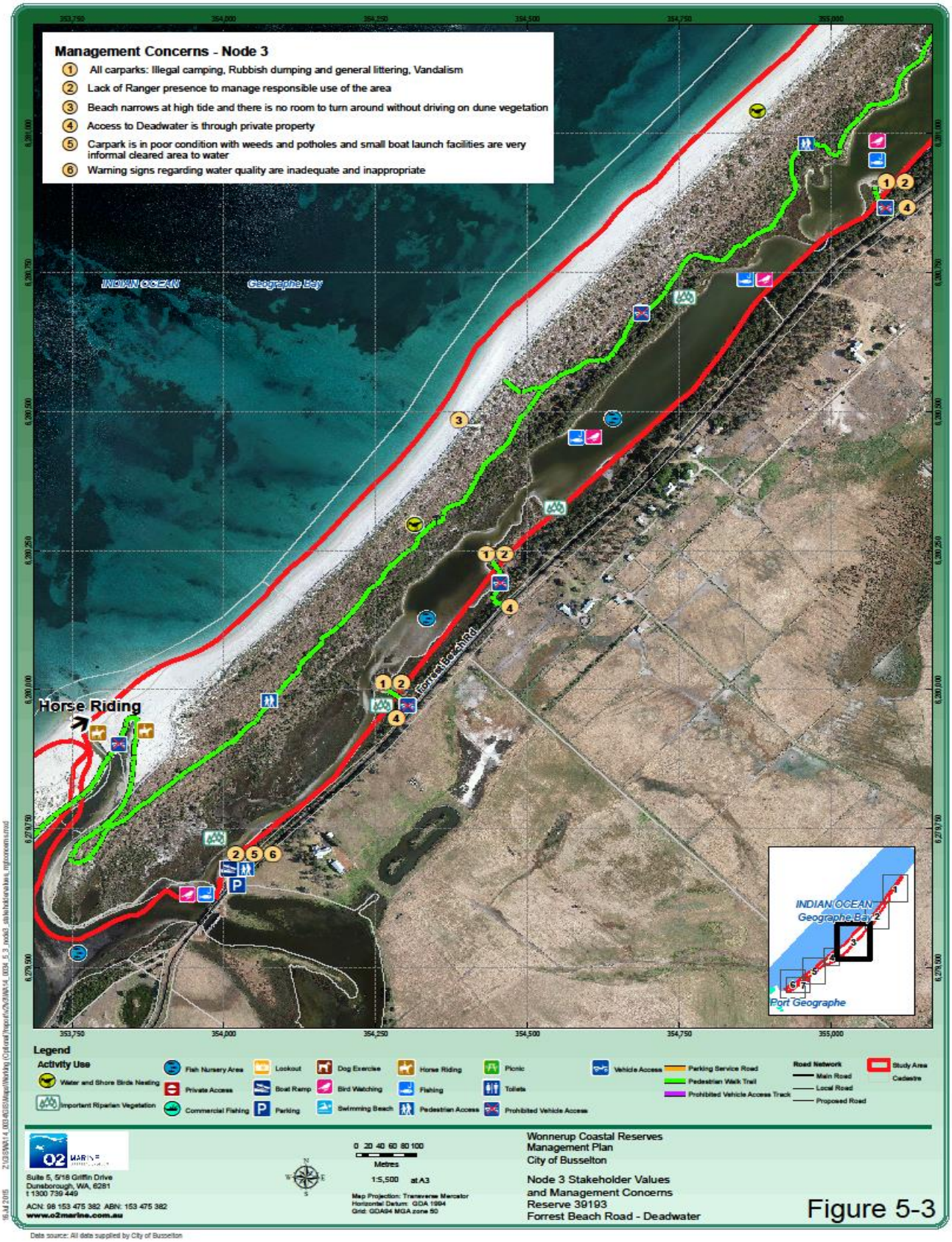
Plate 5-4 TEC vegetation near Deadwater confluence.

Key management concerns for Node 3 include:

- Unauthorised ORV causing damage to coastal dunes during high tides and dune blowouts at access points;
- ORV using tracks to access lagoon for fishing;
- Weeds around carparks and along pedestrian access tracks;
- Exposing aboriginal skeletal remains; and
- Littering and Vandalism.

[9] ORV access is not permitted on Forrest Beach in Node 3.

Figure 5-3 Node 3 Stakeholder Values & Management Concerns: Reserve 39193, Forrest Beach Road – Deadwater



5.4. Node 4: Lesueur Reserve, Layman Road – Estuary Mouth

The key values and management concerns that were identified for Node 4 by the community and key stakeholders are presented on **Figure 5-4** and listed below.

Key values of Node 4 include:

Economic Values

- Commercial fishing.

Social & Cultural Values

- Possible aboriginal skeletal remains in dunes;
- Swimming;
- Beach recreation;
- Scenic area (**Plate 5-5**);
- Bird watching;
- Walking trails;
- Recreational fishing on beach;
- Prawning in the Estuary;
- ORV use on the beach; and
- Dog exercise beach.

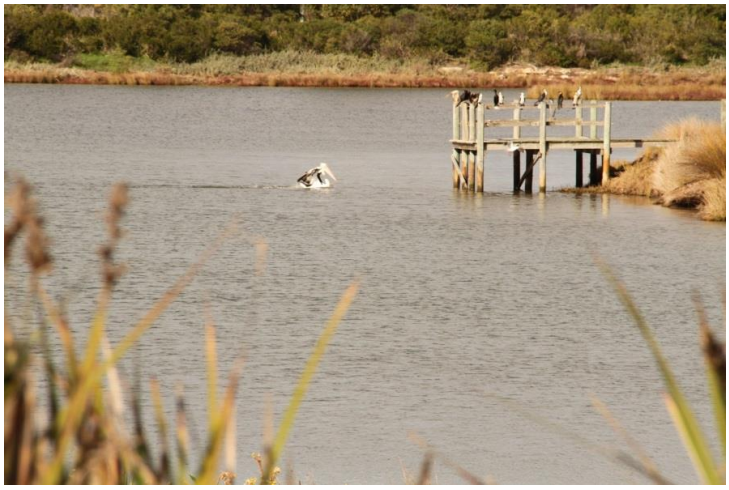


Plate 5-5 Lookout / fishing platform at Vasse-Wonnerup Estuary mouth.

Ecological values

- TEC Vegetation around Estuary;
- Bird nesting habitat in coastal dunes and riparian vegetation surrounding the Estuary;
- Estuary is important migratory waterbird habitat; and
- Estuary is important fish nursery area

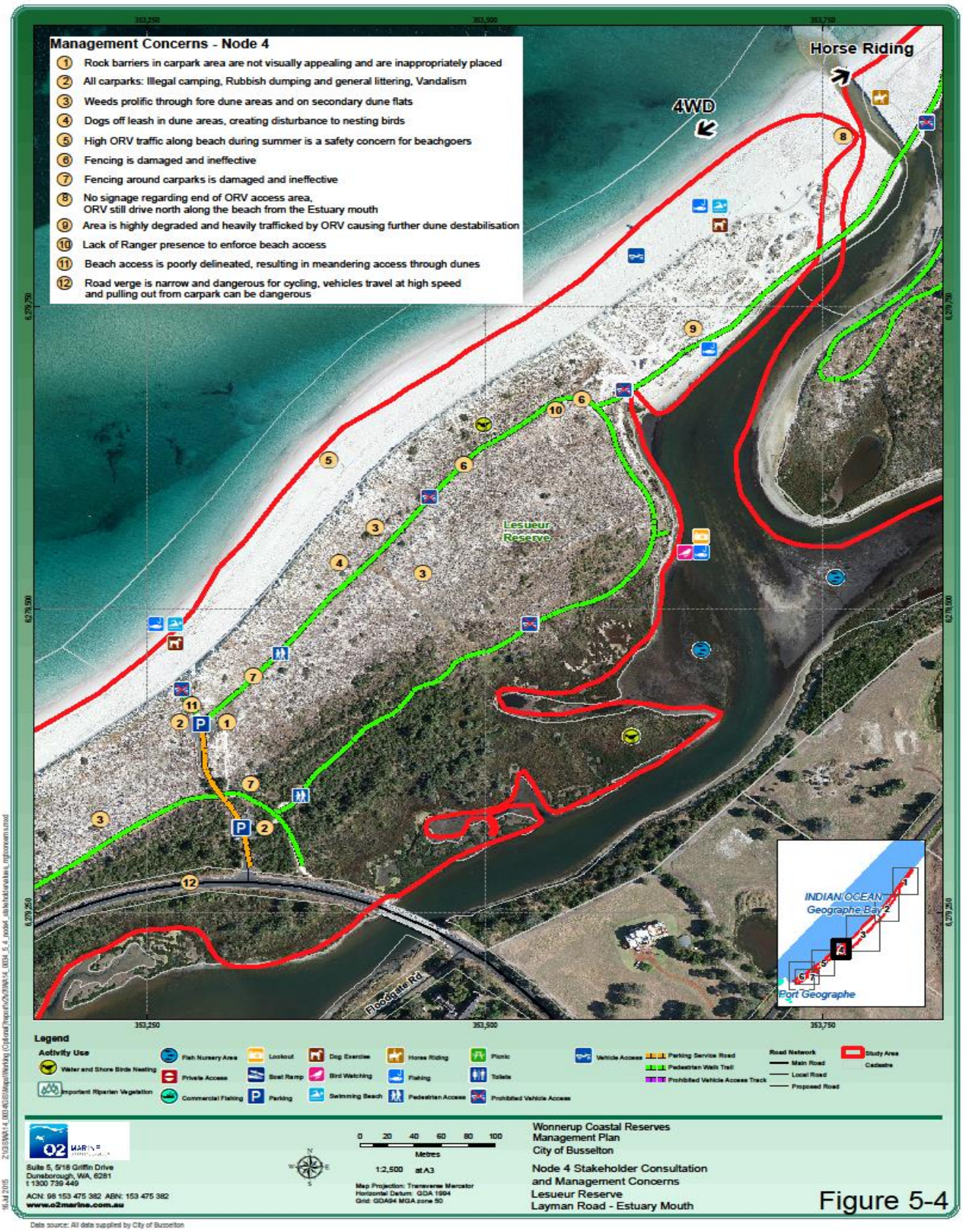
Plate 5-6 Ineffective track closure with limestone rocks.

Plate 5-7 ORV Access to Coastal Dune Areas is Prohibited.

Key management concerns for Node 4 include:

- Ineffective track closure with limestone rocks (**Plate 5-6**);
- Old and damaged fences along car park and tracks;
- Unauthorised ORV using pedestrian tracks;
- Insufficient management of ORV access resulting in damage to dune vegetation and disturbance to nesting bird habitat;
- Insufficient / Inadequate signage;
- Hooning and vandalism at car park;
- Dune destabilization caused by ORV at Estuary mouth dunes;
- Weeds;
- Littering;
- Unauthorised camping;
- Exposing aboriginal skeletal remains; and
- Insufficient surveillance and monitoring of unauthorised access.

Figure 5-4 Node 4 Stakeholder Values & Management Concerns: Lesueur Reserve, Layman Road – Estuary Mouth



5.5. Node 5: Wunda Buri Reserve, Layman Road – Boat Ramp

The key values and management concerns that were identified for Node 5 by the community and key stakeholders are presented on **Figure 5-5** and listed below.

Key values of Node 5 include:

Economic Values

- Commercial fishing.

Social & Cultural Values

- Possible aboriginal skeletal remains in dunes;
- Toilet facilities;
- Swimming;
- Boat Launching for small vessels;
- Beach recreation;
- Shade/shelter;
- Walking trails;
- Scenic area;
- Recreational fishing on beach;
- ORV use on the beach[10]; and
- Dog exercise beach.

Plate 5-8 Beach shelter at Wunda Buri Reserve.

Ecological values

- Bird nesting habitat in coastal dunes; and
- WRP habitat exists along portion of the road corridor within the Reserve.

Key management concerns for Node 5 include:

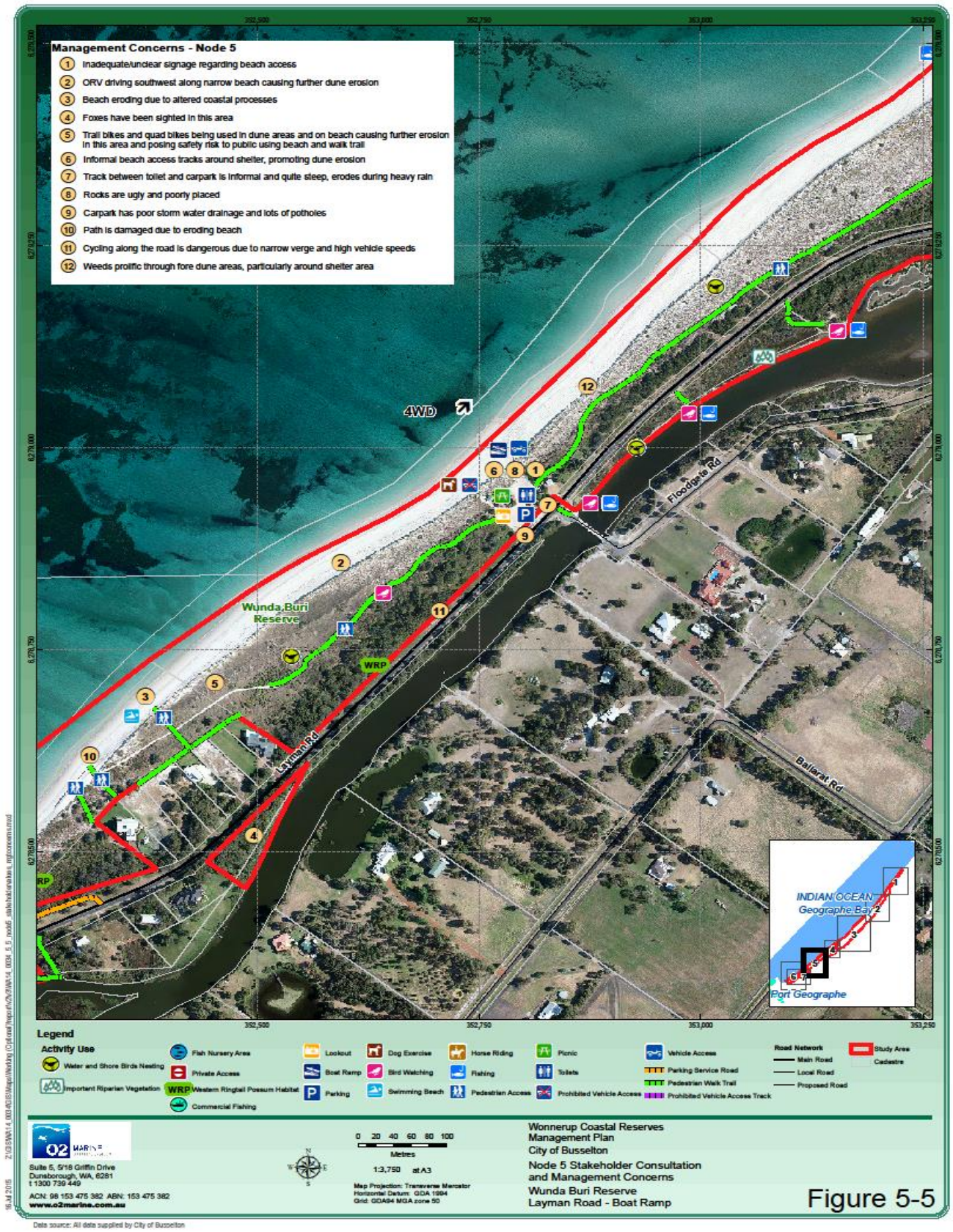
- Pedestrian access is not formalised;
- Existing shelter is dated and needs maintenance (**Plate 5-8**);
- Unauthorised ORV access west of boat ramp entrance (**Plate 5-9**);
- Inadequate signage;
- Car park area and adjoining paths require upgrade;
- Littering;
- Dune destabilisation;
- Weeds;
- Narrow beach to the west;

Plate 5-9 ORV access Not Permitted on the beach to the west of the Wonnerup boat ramp

[10] ORV only permitted on the beach from the Wonnerup Boat ramp, east to the estuary mouth.

- Competing recreational activities result in negative impact to biodiversity values and public safety concerns;
- Exposing aboriginal skeletal remains; and
- Insufficient surveillance and monitoring of unauthorised access.

Figure 5-5 Node 5 Stakeholder Values & Management Concerns: Wunda Buri Reserve, Layman Road – Boat Ramp



5.6. Node 6: Foreshore Reserve, Layman Road

The key values and management concerns that were identified for Node 6 by the community and key stakeholders are presented on **Figure 5-6**.

These key values of Node 6 include:

Economic Values

- Commercial fishing.

Social & Cultural Values

- Possible aboriginal skeletal remains in dunes;
- Swimming;
- Safe beach walking (i.e. No ORV)
- Beach recreation;
- Walking trails; and
- Dog exercise beach.

Ecological values

- Bird nesting habitat in coastal dunes; and
- WRP habitat exists along portion of the road corridor within the Reserve.

Plate 5-10 Coastal dune erosion observed at Node 6 during May 2015.

Plate 5-11 Weeds around beach access from Layman Road, Node 6.

Key management concerns for Node 6 include:

- Unauthorised ORV access is common (anecdotally);
- Beach erosion adjacent to residences on the North side of Layman road (**Plate 5-10**);
- ORV causing damage to dune vegetation and exacerbating erosion;
- Council sump area poses safety risk with soft edges and deep (>2m depth) water during winter;
- ORV access to beach is required for DoT and CoB maintenance works;
- Exposing aboriginal skeletal remains;
- Coastal erosion and unauthorised ORV traffic causing loss of dune vegetation.
- Weeds (**Plate 5-11**); and
- Competing recreational activities result in negative impact to biodiversity values and public safety concerns.

Figure 5-6 Node 6 Stakeholder Values & Management Concerns: Foreshore Reserve, Layman Road

5.7. Node 7: Captain Baudin Reserve, Layman Road

The key values and management concerns that were identified for Node 7 by the community and key stakeholders are presented on **Figure 5-7** and listed below.

Key values of Node 7 include:

Social & Cultural Values

- Possible aboriginal skeletal remains;
- Scenic area;
- Birdwatching;
- Walking trails; and
- Dog exercise beach.

Ecological values

- Riparian waterbird habitat; and
- WRP habitat throughout reserve.

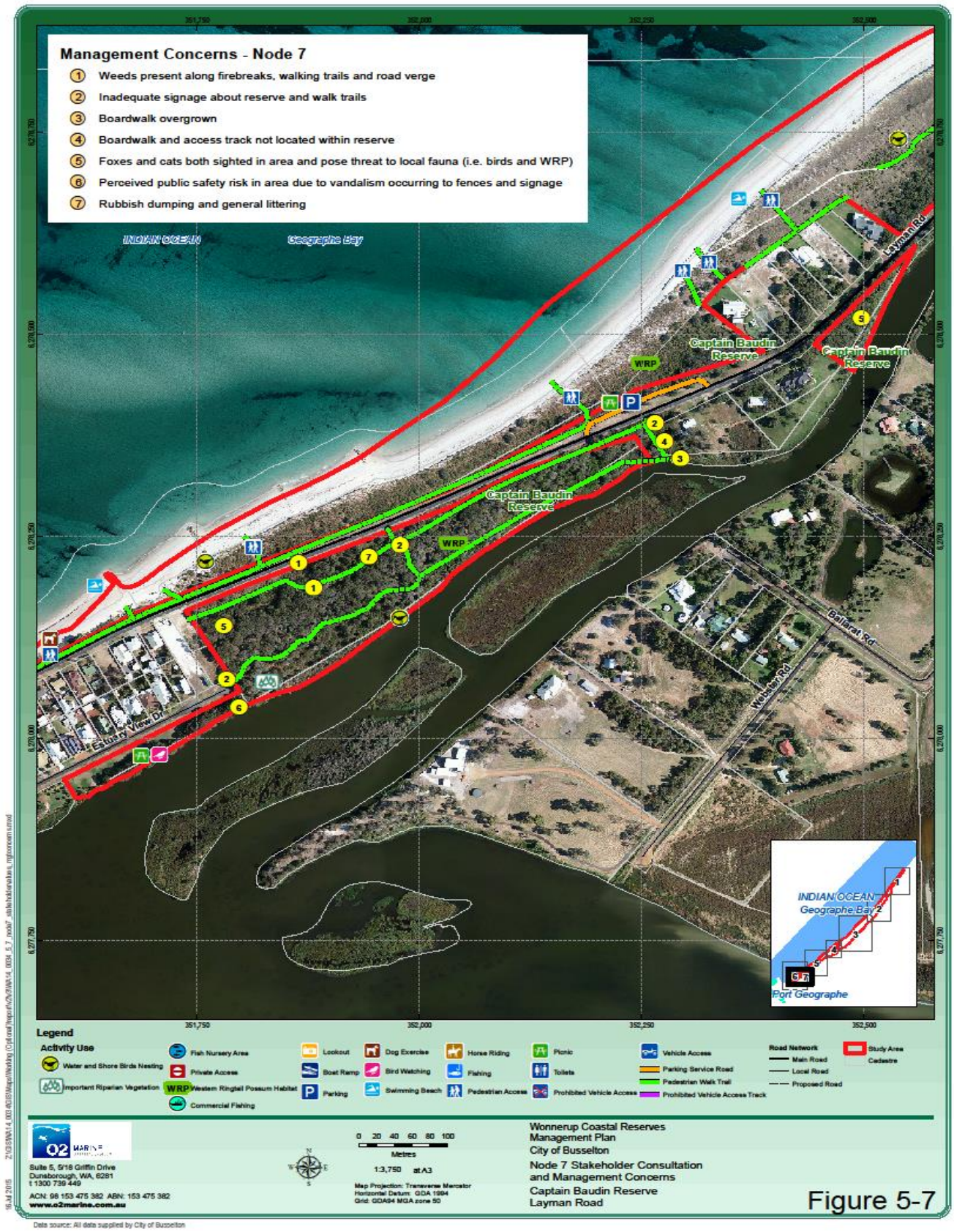
Key management concerns for Node 7 include:

- Inadequate signage;
- Poorly maintained tracks (**Plate 5-12**);
- Public safety concerns (crime);
- Vandalism;
- Weeds (**Plate 5-13**);
- Rubbish dumping;
- Exposing aboriginal skeletal remains; and
- Feral animals (i.e. cats and foxes).

Plate 5-12 Overgrown boardwalk to Estuary in Captain Baudin Reserve

Plate 5-13 Weeds along walk trail within Captain Baudin Reserve

Figure 5-7 Node 7 Stakeholder Values & Management Concerns: Captain Baudin Reserve, Layman Road



6. Management Action Plan

Section 6 details the management strategies and actions to address key management issues within the Wonnerup Coastal Reserves Study Area. The following information is provided for each coastal node:

- Management Considerations;
- Management Actions Table; and
- Site Map.

Management considerations provide a summary of the current uses, key issues, and justification for the strategy proposed. The management strategies and actions have been developed taking into consideration community concerns and key values as outlined in **Section 5**.

For each Management Node the management action tables provide a detailed but succinct outline of:

- Management issues (grouped into Tenure & Vesting, Access and Amenities, Biodiversity and Monitoring & Education);
- The strategic aim for addressing the management issue;
- A timeline for implementation (Immediate, 1-3 years, 3-5 years);
- Actions to achieve the aim (each action corresponds to a number on the corresponding Map).
- Indicative costs for each action; and
- Responsibility for implementation of the actions.

The information contained in the management action tables is presented in the accompanying maps which include reference numbers for each action and the associated timeframe. The actions also include reference to revegetation areas (RA); walk trails (WT), weed control, optimising ranger activities and recommended locations for signage and fencing. Further information regarding these elements is provided in the following appendices:

- Revegetation Works - **Appendix D**;
- Weed Control Techniques - **Appendix E**;
- Signage Examples - **Appendix F**;
- Fencing Examples - **Appendix G**; and
- Ranger Coastal Evaluation Form - **Appendix H**.

Indicative costings are also provided for each action item included in the management action tables. Further information regarding rates used to estimate costs are provided in **Appendix I**.

6.1. Node 1 Action Plan: Lot 38, Forrest Beach Road

6.1.1. Management Considerations

Node 1 is currently frequented by fishers, (both recreational and commercial), families and horse riders. The beach at Node 1 is one of two remaining beaches in the CoB where horse-riding is permitted. It has also been historically accessed by ORV, both from the CoB and the Shire of Capel. However, in recent years ORV use on this beach has been prohibited (CoB Local Government Property Local Law, 2011). The continued closure of this beach to ORV is considered justified given:

- There is only one (1) appropriate[11] entry/exit point to the beach at the CoB/Shire of Capel Boundary; and
- The beach narrows significantly west of the Deadwater track and ORV are forced into the fragile dune vegetation when trafficking the beach during high tide periods.

The management strategy for this area is to formalise the pedestrian access points, manage unauthorised camping, improve signage in the area and promote appropriate behaviour of key user groups. Several target areas for revegetation are also proposed to enhance biodiversity and stabilise the dune system for the future protection of Forrest Beach Road and other infrastructure

6.1.2. Actions

Key actions to be implemented for Node 1 (Lot 38, Forrest Beach Road) are listed in **Table 6-1** and presented on

[11] ORV beach access via the Deadwater track (i.e. Node 2) is causing extensive damage to the TEC vegetation.

Figure 6-1.

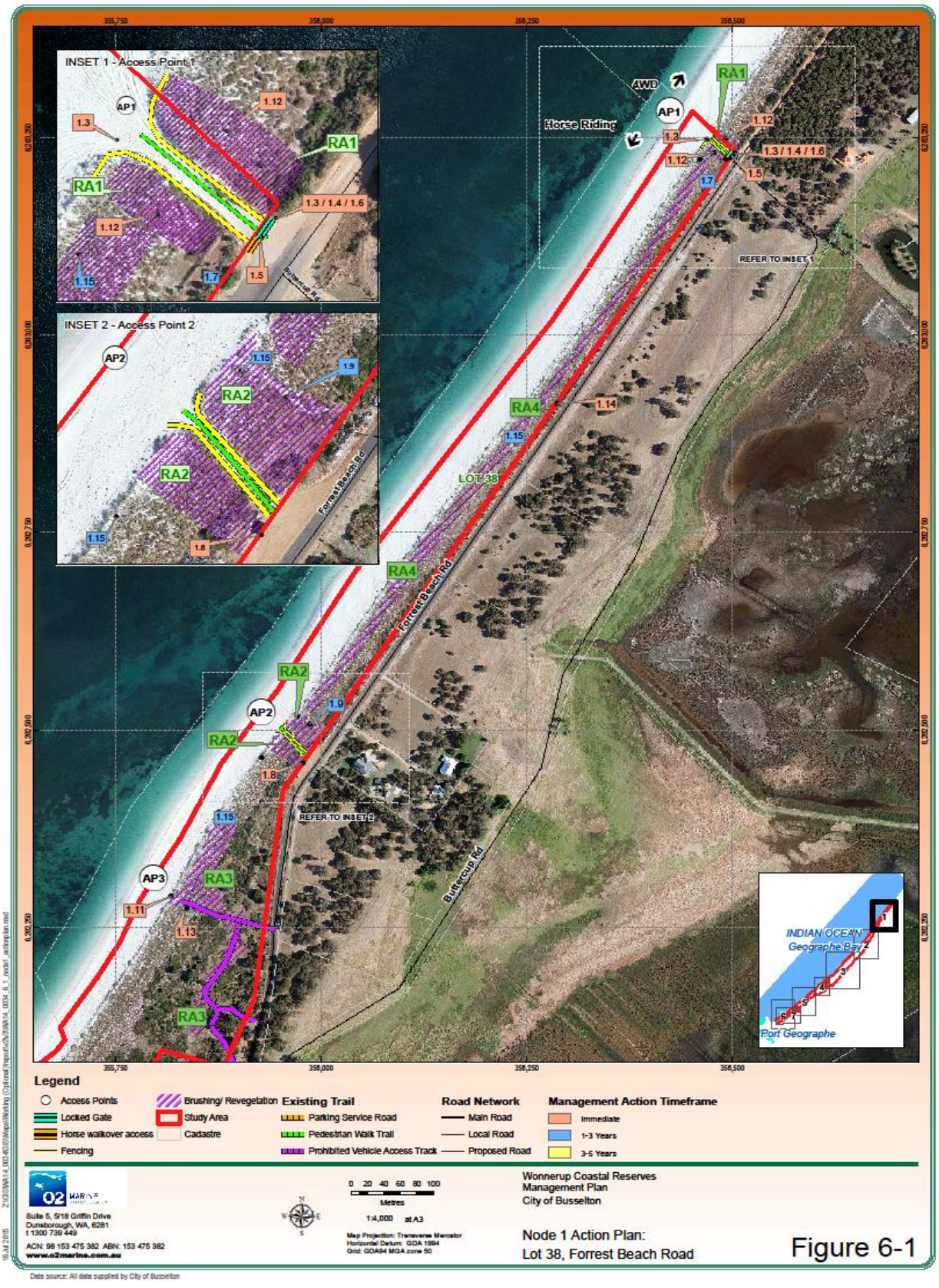
Table 6-1 Node 1 Action Plan: Lot 38, Forrest Beach Road

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
TENURE & VESTING						
Lot 38 is currently vested with the State of Western Australia as Unallocated Crown Land (UCL)	Lot 38 to be Vested with the CoB to facilitate management.	1-3 Years.	1.1	CoB to apply to the State for Lot 38 to be Vested with the CoB to allow implementation of required management.	N/A	CoB - Planning
CULTURAL Vesting and SW Booja Land Settlements	All tenure issues for Wonnerup Coastal management Plan need to be resolved in conjunction with SW Land Claim Settlement	1-3 years	1.21	It is recommended that the City of Busselton enter into negotiations with SWALSC in regards to land tenure issues with the aim of formulating guidelines, research, partnerships and joint management of the Unallocated Crown Land within the WCRMP area.	N/A	CoB- Planning
ACCESS & AMENITIES						
Unauthorised ORV causes damage to vegetation. Unauthorised ORV causes public safety issues. Unauthorised ORV on beach accessing from Shire of Capel. **Insufficient surveillance and monitoring.** Unauthorised camping at car	AP1: ORV not permitted on this beach as per existing Council Bylaws. Permitted access to horse-riders, commercial fisherman and pedestrians only.	Immediate.	1.2	Install directional signage on the Shire of Capel's closest beach access to inform people that existing bylaw will be enforced - no ORV access on beaches forthwith.	$300	CoB – Engineering & Works
			1.3	Install directional signage (one at car park and one on the beach) at Access Point 1 (AP1) to advise users of prohibited ORV access areas.	$300	CoB – Engineering & Works
			1.4	Install educational signage (i.e. no littering and dumping) at AP1.	$200	CoB – Engineering & Works

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
park. Insufficient signage. Littering. Vandalism. Inappropriate toileting.			1.5	Install locked gate at the roadside of AP1 (Forrest Beach road) to prevent ORV access. Key to be provided to commercial fishers. Provide a pedestrian and horse access between gate and fence by installing a 2 m wide, 50 cm in height log across. Erect fencing at either sides of the access.	$6,000	CoB – Engineering & Works
			1.6	Install a rubbish bin at car park.	$300	CoB – Engineering & Works
		1-3 Years	1.7	Extend carpark size if number of visitors increases and consider provision of toilet facility.	$20,000	CoB - Planning
	AP2: Pedestrian access only.	Immediate.	1.8	Install educational signage (i.e. no littering and dumping) signage AP2.	$200	CoB – Engineering & Works
		1-3 Years	1.9	Close 'private' pedestrian access with brushing and revegetation within Revegetation Area (RA2) to prevent dune fragmentation. Adjacent AP2 provides sufficient access to this beach.	$4,400	CoB - Environment
	AP3: Access Closed	Immediate.	1.10	Monitor existing controls to measure effectiveness.	N/A	CoB – Parks & Gardens
			1.11	Upgrade fencing and bollards as required.	N/A	CoB – Engineering & Works
BIODIVERSITY						
Weeds prolific throughout the foredune and along road verge. Weeds provide dune stabilisation function and fauna habitat. ORV damage to fragile vegetation causing dune fragmentation and disturbance to wildlife. Dune scarp damaged by storms.	Targeted vegetation and weed management. Fencing for natural regeneration.	Immediate.	1.12	Revegetate and brush along AP1 (RA1).	$1,420	CoB - Environment
			1.13	Revegetate and brush at AP3 near beach access (RA3).	$14,400	CoB - Environment
			1.14	Targeted spraying along verge. No spraying on dunes to prevent further destabilisation. **It is recommended** that that weed spraying be undertaken in an appropriate manner as not to disturb native plant species.	$500	CoB – Parks & Gardens

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
		3-5 years	1.15	Place brushing along the toe of the vegetation edge. (RA4).	$2,000	CoB - Environment
MONITORING						
(These areas are not marked on the maps).	Education	Immediate.	1.16	Advertise of existing closure of the beach through promotion of the WCRMP.	$500	CoB - Environment (Planning (Rangers))
			1.17	Commercial Fishers to develop beach access code of conduct.	N/A	CoB - Environment
			1.18	Horse-riders to develop beach access code of conduct, including considerations of parking and cleaning of horse carriages to prevent weed spread.	N/A	CoB - Environment
	Increase surveillance, Monitoring & Education	Immediate.	1.19	Optimise surveillance during the first summer after beach closure to record beach users and frequency of unauthorised access. Visits to occur at least twice weekly with weekend visits occurring on a monthly basis.	N/A	CoB - Planning (Rangers)
		1-3 Years.	1.20	Increase surveillance, if required commensurate with frequency of unauthorised ORV access/vandalism identified through monitoring.	N/A	CoB - Planning (Rangers)
		1-3 Years.	1.20	Consider pilot 'Community Ranger' project. Similar to 'Preston Beach Community Rangers'.	N/A	CoB - Planning (Rangers)

Figure 6-1 Node 1 Action Plan: Lot 38, Forrest Beach Road



6.2. Node 2 Action Plan: Reserve 39193, Forrest Beach Road – Deadwater Track

6.2.1. Management Considerations

Node 2 is currently frequented by fishers, (both recreational and commercial) and horse riders. The Deadwater is also a popular fishing spot for recreational anglers. The beach extends from Node 1 and is one of two remaining beaches in the CoB where horse-riding is permitted. As with Node 1, this beach has also been historically accessed by ORV. However, as with Node 1, ORV use on this beach is prohibited (Shire of Busselton, 2010). The Deadwater track at Node 2 provides a means of ORV beach access, however, the ORV use of this track is causing significant degradation of the fragile saltmarsh TEC vegetation, particularly during winter when higher water levels in the Deadwater force ORV into the vegetation.

The management strategy for Node 2 is to close the ORV access at the Deadwater track and manage for pedestrians and horse riders only. The area will be enhanced with clear carpark delineation and upgrade of the existing walk trail through along the Western side of the Deadwater.

6.2.1 Actions

Key actions to be implemented for Node 2 (Reserve 39193, Forrest Beach Road – Deadwater Track) are listed in **Table 6-2** and presented on Figure 6.2 below.

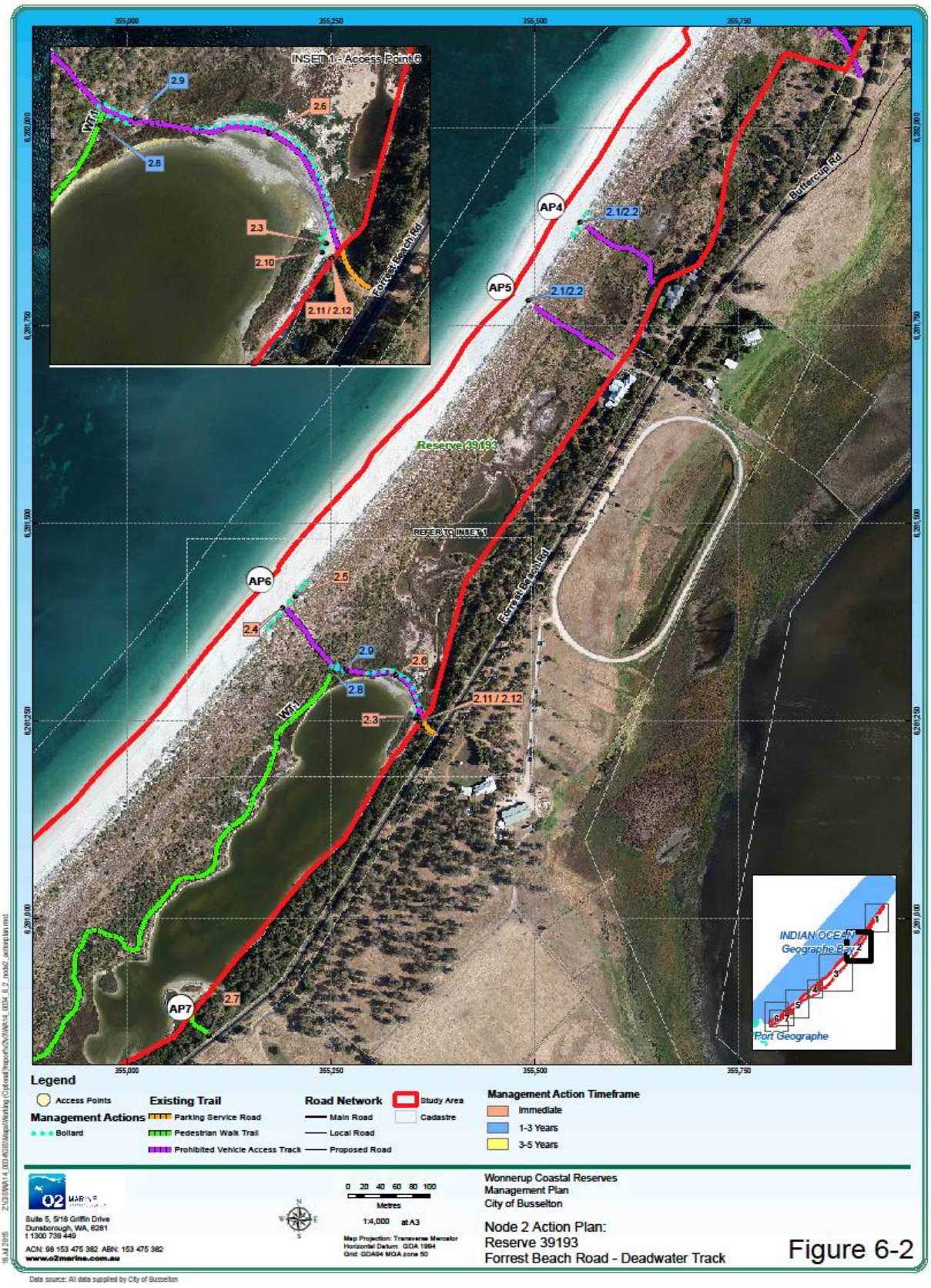
Figure 6-2.

Table 6-2 Node 2 Action Plan: Reserve 39193, Forrest Beach Road – Deadwater Track

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
ACCESS & AMENITIES						
Unauthorised ORV causes damage to vegetation. Unauthorised ORV causes public safety issues. Insufficient surveillance and monitoring. Insufficient signage. Littering. Vandalism.	AP4: Closed to ORV, pedestrians and horse riders. Pedestrian traffic directed to AP5 which also provides emergency vehicle access from Forrest Beach Road.	1-3 Years.	2.1	Install bollards at beach side of AP4.	$500	CoB - Engineering & Works
			2.2	Install directional signage on the beach side of AP4 & AP5 to advise access restrictions.	$300	CoB - Engineering & Works
	AP6: Closed to ORV, open to horse riders and pedestrians.	Immediate.	2.3	Install directional and interpretative signage at the car park.	$600	CoB - Engineering & Works
			2.4	Install bollards at the beach access to prevent ORV access. Leave a 1.8 m gap for horse riders' access.	$500	CoB - Engineering & Works
			2.5	Install bollards at the beach access (close to AP6) to prevent ORV from using the alternative track.	$500	CoB - Engineering & Works
			2.6	Delineate beach access with bollards to guide pedestrians around the lagoon and to allow natural regeneration to occur.	$3,000	CoB - Engineering & Works
	AP7: Closes to ORV, open to pedestrians.	Immediate.	2.7	Close vehicle access at AP7 using large rocks and include carpark pull-in area along road verge.	$1,000	CoB - Engineering & Works
	Walk Trail 1: Provide information about the trail and enhance pedestrian experience.	1-3 Years.	2.8	Install interpretative signage along the walk trail (WT1). Alternative 2 new routes: from car park to river mouth and return via beach (loop) or through river mouth connecting with walk trail west).	$500	CoB - Environment
			2.9	Install bollards at northern (beachside) entry of AP6.	$500	CoB - Engineering & Works
	Prevent ORV access and delineate	Immediate.	2.10	Allow pedestrian and horse-riding access to Deadwater in consultation with landowner. .	N/A	CoB - Planning

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
	Pedestrian and horse access to Deadwater (private land) and Beach.		2.11	Delineate pedestrian access and restrict vehicle access with bollards to prevent further degradation to vegetation.	$3,000	CoB - Engineering & Works
			2.12	Install rubbish bin.	$300	CoB - Engineering & Works
BIODIVERSITY						
Dune fragmentation. Weeds. Dune blowouts caused by people parking on dune and ORV turning around over the vegetation. Damage to Threatened Ecological Community vegetation. Disturbance to bird nesting habitat.	AP6: Protect surrounding native vegetation to allow natural regeneration.	Immediate.	2.13	Areas protected as per items 2.4, 2.5, 2.6, 2.9 & 2.10.	N/A	N/A
WATER QUALITY						
Inadequate flushing of Deadwater	VETWG to define water quality objectives, targets and management.	1-3 Years.	2.14	As determined within Vasse-Wonnerup Estuary Management Plan.	N/A	VETWG
MONITORING						
(These areas are not marked on the maps).	Increase surveillance, Monitoring & Education	Immediate.	2.15	Optimise surveillance during the first summer after beach closure to record beach users and frequency of unauthorised access. Visits to occur at least twice weekly with weekend visits occurring on a monthly basis.	N/A	CoB - Planning (Rangers)
		1-3 Years.	2.16	Increase surveillance, if required commensurate with frequency of unauthorised ORV access/vandalism identified through monitoring.	N/A	CoB - Planning (Rangers)

Figure 6-2 Node 2 Action Plan: Lot 38, Forrest Beach Road



6.3. Node 3 Action Plan: Reserve 39193, Forrest Beach Road – Deadwater

6.3.1. Management Considerations

Node 3 is currently frequented by fishers, (both recreational and commercial) and horse riders. As with Node 2, the Deadwater is a popular fishing spot for recreational anglers. The beach extends from Node 1 and Node 2, and is one of two remaining beaches in the CoB where horse-riding is permitted. As with Nodes 1 and 2, this beach has also been historically accessed by ORV. However, ORV use on this beach is prohibited (Shire of Busselton, 2010). Access to the Deadwater in Node 3, is via several ORV access tracks that run through private property. These tracks are to be closed to ORV with pull-off parking available to allow pedestrian access along these tracks to the Deadwater. There is also a small carpark area at the confluence of the Deadwater with the Vasse-Wonnerup Estuary, this carpark requires some minimal improvement works including future resurfacing to manage drainage around the Estuary and improve aesthetics.

In brief, the management strategy for Node 3 is to close the ORV access through private property and upgrade for pedestrian access only, and to make some minor improvements to the carpark at the Deadwater confluence.

6.3.2. Actions

Key actions to be implemented for Node 3 (Reserve 39193, Forrest Beach Road – Deadwater) are listed in **Table 6-3** and presented on **Figure 6-3**.

Table 6-3 Node 3 Action Plan: Reserve 39193, Forrest Beach Road – Deadwater

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
ACCESS & AMENITIES						
ORV using tracks to access lagoon for fishing. Limited ranger presence. ORV damage to wetland vegetation. Littering. ORV cause damage to dunes during high tide. Vandalism.	AP8 & AP9: Close off all accesses to ORV. Pedestrian access only.	Immediate.	3.1	Install educational signage at the 3 access points AP8, AP9 and AP10 (littering and ORV access).	$600	CoB – Environment
			3.2	Install large rocks to prevent ORV, but allow for pedestrian access at AP8 & AP9. Include carpark pull-in area along road verge.	N/A	CoB – Engineering & Works
	AP10: Manage carpark area.	Immediate.	3.3	Install rubbish bin.	$300	CoB – Engineering & Works
			3.4	Install directional and interpretative signage at the car park. Update Water Quality Signage at carpark.	$500	CoB – Environment
		3-5 Years.	3.5	Resurface carpark using crushed limestone as required.	$10,000	CoB – Engineering & Works

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
	WT1: Enhance pedestrian experience. Direct pedestrians around estuary mouth.	1-3 Years.	3.6	Install low visual impact interpretative signage along the walk trail (WT1).	$1,000	CoB - Environment
BIODIVERSITY						
Weeds around carparks and along pedestrian access tracks. Dune blowouts caused by ORV access.	Targeted weed spraying.	Immediate.	3.7	Targeted weed spraying around carpark and pedestrian access points.	$500	CoB – Parks & Gardens
	Brushing to stabilise dune blowout.	1-3 Years.	3.8	Install brushing to stabilise dune blowout. (RA5)	$200	CoB - Environment
WATER QUALITY						
Inadequate flushing of Deadwater.	VETWG to define water quality objectives, targets and management.	1-3 Years.	3.9	As determined within Vasse-Wonnerup Estuary Management Plan.	N/A	VETWG
MONITORING						
(These areas are not marked on the maps).	Increase surveillance, Monitoring & Education	Immediate.	3.10	Optimise surveillance during the first summer after beach closure to record beach users and frequency of unauthorised access. Visits to occur at least twice weekly with weekend visits occurring on a monthly basis.	N/A	CoB - Planning (Rangers)
		1-3 Years.	3.11	Increase surveillance, if required commensurate with frequency of unauthorised ORV access/vandalism identified through monitoring.	N/A	CoB - Planning (Rangers)

Figure 6-3 Node 3 Action Plan: Reserve 39193, Forrest Beach Road – Deadwater

6.4. Node 4: Lesueur Reserve, Layman Road – Estuary Mouth

6.4.1. Management Considerations

Node 4 is currently frequented by fishers, (both recreational and commercial), individuals walking their dogs and families recreating on the beach. The beach at Node 4 is the last remaining beach within the CoB where ORV access is permitted. However, frequent incursions of ORV access into the dune areas within Node 4 is resulting in dune disturbance and damage to city infrastructure (i.e. fences, signs, etc.). Despite evidence of damage to dune vegetation from ORV use in this area, the access on/off the beach and around the dune areas is not well signposted or well defined. Furthermore, the beach in this area is not showing any evidence of erosion and so is currently considered to be of sufficient width to allow sustainable ORV use. To facilitate sustainable, continued ORV access to the beach at Node 4 (and including Node 5), a three (3) stage approach has been proposed. This includes:

- **Stage 1 - ORV permitted between Boat Ramp and Estuary mouth.** Improve car park facilities, formalise and rationalise beach access. Improve behaviour of key user groups through education and signage. Undertake seasonal beach closures to ORV as required. Commence monitoring to assess community behaviour and ORV beach use;
- **Stage 2 - Monitor condition of tracks, infrastructure and public behaviour.** If required, upgrade prevention measures (i.e. fencing, surveillance) to eliminate further incursions. Continue monitoring community behaviour; and
- **Stage 3 (If required) – Close beach access for ORV.** Closure of the beach would be determined based on frequency of incursions to dune areas and extent of damage caused by ORV. If closure is required, then it is recommended that a road will be installed from Lesueur Reserve carpark to the Estuary mouth and a carpark is installed at the Estuary mouth to allow continued access to the beach in this area for recreational fishing purposes.

Essentially, the ORV users must improve their behaviour in this area; otherwise ORV access to this beach should be closed.

Node 4 also includes area of high ecological value with TEC vegetation present along the shore of the Vasse-Wonnerup Estuary. A number of revegetation measures are also proposed to improve the natural and aesthetic values of this area.

6.4.2. Actions

Key actions to be implemented for Node 4 (Lesueur Reserve, Layman Road – Estuary Mouth) are listed in **Table 6-4** and presented on **Figure 6-4**.

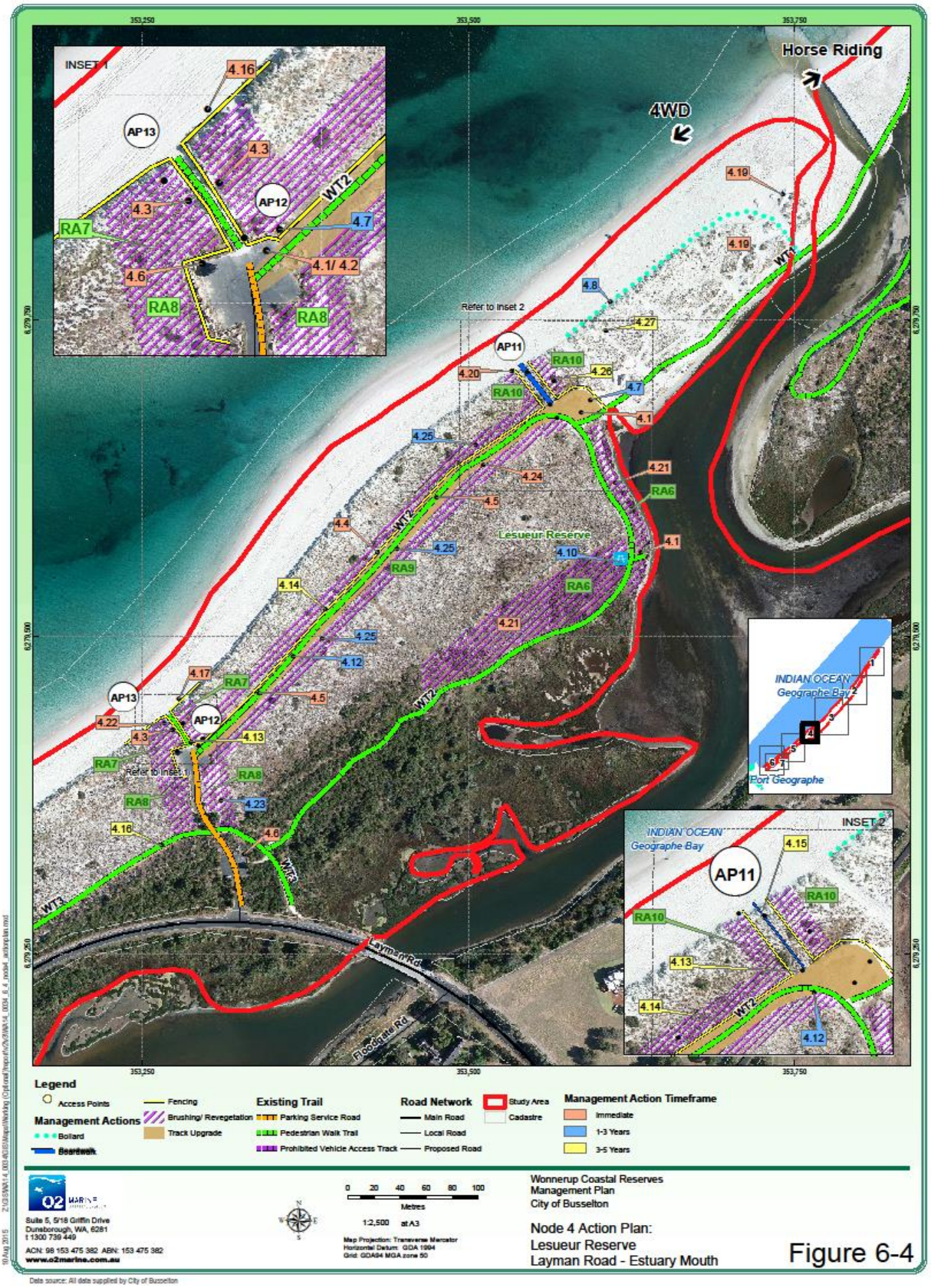
Table 6-4 Node 4 Action Plan: Lesueur Reserve, Layman Road – Estuary Mouth

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
ACCESS & AMENITIES						
Car park in poor condition. Rocks poorly placed, feel 'out of place'. Insufficient surveillance and monitoring. Area feels remote and poorly maintained, leading to anti-social behaviours. Old and damaged fences along car park and tracks. Unauthorised ORV on pedestrian tracks. Insufficient / Inadequate signage. Hooning and vandalism at car park. Littering. Unauthorised camping.	Stage 1: Improve car park facilities, formalise and rationalise beach access. ORV permitted between Boat Ramp and River Mouth. Monitoring.	Immediate.	4.1	Install interpretive signage at coastal dune entry points near estuary mouth at AP11, 12, 13 and WT2 and as per map. Upgrade existing signs where possible.	$4000	CoB – Environment
			4.2	Install directional signage for the entire area at car park.	$300	CoB – Engineering & Works
			4.3	Formalise pedestrian AP13 with fencing.	$3,000	CoB – Engineering & Works
			4.4	Repair existing fence along WT2.	$1,000	CoB – Engineering & Works
			4.5	Upgrade WT2 to include crushed limestone path. Ensure western portion of WT2 wide enough for service vehicles to access mouth area.	$30,000	CoB – Engineering & Works
			4.6	Install vandal resistant rubbish bins at both car parks.	$300	CoB – Engineering & Works
	Stage 2: Monitor condition of tracks and public behaviour. Identify appropriate timing for complete closure if required through monitoring.	1-3 Years.	4.7	Install remote camera at eastern carpark to monitor unauthorised ORV access / vandalism.	$1,500	CoB – Engineering & Works
			4.8	Install physical barriers i.e. bollards/fencing in dune areas to prevent access.	$2,000	CoB – Engineering & Works
			4.9	If required, upgrade AP11, AP12, AP13 and WT2 & WT3 entry points with heavy duty fencing and dog-leg style access to prevent unauthorised motorbike/quad access.	$30,000	CoB – Engineering & Works
			4.10	Install Picnic Area along WT2 near viewing platform.	$20,000	CoB – Engineering & Works

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
			4.11	Undertake community consultation (for whole area) to determine community views on beach closure if required due to unauthorised access / vandalism.	N/A	CoB – Environment
			4.12	Install road from most eastern carpark to estuary along current access track and install carpark adjacent to estuary at AP11.	$40,000	CoB – Engineering & Works
	Stage 3: Close beach to ORV.	3-5 Years.	4.13	Upgrade signage to define new (pedestrian) access areas.	$300	CoB – Engineering & Works
			4.14	If required, upgrade/ replace fencing along new road to prevent unauthorised ORV access to dune areas.	$10,000	CoB – Engineering & Works
			4.15	Install boardwalk through dunes from new carpark at AP11 to estuary mouth with a lookout and interpretative signage.	$40,000	CoB – Engineering & Works
			4.16	Future upgrade of WT3 to dual use pedestrian/cycle path as required in accordance with the CoB Bike Plan (Consulting Civil & Traffic Engineers, Risk Managers, 2010). Consider whether paving of WT3 is required as per the CoB Bike Plan.	N/A	CoB – Engineering & Works
BIODIVERSITY						
Damage to nesting bird habitat from unauthorised ORV access to dune areas and dogs off-leash in dune areas. Dune destabilisation. Loss of biodiversity. Weeds.	Protect native vegetation through fencing, revegetation planting and targeted weed spraying.	Immediate.	4.17	Install educational signage 'dog on-leash' during nesting season' at AP11 car park. Install signs along walking trails.	$200	CoB – Environment
			4.18	Allow natural regeneration of river mouth area through protection by installing bollards. Requires deep installation (i.e. >1m depth)	$2,000	CoB – Engineering & Works
			4.19	Delineate a turning area with bollards at river mouth and install directional signage. Bollards will be removed once beach is completely closed to ORV.	$2,000	CoB – Engineering & Works
			4.20	Existing fence along AP11 to be repaired.	$8,000	CoB – Engineering & Works
			4.21	Revegetation planting along estuary foreshore and WT2 (RA6).	$12,360	CoB - Environment
			4.22	Revegetation planting and brushing along fence at AP13 (RA7)	$2,160	CoB - Environment

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
			4.23	Revegetation planting around carpark area including in between existing boulders. (RA8)	$4,200	CoB - Environment
			4.24	Targeted weed spraying along WT2.	$1,000	CoB – Parks& Gardens
		1-3 years.	4.25	Revegetation planting along WT2 western portion (RA9).	$15,320	CoB - Environment
		3-5 years.	4.26	Revegetation planting along boardwalk. (RA10).	$1,460	CoB - Environment
			4.27	If new fenced off area at river mouth is not stabilised and natural regeneration doesn't occur then brushing and seeding is recommended.	$1,000	CoB - Environment
MONITORING						
(These areas are not marked on the maps).	Increase surveillance & monitoring.	Immediate.	4.28	Optimise surveillance during the first summer after beach closure to record beach users and frequency of unauthorised access. Visits to occur at least twice weekly with weekend visits occurring on a monthly basis.	N/A	CoB - Planning (Rangers)
		1-3 Years.	4.29	Increase surveillance, if required commensurate with frequency of unauthorised ORV access/vandalism identified through monitoring.	N/A	CoB - Planning (Rangers)
			4.30	Consider pilot 'Community Ranger' project. Similar to 'Preston Beach Community Rangers'.	N/A	CoB - Planning (Rangers)
	Educate User Groups	Immediate.	4.31	Commercial fishers to develop beach access code of conduct.	N/A	CoB – Environment
			4.32	Local 4wd club to develop ORV beach code of conduct for beach signage.	N/A	CoB – Environment

Figure 6-4 Node 4 Action Plan: Lesueur Reserve, Layman Road – Estuary Mouth



6.5. Node 5: Wunda Buri Reserve, Layman Road – Boat Ramp

6.5.1. Management Considerations

Similar to Node 4, Node 5 is frequented by fishers, (both recreational and commercial), individuals walking their dogs and families recreating on the beach. Node 5 also allows for beach launching of small vessels and provides toilet facilities. However, at Node 5, ORV access to the beach west of the boat ramp is not currently, nor has it previously been, permitted (Shire of Busselton, 2010).. Furthermore, the beach west of the boat ramp is under threat from coastal erosion and is not of sufficient width to allow sustainable ORV use. Competing beach uses in Node 5 are considered to pose a threat to public safety and are also adversely affecting the biodiversity values of the area.

As with Node 4, a three (3) stage approach to potential future closure of the beach is recommended to allow sustained continued ORV access to the beach east of the boat ramp. However, it is recommended that the closure of the beach west of the boat ramp is reinforced and is applied to all ORV, including those operated by commercial fishers to protect this area from further erosion. Upgrade and formalisation of pedestrian access in Node 5 is also recommended to enhance the functional and aesthetic value of the area. Several target areas for revegetation are also proposed to enhance biodiversity and stabilise the dune system.

6.5.2. Actions

Key actions to be implemented for Node 5 (Wunda Buri Reserve, Layman Road – Boat Ramp) are listed in **Table 6-5** and presented on **Figure 6-5**.

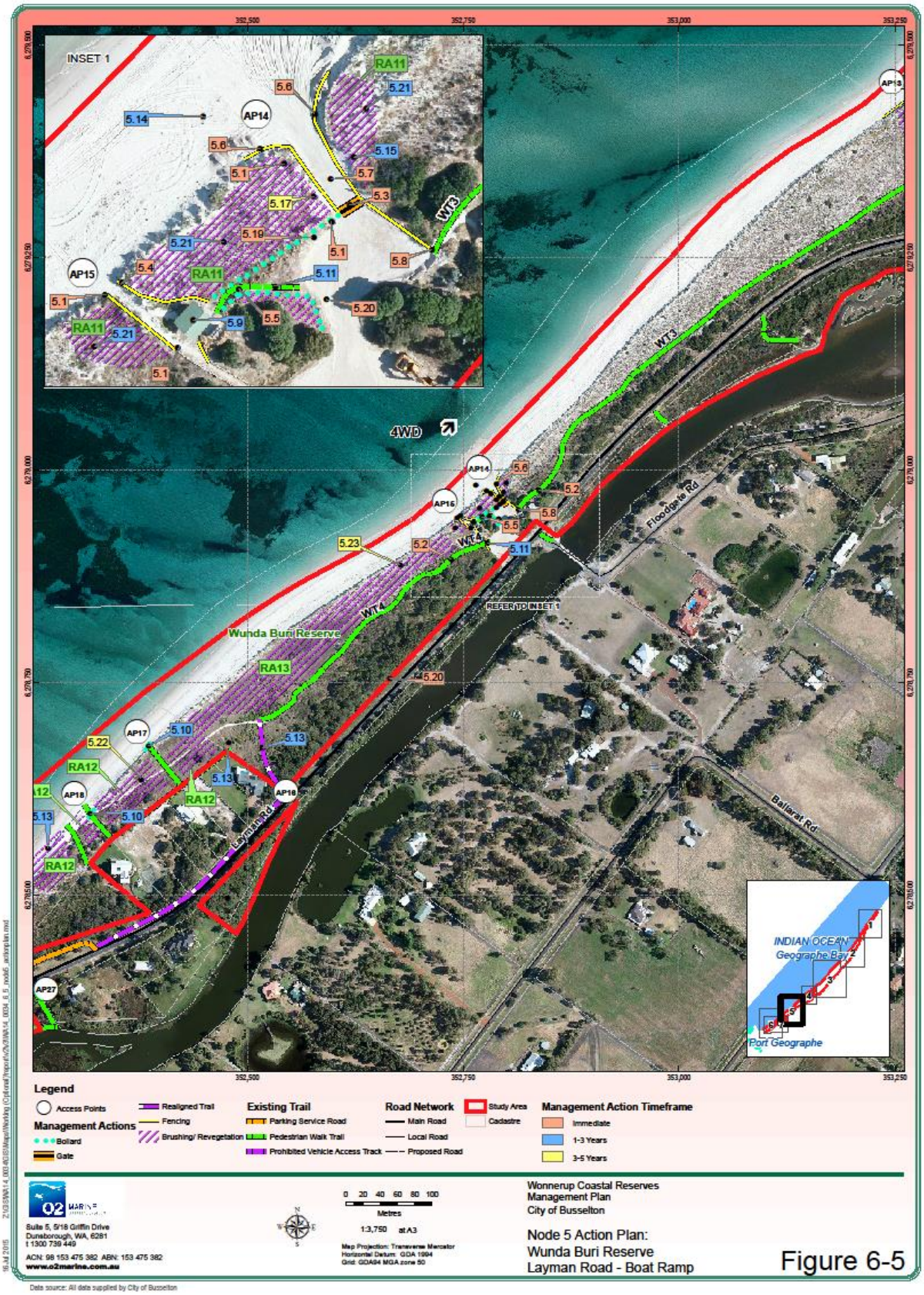
Table 6-5 Node 5 Action Plan: Wunda Buri Reserve, Layman Road – Boat Ramp

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
ACCESS & AMENITIES						
Pedestrian access needs to be formalised. Rocks poorly placed, feel 'out of place'. Insufficient monitoring & surveillance. Unauthorised ORV west of boat ramp entrance. Inadequate signage.	Stage 1: Rationalise and on-going monitoring of ORV access at boat ramp. Closure to commercial fishers from Boat Ramp to Port Geographe.	Immediate.	5.1	Install interpretive /educational/directional signage at Boat Ramp (AP14, AP15); replace existing ones at car park and at beach entrance. Install directional signage to allow ORV access to the east.	$1,200	CoB – Environment
			5.2	Install interpretative signage along WT3 and WT4.	$1,000	CoB – Environment
			5.3	Install access gate at boat ramp (AP14) so that beach can be closed during periods of extreme high tides/storm surge or seasonally if required to manage erosion.	$1,000	CoB – Engineering & Works

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
Littering. Existing shelter is dated and needs maintenance. Path from car park to shelter needs upgrading. Car park area needs upgrading.			5.4	Formalise pedestrian access (AP15) by extending fencing and install signage.	$1,100	CoB – Engineering & Works
			5.5	Remove rocks currently located on dunes to prevent ORV driving on dunes and replace with bollards.	N/A	CoB – Engineering & Works
			5.6	Fence boat ramp to base of foredunes.	$1,000	CoB – Engineering & Works
			5.7	Install vehicle counter at boat ramp beach access to determine use volumes.	$1,500	CoB – Engineering & Works
			5.8	Install stairs on track to toilets from car park.	$3,000	CoB – Engineering & Works
	Stage 2: Monitor condition of tracks/accesses and public behaviour. Identify appropriate timing for complete closure through monitoring.	1-3 Years.	5.9	Replace shelter at the end of its lifespan.	$25,000	CoB – Engineering & Works
			5.10	Install physical barriers i.e. bollards/fencing in dune areas to prevent ORV using AP17 and AP18 from the beach.	$400	CoB – Engineering & Works
			5.11	Upgrade path from car park to shelter. Plant trees to provide wind protection.	$500	CoB – Environment / Parks & Gardens
			5.12	If required, upgrade entrance to pedestrian access point (WT4) from car park with dog-leg style access to prevent unauthorised motorbike/quad access to WT4	$200	CoB – Engineering & Works
			5.13	Re-align walk trail and extend WT4 path along Layman Road. Close off track WT4 on the beach side.	$50,000	CoB – Engineering & Works
			5.14	If required, install large rocks on beach left of AP14 to prevent ORV turning left as from AP14.	N/A	CoB – Engineering & Works
			5.15	Install remote camera at carpark to monitor unauthorised ORV access / vandalism.	$2,000	CoB – Engineering & Works
			5.16	Undertake community consultation to determine community views on beach closure if required due to unauthorised access / vandalism.	$5,000	CoB – Environment
	Stage 3: Close off	3-5 Years	5.17	Upgrade signage to advise changes to beach access.	$300	CoB – Engineering

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
	beach access to ORV.					& Works
			5.18	Change bylaws regarding ORV beach access to close all areas/accesses.	N/A	CoB – Planning
BIODIVERSITY						
Damage to nesting bird habitat. Dune destabilisation. Loss of biodiversity. Weeds.	Protect native vegetation through fencing and removal of weeds.	Immediate.	5.19	Plant feature trees on beach side of car park. (RA11).	$500	CoB – Environment
			5.20	Weed spraying along road verge and around carpark edges.	$1,000	CoB – Parks & Gardens
		1-3 Years	5.21	Brushing and revegetation in areas either sides of the boat ramp and adjacent to the picnic area. (RA11).	$2,120	CoB – Environment
		3-5 Years	5.22	Brushing and revegetation along WT4 after track closure. (RA12)	$16,160	CoB – Environment
			5.23	Brushing in foredune, beachside of WT4 near Carpark. (RA13)	$1,200	CoB – Environment
MONITORING						
(These areas are not marked on the maps).	Increase surveillance & monitoring.	Immediate.	5.24	Optimise surveillance during the first summer after beach closure to record beach users and frequency of unauthorised access. Visits to occur at least twice weekly with weekend visits occurring on a monthly basis.	N/A	CoB - Planning (Rangers)
		1-3 Years.	5.25	Increase surveillance, if required commensurate with frequency of unauthorised ORV access/vandalism identified through monitoring.	N/A	CoB - Planning (Rangers)
			5.26	Consider pilot 'Community Ranger' project. Similar to 'Preston Beach Community Rangers'.	N/A	CoB - Planning (Rangers)
	Educate User Groups	Immediate.	5.27	Commercial fishers to develop beach access code of conduct.	N/A	CoB – Environment
			5.28	Local 4wd club to develop ORV beach code of conduct for beach signage.	N/A	CoB – Environment

Figure 6-5 Node 5 Action Plan: Wunda Buri Reserve, Layman Road – Boat Ramp



6.6. Node 6: Foreshore Reserve, Layman Road

6.6.1. Management Considerations

Node 6 is frequented by local residents from both Wonnerup and Port Geographe, and is utilised for beach walking, dog walking and general beach recreation. The area is also a popular fishing spot for commercial fishing operators.

The beach within Node 5 is known to be susceptible to erosion and has undergone many changes in recent years as a result of the adjacent Port Geographe development. However, the coastal processes in this area are being closely monitored by the Department of Transport through the implementation of the Port Geographe Environmental Monitoring and Management Plan (DoT, 2015). In addition, this stretch of beach is also being monitored as part of the CoB Coastal Management Program. Given that these programs are already underway, no further recommendations have been made to manage coastal erosion in this area.

Furthermore, given the potential for future maintenance works on this beach, the recommendation included in this plan are focused on formalising the pedestrian and maintenance vehicle access to the beach and preventing ORV access. Recommendations are also made to improve public safety in the vicinity of the council sump that is located within Node 6.

6.6.2. Actions

Key actions to be implemented for Node 6 (Foreshore Reserve, Layman Road) are listed in **Table 6-6** and presented on **Figure 6-6**.

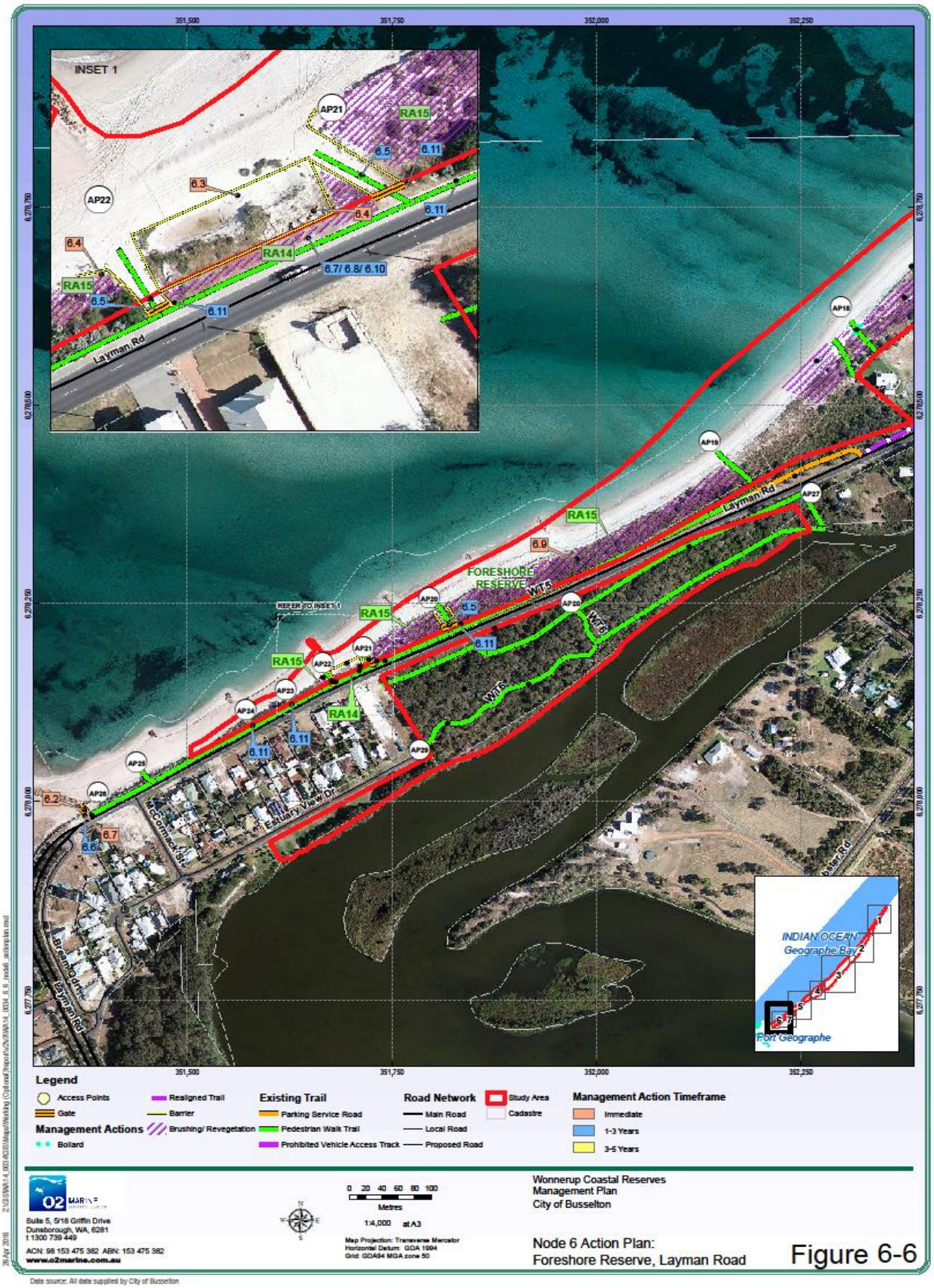
Table 6-6 Node 6 Action Plan: Foreshore Reserve, Layman Road

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
TENURE & VESTING						
UCL on beach side of Layman Road requires vesting with City of Busselton to enable management	Portion of UCL to be Vested with the City of Busselton.	Immediate.	6.1	City of Busselton to apply to the State for UCL to be Vested with the City of Busselton.	N/A	CoB – Planning
ACCESS & AMENITIES						
Unauthorised ORV, motorbike and quad bike access is common (anecdotally). Insufficient monitoring & surveillance. Beach erosion adjacent to	Beach for pedestrian use only. Beach closed to commercial fishers. ORV beach access only for DoT and CoB	Immediate.	6.2	Install directional signage at AP26.	$300	CoB – Engineering & Works
			6.3	Install a barrier around CoB sump area to prevent public access to sump area and along other side. AP22.	$5,000	CoB – Engineering & Works
			6.4	Once barrier installed, remove rocks at CoB sump for use in other areas (as recommended for Node 2).	N/A	CoB – Engineering & Works

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
residences on the North side of Layman road. ORV causing damage to dune vegetation and exacerbating erosion. Council sump area poses safety risk with soft edges and deep (>2m depth) water during winter. ORV access to beach is required for maintenance.	maintenance works.	1-3 Years.	6.5	Install gate and bollard entry for pedestrians at AP20 & AP21 formalise access with crushed limestone to manage weeds and unauthorised access. Remove existing rocks. Provide key to DOT.	$3,000	CoB – Engineering & Works
			6.6	Install gate and bollard entry for pedestrians at AP26. Provide key to DoT.	$1,500	CoB – Engineering & Works
			6.7	Install remote cameras at AP26 and at CoB sump to monitor unauthorised ORV access / vandalism.	$2,000	CoB – Engineering & Works
BIODIVERSITY						
Coastal erosion and unauthorised ORV traffic causing loss of dune vegetation. Weeds. Damage to nesting bird habitat caused by unauthorised ORV access during nesting season.	Enhance natural dune and foreshore vegetation buffer through planting and targeted weed removal.	1-3 Years.	6.8	Revegetation planting (with low shrubs) on the road side of CoB sump area. Access should be maintained to Beach side of sump (RA14).	$280	CoB – Environment
			6.9	Revegetation planting in the foredune from A19 to AP21 and including around AP20. (RA15)	$25,720	CoB – Environment
			6.10	Targeted weed spraying along road verge and around CoB sump.		CoB – Parks & Gardens
			6.11	Install interpretative signage at all Access points to explain importance of stay off dunes to protect bird nesting, fragile ecosystems and minimise coastal erosion.	$1,500	CoB – Environment
		3-5 Years.	6.12	Further widening coastal dunes vegetation through brushing and revegetation planting if beach is stabilised and accretes.	N/A	CoB – Environment
MONITORING						
(These areas are not marked on the maps).	Increase surveillance & monitoring.	Immediate.	6.13	Optimise surveillance during the first summer after beach closure to record beach users and frequency of unauthorised access. Visits to occur at least twice weekly with weekend visits occurring on a monthly basis.	N/A	CoB - Planning (Rangers)
		1-3 Years.	6.14	Increase surveillance, if required commensurate with frequency of unauthorised ORV access/vandalism identified through monitoring.	N/A	CoB - Planning (Rangers)

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
			6.15	Consider pilot 'Community Ranger' project. Similar to 'Preston Beach Community Rangers'.	N/A	CoB - Planning (Rangers)
	Educate User Groups	Immediate.	6.16	Notify Commercial fisherman of changes to vehicle access areas.	N/A	CoB – Environment

Figure 6-6 Node 6 Action Plan: Foreshore Reserve, Layman Road



6.7. Node 7: Captain Baudin Reserve, Layman Road

6.7.1. Management Considerations

Node 7 is frequented by local resident's utilising the area for bush walking and/or walking their dogs along the bushland walk trails. The area provides very important habitat for Western Ringtail Possum and there is anecdotal evidence of feral cats and foxes preying on possums in this area. The reserve is also moderately impacted by weeds with the majority of weed encroachment being confined to walk trails and along the road verge.

The management strategy for Node 7 is focussed on better protecting the biodiversity values of this reserve through targeted feral animal control and weed management. Recommendations are also made regarding upgrade of the walking trails.

6.7.2. Actions

Key actions to be implemented for Node 7 (Captain Baudin Reserve, Layman Road) are listed in **Table 6-7** and presented on **Figure 6-7**.

Table 6-7 Node 7 Action Plan: Captain Baudin Reserve, Layman Road

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
TENURE & VESTING						
AP27 to CBR Eastern end is via road reserve.	Portion of road reserve to be Vested with the City of Busselton.	Immediate.	7.1	City of Busselton to apply to the State for portion of Road Reserve to be Vested with the City of Busselton to include access AP27.	N/A	CoB - Planning
ACCESS AND AMENITIES						
Inadequate signage. Public safety concerns (crime). Vandalism.	Upgrade CBR access/tracks and signage.	1-3 Years	7.2	Upgrade AP27 and AP28. Use crushed limestone and bollards to formalise. Include lockable/removable bollards for maintenance vehicle access.	$5,000	CoB – Engineering & Works
			7.3	Install directional/interpretative signage along WT6 and at Carpark on Layman Road and at AP28 & 29.	$1,200	CoB – Environment
			7.4	Repair damaged fencing along road reserve.	$1,000	CoB – Engineering & Works
			7.5	Upgrade WT6 with crushed limestone and eliminate where possible blind corners through pruning and install appropriate site drainage along path.	$5,000	CoB – Engineering & Works

MANAGEMENT ISSUE	STRATEGY	TIMEFRAME	ACTIONS		COST	RESPONSIBILITY
BIODIVERSITY						
Weeds. Feral animals (cats and foxes).	Protection of native flora and fauna through weed and feral animal control.	Immediate.	7.6	Implement intensive fox/cat trapping program. During spring/summer. Involve community group in monitoring program as per Item 7.8.	$3,000	CoB - Environment
		1-3 Years.	7.7	Targeted weed spraying along road reserve, WT6 and at AP27, 28 & 29.	$2,000	CoB - Environment
CULTURAL						
Plant species unique to the area have been identified as Culturally significant to the aboriginal community. Such species need to be protected.	Conservation and protection of biodiversity and cultural values	2-4 years	7.9	**It is recommended** that plant species customarily used for cultural purposes, such as the Yellow Quandong (*Santalum acuminatum*), (located within the western portion of the Captain Baudin Reserve near the James Richardson Park in Node 7), should be specifically protected from clearing and seeds or cuttings from these plants be harvested and included in revegetation plans.	$1500.oo	COB in consultation with aboriginal community and DPaW, local nurseries
			7.10	**It is recommended** that the WCRMP recognises Noongar connection to country and the Traditional Owners by raising public awareness through interpretative signage stating 'Entering Aboriginal Reserves' that are placed at the entrances to the WCRMP.		
MONITORING						
(These areas are not marked on the maps).	Community Monitoring	1-3 Years.	7.8	Establish friends of CBR to monitor track condition (i.e. weeds, pruning, presence of feral animals, etc) and determine when works required.	N/A	CoB – Environment

Figure 6-7 Node 7 Action Plan: Captain Baudin Reserve, Layman Road

7. Implementation

The successful implementation of the WCRMP requires an effective governance process in place. Recommendations regarding governance structure and implementation mechanisms and tools are outlined below.

7.1. Facilitation & Implementation Role

Assign to a department, staff, or a Steering Group the facilitation role for the implementation of the Plan and delivery of the management actions. The person/group will be responsible for:

- Defining roles and responsibilities of the relevant City departments for the implementation of management actions.
- Developing an implementation strategy in consultation with key staff and executives;
- Driving the delivery of the management actions and projects as recommended in the Plan;
- Monitoring progress and quality of actions and projects in line with the Plan aims, objectives and desired outcomes;
- Undertaking periodic review of the Plan aims, objectives and desired outcomes as implementation takes place; and
- Developing effective communication channels to seek advice and direction in relation to the implementation of the Plan within the City and with key stakeholders and government bodies as required.

7.2. Implementation Strategy

It is recommended that a works Implementation Strategy is developed based on the recommendations provided in the Plan. The Implementation Strategy should outline the pprioritisation of works, including the actions to be undertaken, when and by whom.

7.2.1. Funding Sources

Identification of funding resources (Internal and External) is a critical factor in the successful implementation of the Plan. Internal budget planning should allocate funding through relevant departments (i.e. Planning, Environment, Infrastructure, etc.).

Externally, there are a number opportunities to source funds for management of public reserves. **Table 7-1** provides a summary of funding opportunities for coastal on-ground works projects.

Table 7-1 External Funding Sources

Funding source	Size project	Eligible activities
Coastwest (DoP)	$5,000-$50,000	Available annually for on-ground coastal restoration works, funding staff position, signage, education programs, further community consultation, weed control, fauna and flora surveys, monitoring projects. Applications open around May every year and must be completed in 12 months. A combination of financial resources and in-kind support providing a project funding ratio of 1:1, Coastwest grant dollar to applicant dollar is required. Applications are looked upon favorably if there is a strong community engagement/involvement through in kind support.
SWCC Devolved Grants	Up to $20,000	Applications close in November. Eligible projects: Community development, project development and implementation, information delivery and improved access to information and more.
Trail Grants	Up to $25,000	The Department of Sport and Recreation (DSR) and Lotterywest offers Trails Grants for incorporated not-for-profit organisations and local government authorities. Grants are available under the following categories: • Trail planning. • Trail construction. • Upgrades to existing trails. • Promotion and marketing. Applications for these grants are open throughout the year, with no matched funding required. However, trail maintenance is not eligible under this program.
Australian Bird Environment Foundation (ABEF) Grant Funds	Up to $5,000.	The ABEF provides grants to support practical, on ground, conservation activities as part of our endeavours to counter the constant threat to Australia's birds from vegetation clearance, habitat degradation and competition from invading species. Grants have supported projects of three types: • Practical conservation such as native plantings for revegetation and fencing of remnant vegetation; • Research and survey of the needs of Australian birds and their habitats; and • Public education such as provision of information brochures, signage, posters, educational programs in schools and school-based projects which promote habitat restoration and awareness of birds by students.

7.2.2. Community Involvement

Community support and involvement is vital to ensure beach users and the local community are familiar with any proposed changes and to engender a degree of local ownership over management issues.

Successful implementation of the WCRMP will require close liaison with, and co-operation of community / user groups, particularly Coastcare, recreational and commercial fishers, and ORV groups. Implementation should build on existing relationships between the CoB, SWCC, PNP, Geocatch and other community groups operating in the area. A summary of these key relations are provided in **Table 7-2.**

Table 7-2 Community Involvement Opportunities

Management Action	Community Group
Planting and rehabilitation works.	GeoCatch, Coastcare groups, user-groups, community nursery, local residents, schools.
Community Beach Monitoring.	Coastcare groups, user groups, university students and schools.
Education	Commercial & Recreational Fishers – e.g. local fishing club, Facebook groups. Horse-riding clubs. ORV Groups
Aboriginal Groups and individuals	Consider opportunities for individuals and groups to be involved with interpretation, signage, and appropriate cultural awareness activities in the area where possible.

7.3. Monitoring and Evaluation

In order to effectively assess the progress and success of the WCRMP actions and projects, a monitoring and evaluation process should be implemented. The aim of the monitoring and evaluation phase will enable the CoB to:

- Oversee the performance measurement of the actions and projects in line with the WCRMP aims, objectives and desired outcomes;
- Evaluate effectiveness of management actions;
- Review strategic advice and direction in relation to the implementation of the Plan; and
- Provide valuable information to executives and Council.

To ensure effective implementation of this plan it is recommended that the project be evaluated at least bi-annually.

The Western Australian Department of Planning provides advice on project monitoring and evaluation within the Coastal Planning and Management Manual: Chapter 5 – Evaluation. This document is available online at:
http://www.planning.wa.gov.au/dop_pub_pdf/5_Project_Evaluation.pdf

The Australian Government National Landcare Program: Caring for our Country also provides example Monitoring, Evaluation, Reporting and Improvement (MERI) Plan templates to assist in monitoring and evaluating project performance. These are available online at:

http://www.nrm.gov.au/my-project/monitoring-and-reporting-plan/meri

Reporting and reviewing, otherwise known as adaptive management, provides the ability to alter actions within the plan when monitoring results indicate that changes may be beneficial. Include a defined term for the plan to run, which could be between five and ten years. After this period, the WCRMP management measures, their effectiveness and implementation should be reviewed. The program to revise the Management Plan needs to take account of changing circumstances (e.g. responsible authorities, zoning, new issues for management such as fracking or climate change) and should be conducted in the light of the monitoring results and comprehensive public consultation. Alterations to the Management Plan need to be submitted to the CoB for approval.

8. References

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Thackway R. and Cresswell I. (1995). An Interim Biogeographic Regionalisation for Australia (IBRA): A Framework for Establishing the National System of Reserves. Canberra.

WAPC, 2013, State Planning Policy No. 2.6 State Coastal Plannning Policy, Government Gazette. Western Australia Planning Commission, Western Australia.

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WAPC, 2013, State Coastal Planning Policy Guidelines, Government Gazette. Western Australia Planning Commission, Western Australia.

Webb A., Keighery B., Keighery G., Longman V., Black A. & O'Connor A. (2009). The Flora and Vegetation of the Busselton Plain (Swan Coastal Plain). A report for the Department of Environment and Conservation as part of the Swan Bioplan Project. pp 336.

Appendix A EPBC Protected Matters Search Tool Report (DOTE, 2015)

Australian Government
Department of the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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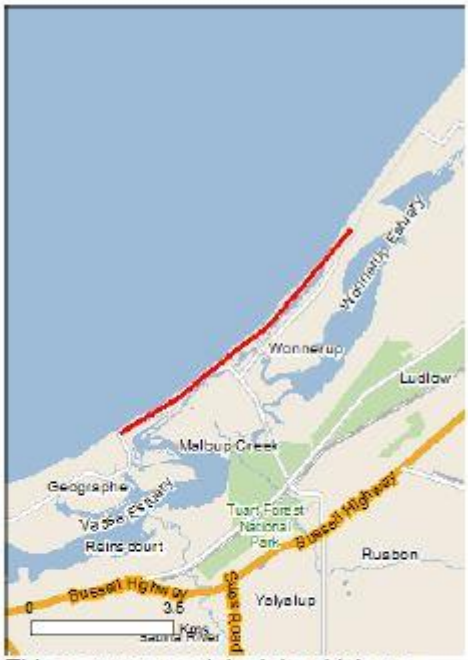

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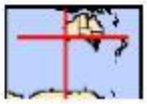

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	39
Listed Migratory Species:	42

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage/index.html

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	63
Whales and Other Cetaceans:	13
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	3
Regional Forest Agreements:	None
Invasive Species:	24
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Vasse-wonnerup system	Within Ramsar site

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat may occur within area
Calyptorhynchus baudinii Baudin's Black-Cockatoo, Long-billed Black-Cockatoo [769]	Vulnerable	Breeding known to occur within area
Calyptorhynchus latirostris Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
Diomedea epomophora epomophora Southern Royal Albatross [25996]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora sanfordi Northern Royal Albatross [82331]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans amsterdamensis Amsterdam Albatross [82330]	Endangered	Species or species habitat may occur within area
Diomedea exulans exulans Tristan Albatross [82337]	Endangered	Species or species habitat may occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding likely to occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris impavida Campbell Albatross [82449]	Vulnerable	Species or species habitat may occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Neophoca cinerea Australian Sea-lion [22]	Vulnerable	Species or species habitat may occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir [25911]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Banksia nivea subsp. uliginosa Swamp Honeypot [82766]	Endangered	Species or species habitat likely to occur within area
Banksia squarrosa subsp. argillacea Whicher Range Dryandra [82769]	Vulnerable	Species or species habitat may occur within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat likely to occur within area
Centrolepis caespitosa [6393]	Endangered	Species or species habitat may occur within area
Chamelaucium sp. C Coastal Plain (R.D.Royce 4872) Royce's Waxflower [86887]	Vulnerable	Species or species habitat likely to occur

Name	Status	Type of Presence within area
Diuris micrantha		
Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat may occur within area
Drakaea micrantha		
Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat may occur within area
Petrophile latericola		
Laterite Petrophile [64532]	Endangered	Species or species habitat may occur within area
Reptiles		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Sharks		
Carcharias taurus (west coast population)		
Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat known to occur within area
Carcharodon carcharias		
Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Diomedea amsterdamensis		
Amsterdam Albatross [64405]	Endangered*	Species or species habitat may occur within area
Diomedea dabbenena		
Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto)		
Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato)		
Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi		
Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Sterna anaethetus Bridled Tern [814]		Foraging, feeding or related behaviour likely to occur within area
Sterna caspia Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Pandion cristatus Eastern Osprey [82411]		Breeding known to occur within area
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered*	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Himantopus himantopus Black-winged Stilt [870]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area
Sterna anaethetus Bridled Tern [814]		Foraging, feeding or related behaviour likely to occur within area
Sterna caspia Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat likely to occur within area
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus subelongatus West Australian Seahorse [66722]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish [66276]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri New Zealand Fur-seal [20]		Species or species habitat may occur within area
Neophoca cinerea Australian Sea-lion [22]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Whales and other Cetaceans [Resource Information]

Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area

Name	Status	Type of Presence
Bos taurus		
Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris		
Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus		
Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer		
Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus		
House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus		
Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus		
Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa		
Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes		
Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides		
Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Brachiaria mutica		
Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris		
Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera		
Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera		
Boneseed [16905]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana		
Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum		
African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea		
Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata		
Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area

Name	Status	Type of Presence
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Nationally Important Wetlands [Resource Information]

Name	State
Vasse-Wonnerup Wetland System	WA

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.627964 115.396329,-33.621675 115.409118,-33.612812 115.421821,-33.60688 115.42843,-33.591365 115.446282,-33.591365 115.446111,-33.591365 115.446111

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix B *Naturebase* Search Report (DPAW, 2015)

NatureMap Species Report

Created By Guest user on 15/06/2015

Current Names Only Yes

Core Datasets Only Yes

Method 'By Line'

Vertices 33° 37' 41" S,115° 23' 48" E 33° 37' 41" S,115° 23' 48" E 33° 37' 27" S,115° 24' 20" E 33° 37' 27" S,115° 24' 20" E 33° 37' 04" S,115° 24' 55" E 33° 37' 04" S,115° 24' 55" E 33° 36' 28" S,115° 25' 43" E 33° 36' 28" S,115° 25' 43" E 33° 35' 36" S,115° 26' 39" E 33° 35' 36" S,115°

	Name ID	Species Name	Naturalised	Conservation Code	1Endemic To Query Area
1	3262	Acacia cochlearis (Rigid Wattle)			
2	3424	Acacia littorea			
3	24260	Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)			
4	24261	Acanthiza chrysorrhoa (Yellow-rumped Thornbill)			
5	42368	Acritoscincus trilineatus (Western Three-lined Skink)			
6	41323	Actitis hypoleucos (Common Sandpiper)		IA	
7.	190	*Alopecurus myosuroides (Slender Foxtail)*	Y		
8.	6565	*Alyxia buxifolia (Dysentery Bush)*			
9.	24310	*Anas castanea (Chestnut Teal)*			
10.	24312	*Anas gracilis (Grey Teal)*			
11.	24315	*Anas rhynchotis (Australasian Shoveler)*			
12.	24316	*Anas superciliosa (Pacific Black Duck)*			
13.	6949	*Anthocercis littorea (Yellow Tailflower)*			
14.	24561	*Anthochaera carunculata (Red Wattlebird)*			
15.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
16.	24285	*Aquila audax (Wedge-tailed Eagle)*			
17.	25558	*Ardea ibis (Cattle Egret)*		IA	
18.	41324	*Ardea modesta (Eastern Great Egret)*		IA	
19.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
20.	42108	*Austroparmelina labrosa*			
21.	24318	*Aythya australis (Hardhead)*			
22.	32204	*Banksia nivea subsp. uliginosa*		T	
23.	24162	*Bettongia penicillata subsp. ogilbyi (Woylie, Brush-tailed Bettong)*		T	
24.	24319	*Biziura lobata (Musk Duck)*			
25.	24345	*Botaurus poiciloptilus (Australasian Bittern)*		T	
26.	15579	*Caladenia chapmanii*			
27.	24779	*Calidris acuminata (Sharp-tailed Sandpiper)*		IA	
28.	24784	*Calidris ferruginea (Curlew Sandpiper)*		T	
29.	24788	*Calidris ruficollis (Red-necked Stint)*		IA	
30.	25335	*Caretta caretta (Loggerhead Turtle)*		T	
31.	43241	*Carex thecata*			
32.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
33.	27662	*Chrysothrix candelaris*			
34.	24833	*Cincloramphus cruralis (Brown Songlark)*			
35.	24288	*Circus approximans (Swamp Harrier)*			
36.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
37.	24399	*Columba livia (Domestic Pigeon)*	Y		
38.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
39.	25592	*Corvus coronoides (Australian Raven)*			
40.	25595	*Cracticus tibicen (Australian Magpie)*			
41.	25596	*Cracticus torquatus (Grey Butcherbird)*			
42.	3140	*Crassula glomerata*	Y		
43.	24322	*Cygnus atratus (Black Swan)*			
44.	3805	*Daviesia decurrens (Prickly Bitter-pea)*			
45.	25618	*Diomedea exulans (Wandering Albatross)*		T	
46.	4454	*Diplolaena dampieri (Southern Diplolaena)*			
47.	24651	*Eopsaltria australis subsp. griseogularis (Western Yellow Robin)*			
48.	24567	*Epthianura albifrons (White-fronted Chat)*			
49.	24379	*Erythrogonys cinctus (Red-kneed Dotterel)*			
50.	5625	*Eucalyptus diversicolor (Karri)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
51.	10765	*Exocarpos sparteus (Broom Ballart, Djuk)*			
52.	25622	*Falco cenchroides (Australian Kestrel)*			
53.	24472	*Falco cenchroides subsp. cenchroides (Australian Kestrel)*			
54.	25623	*Falco longipennis (Australian Hobby)*			
55.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
56.	25727	*Fulica atra (Eurasian Coot)*			
57.	25729	*Gallinula tenebrosa (Dusky Moorhen)*			
58.	25730	*Gallirallus philippensis (Buff-banded Rail)*			
59.	42314	*Gavicalis virescens (Singing Honeyeater)*			
60.	25530	*Gerygone fusca (Western Gerygone)*			
61.	24443	*Grallina cyanoleuca (Magpie-lark)*			
62.	24487	*Haematopus longirostris (Pied Oystercatcher)*			
63.	24293	*Haliaeetus leucogaster (White-bellied Sea-Eagle)*		IA	
64.	24295	*Haliastur sphenurus (Whistling Kite)*			
65.	25410	*Heleioporus eyrei (Moaning Frog)*			
66.	25119	*Hemiergis quadrilineata*			
67.	5117	*Hibbertia cuneiformis (Cutleaf Hibbertia)*			
68.	25734	*Himantopus himantopus (Black-winged Stilt)*			
69.	24491	*Hirundo neoxena (Welcome Swallow)*			
70.	26946	*Hormophysa cuneiformis*			
71.	43384	*Hydrophis platurus (Yellow-bellied Seasnake)*			
72.	25478	*Isoodon obesulus (Southern Brown Bandicoot)*		P5	
73.	24153	*Isoodon obesulus subsp. fusciventer (Quenda, Southern Brown Bandicoot)*		P5	
74.	933	*Lepidosperma gladiatum (Coast Sword-sedge, Kerbin)*			
75.	6374	*Leucopogon conostephioides*			
76.	41260	*Leucopogon microcarpus*			
77.	6427	*Leucopogon parviflorus (Coast Beard-heath)*			
78.	25661	*Lichmera indistincta (Brown Honeyeater)*			
79.	25741	*Limosa limosa (Black-tailed Godwit)*		IA	
80.	24690	*Macronectes giganteus (Southern Giant Petrel)*			
81.	24326	*Malacorhynchus membranaceus (Pink-eared Duck)*			
82.	25654	*Malurus splendens (Splendid Fairy-wren)*			
83.	25758	*Megalurus gramineus (Little Grassbird)*			
84.	25184	*Menetia greyii*			
85.	24598	*Merops ornatus (Rainbow Bee-eater)*		IA	
86.	25191	*Morethia lineoocellata*			
87.	7291	*Myoporum insulare (Blueberry Tree, boobialla)*			
88.	8117	*Myriocephalus helichrysoides*			
89.	24350	*Nycticorax caledonicus subsp. hilli (Rufous Night Heron)*			
90.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
91.	4113	*Ornithopus compressus (Yellow Serradella)*	Y		
92.	24328	*Oxyura australis (Blue-billed Duck)*		P4	
93.	24623	*Pachycephala pectoralis subsp. fuliginosa (Golden Whistler)*			
94.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
95.		*Pachycephala sp.*			Y
96.	24630	*Pardalotus striatus subsp. westraliensis (Striated Pardalote)*			
97.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
98.	25697	*Phalacrocorax carbo (Great Cormorant)*			
99.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
100.	25699	*Phalacrocorax varius (Pied Cormorant)*			
101.	24409	*Phaps chalcoptera (Common Bronzewing)*			
102.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
103.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
104.	24745	*Platycercus icterotis subsp. icterotis (Western Rosella)*			
105.	24750	*Platycercus zonarius subsp. semitorquatus (Twenty-eight Parrot)*			
106.	24383	*Pluvialis squatarola (Grey Plover)*		IA	
107.	24679	*Podargus strigoides subsp. brachypterus (Tawny Frogmouth)*			
108.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
109.	25722	*Polytelis anthopeplus (Regent Parrot)*			
110.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
111.	24771	*Porzana tabuensis (Spotless Crake)*			
112.	1676	*Prasophyllum hians (Yawning Leek Orchid)*			
113.	24166	*Pseudocheirus occidentalis (Western Ringtail Possum)*		T	
114.	24776	*Recurvirostra novaehollandiae (Red-necked Avocet)*			
115.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
116.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
117.	24279	*Sericornis frontalis subsp. maculatus (White-browed Scrubwren)*			
118.	24145	*Setonix brachyurus (Quokka)*		T	
119.	7022	*Solanum nigrum (Black Berry Nightshade)*	Y		
120.	1558	*Sparaxis bulbifera*	Y		

121	3262	*Acacia cochlearis (Rigid Wattle)*	
122	20537	*Stachystemon virgatus*	
123	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	
124	44492	*Stuckenia pectinata*	
125	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*	
126	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*	
127	24844	*Threskiornis molucca (Australian White Ibis)*	
128	24845	*Threskiornis spinicollis (Straw-necked Ibis)*	
129	148	*Triglochin muelleri*	
130	24808	*Tringa nebularia (Common Greenshank)*	IA
131	24852	*Tyto alba subsp. delicatula (Barn Owl)*	
132	7157	*Utricularia violacea (Violet Bladderwort)*	
133	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*	
134	24856	*Zosterops lateralis subsp. gouldi (Grey-breasted White-eye)*	

Conservation Codes

Conservation Codes

T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna

1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Appendix C Vegetation Condition Scale

Vegetation Condition Scale. Adopted from Keighery (1994).

Keighery Condition Scale (Keighery 1994)
Pristine Pristine or nearly so, no obvious signs of disturbance
Excellent Vegetation structure intact; disturbance affecting individual species; weeds are non-aggressive species
Very good Vegetation structure altered; obvious signs of disturbance *For example, disturbance to vegetation structure caused by repeated fires; the presence of some more aggressive weeds; dieback; logging; grazing*
Good Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. *For example, disturbance to vegetation structure caused by very frequent fires; the presence of some very aggressive weeds at high density; partial clearing; dieback; grazing.*
Degraded Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. *For example, disturbance to vegetation structure caused by very frequent fires; the presence of very aggressive weeds; partial clearing; dieback; grazing*
Completely Degraded The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. *These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.*

Appendix D Revegetation Works

SUMMARY OF PROPOSED REVEGETATION WORKS

Location	Area (m^2)	Flora Species[12]
Node 1: Lot 38, Forrest Beach Road		
RA1	710	Coastal Fore Dune Species
RA2	2,200	Coastal Fore Dune Species
RA3	7,200	Coastal Fore Dune Species
RA4	12,000	N/A - Brushing Only
Node 3: Reserve 39193, Forrest Beach Road - Deadwater		
RA5	970	N/A - Brushing Only
Node 4: Lesueur Reserve, Layman Road – Estuary Mouth		
RA6	6,180	Fringing Wetland Vegetation Species
RA7	1,080	Coastal Fore Dune Species
RA8	2,100	Consolidated Dune Species
RA9	7,660	Consolidated Dune Species
RA10	730	Coastal Fore Dune Species
Node 5: Wunda Buri Reserve, Layman Road – Boat Ramp		
RA11	1,060	Coastal Fore Dune Species
RA12	8,080	Coastal Fore Dune Species
RA13	12,780	N/A - Brushing Only
Node 6: Foreshore Reserve, Layman Road		
RA14	140	Coastal Fore Dune Species
RA15	12,860	N/A - Brushing Only

REVEGTATION SPECIES LIST

[12] Refer to revegetation species lists below.

Revegetation species list adopted from the '*The Flora and Vegetation of the Busselton Plain'* (Webb *et al*., 2009).

Coastal Fore Dune Species	Consolidated Dune Species	Fringing Wetland Vegetation Species
Acacia cochlearis	*Agonis flexuosa*	*Melaleuca rhaphiophylla*
Scaevola crassifolia	*Spyridium globulosum*	*Melaleuca viminea*
Acanthocarpus preissi	*Hibbertia cuniformis*	*Banksia littoralis*
Spinifex longifolius	*Leucopogon parviflorus*	*Agonis flexuosa*
Lepidosperma gladiatum	*Acacia littorea*	*Hakea varia*
Ficinia nodosa	*Acacia cochlearis*	*Acacia saligna*
	Pimelea argente	*Adriana quadripartite*
	Lepidosperma gladiatum	*Melaleuca incana*
	Austrostipa flavescens	*Myoporum capparoides*
	Dichondra repens	*Samolus repens*
	Rhagodia baccata	*Lobelia alata*
	Olearia axillaris	*Gahnia trifida*
		Baumea juncea
		Spyridium globulosum
		Acacia littorea
		Lepidosperma gladiatum

Appendix E Weed Control Techniques

WEED CONTROL TECHNIQUES

Adopted from *Florabase*. Accessed online June 2015 at: https://florabase.dpaw.wa.gov.au/

Weed Species	Weed Control	Timing for Application
Arum lily (*Zantedeschia aethiopica*)	• Spot spray metsulfuron methyl 0.4 g/15 L of water (or 5g /ha) + 225 mL glyphosate + Pulse®. As glyphosate is non selective, only apply where there is no chance of off target application on native vegetation. • Otherwise, spot spray metsulfuron methyl or chlorsulfuron 0.4 g/15 L of water (or 5g /ha) + Pulse®.	June and September. Herbicide application can send some tubers into dormancy therefore any control needs to continue for at least five years.
Bridal Creeper (*Asparagus asparagoides*)	• Spray 0.2 g metsulfuron methyl + Pulse® in 15 L water (or 2.5 - 5g /ha + Pulse®). • Release rust	August and September. Follow-up treatment is nearly always required for between 3-5 years to eradicate it all.
Couch Grass (*Cynodon dactylon*) (Poaceae)	• Spray Fusilade® Forte at 8 ml/L + wetting agent when plants are small and beginning new growth, or 1% Glyphosate* in late spring/summer and autumn when rhizomes are actively growing. • Add surfactant LI 700 (25%) to Glyphosate (greatly enhances the action of Glyphosate) • In sensitive areas try painting runners or crowns with 50% Glyphosate. • *Bioactive ('Frog Friendly') Round-up is recommended.	November to April. Follow-up treatment is nearly always required for between 3-5 years to eradicate it all. Couch grass is very tough & needs regular follow up (2 -3 months).
False Onion Weed (*Trachyandra divaricata*)	• Manually remove isolated or small infestations prior to flowering. • Wipe with 50% glyphosate solution before flowering. • For dense infestations in degraded areas spot spray 0.4 g chlorosulfuron plus 25 ml wetting agent in 10 L of water when plants actively growing.	June to August.
European Sea Rocket (*Cakile maritima*)	• In many situations it is well established and trying to control it may not be feasible or appropriate, e.g. If removal will lead to dune destabilisation. • Manual removal is effective but must be done at least every 8-10 weeks. • Ensure material is removed off-site, as once	June to November.

Weed Species	Weed Control	Timing for Application
	pods are formed; seed will often mature if plants have been uprooted. • Selective control can be achieved by spot spraying Logran® at 0.5 g/10 L. Wick application with 50% glyphosate or foliar spraying with 1% glyphosate provides reasonable control and can be used at flowering to reduce seed set.	
Hare's Tail Grass (*Lagurus ovatus*)	• Prevent seed set. • Hand removal small isolated infestations. • In selective situations spray with 16 ml/10 L (800 ml/ha) Fusilade® Forte + spray oil or for generic fluazifop-p (212g/L active ingredient) 10ml/10L or 500ml/ha + spray oil any time before flowering. • A lower rate of 13 ml/10 L Fusilade® Forte or for generic fluazifop-p (212g/L active ingredient) 8ml/10L can be used in winter at the 2-8 leaf stage before stem elongation.	June to August.
Rose Pelargonium (*Pelargonium capitatum*)	• Hand pull isolated plants taking care to remove the entire stem as it can reshoot from below ground level. • Spot spray metsulfuron methyl 5 g/ha + Pulse®.	June to October.
Pampas Grass (*Cortaderia selloana*)	• Cut out small plants, remove uprooted plants to avoid them resprouting. • Treat young plants with13ml/L Fusilade Forte® + spray oil or for generic fluazifop-p (212g/L active ingredient) 8mL/L + spray oil. May require more than one application. • Alternatively foliar spray glyphosate at 4%. Remove flower heads. Slash/burn clumps. Spray regrowth with 1% glyphosate in spring.	July to November.
Petty Spurge (*Euphorbia peplus*)	• Spray metsulfuron methyl at 0.1 g/15 L (2.5 g/ha) + wetting agent or glyphosate at 0.5% while actively growing.	June to September.
Plantago (*Plantago lanceolata*)	• Hand remove small/isolated infestations. • Spray in early stages of growth with 1% glyphosate.	May to October.

Weed Species	Weed Control	Timing for Application
Sea Spinach (*Tetragonia decumbens*)	• Not typically controlled in Western Australia	N/A
Sea Spurge (*Euphorbia paralias*)	• Hand remove small isolated infestations, ensuring use of appropriate personal protective equipment and safety guidelines. • When actively growing, spray with 50 mL glyphosate (360 g/L) + 0.2 g metsulfuron + Pulse® in 10 L water. • Consider possible dune erosion arising from removal.	September to January.
Wild Fumitory (*Fumaria capreolata*)	• Spray metsulfuron methyl at 0.1 g/15 L (2.5 g/ha) + wetting agent or glyphosate 0.5%.	July to September.
Wild Onion (*Asphodelus fistulosus*)	• Hand pull small infestations. Apply metsulfuron-methyl at 0.1 g /10 L + 100 ml spray oil when flowering.	July to October.

IMPORTANT NOTE. Whenever weed control is to be undertaken by community groups then the procedures and recommendations identified in the *City of Busselton Volunteer and NRM group manual (DRAFT) (2015)* should take precedence over those control measures described above.

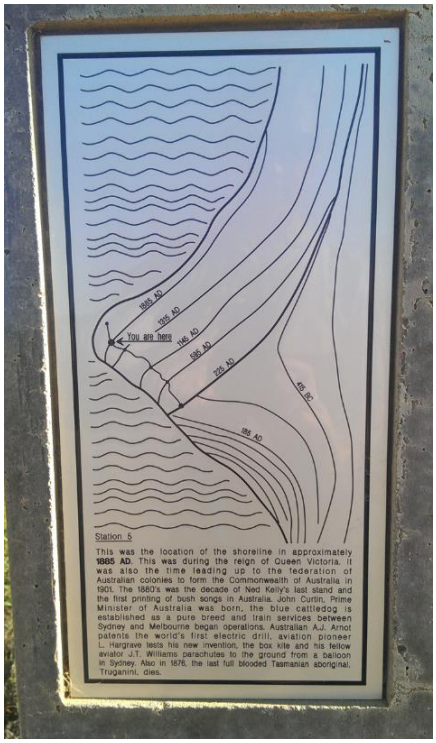
Appendix F Signage Examples

Examples of educational or interpretive signage are provided below. In order to be cost effective, interpretive signage should be developed in consultation with coastal managers, NRM organisations and community groups and should be consistent and utilised throughout the City of Busselton.

Further guidance regarding signage for coastal management is provided within the Coastal Planning and Management Manual: Section 7 (WAPC, 2003) which can be accessed online at:

http://www.planning.wa.gov.au/dop_pub_pdf/7_Stabilisation_Rehab.pdf

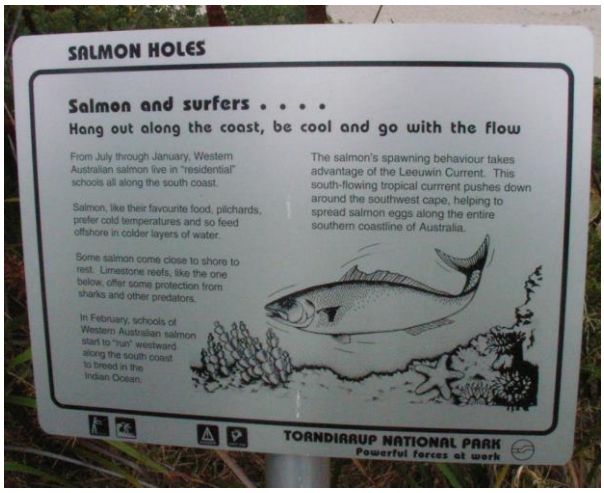
EXAMPLES OF INTERPRETIVE AND EDUCATIONAL SIGNAGE




Welcome to Natural Bridge and Castle Cove
Take the short walks to the lookouts or further explore this spectacular stretch of coastline on the Bigurda Trail.
Castle Cove 500m return
Natural Bridge 750m return
Bigurda Trail
Explore Kalbarri National Park's spectacular coastal cliffs on the Bigurda Trail, a moderately easy eight kilometre walk linking several coastal sites.
Distances to...
Trail classification
Be prepared:
Carry plenty of drinking water – at least 3 litres per person per day.
Wear sturdy shoes, sunscreen and a hat.
Look out for the Bigurda, or euro, a kangaroo with reddish fur that is common in this area. Also keep an eye out for migrating humpback whales which pass close by from May to September.
Cliff Risk Area
For your safety:
Keep to the paths and lookouts
Stand well back from cliff edges
Supervise young children closely
Kalbarri is a special place for the Nanda Aboriginal people. Today, the Nanda people welcome visitors who respect the cultural and natural heritage of Kalbarri National Park.
To Kalbarri
Department of Environment and Conservation
Our environment, our future


Mixed communities


SALMON HOLES
Powerful forces are working to close this beach
In winter, gale force storms and wind-driven waves are powerful enough to carry truckloads of sand away from south coast beaches.
The steps down to Salmon Holes beach are built on a steep sand dune that bears the full force of these brutal storms.
The dune is held in place only by the roots of coastal plants. These plants are hardy enough to resist storms, but they cannot survive being trampled on by feet or crushed by sand boards.
Where plants die and the sand becomes bare, wind and waves start to blow away the dune. The dune face may slump, leading to damage or collapse of the stairways that lead to the beach.
LOOKOUT and STAIRWAY TO BEACH
STAIRWAY TO BEACH
Help keep this surfing and fishing beach open
Don't take shortcuts off the stairway
Leave your sand boards at home or in the car
TORNDIRRUP NATIONAL PARK
Powerful forces at work


SALMON HOLES
Salmon and surfers . . . .
Hang out along the coast, be cool and go with the flow
From July through January, Western Australian salmon live in "residential" schools all along the south coast.
Salmon, like their favourite food, pilchards, prefer cold temperatures and so feed offshore in colder layers of water.
Some salmon come close to shore to rest. Limestone reefs, like the one below, offer some protection from sharks and other predators.
In February, schools of Western Australian salmon start to "run" westward along the south coast to breed in the Indian Ocean.
The salmon's spawning behaviour takes advantage of the Leeuwin Current. This south-flowing tropical current pushes down around the southwest cape, helping to spread salmon eggs along the entire southern coastline of Australia.
TORNDIRRUP NATIONAL PARK
Powerful forces at work

Appendix G Fencing Examples

EXAMPLES OF STANDARD FENCING CONFIGURATIONS

Treated pine post and rail with cable ($50 m^2)

Treated pine post with ring-lock wire mesh ($30 - 40 per m^2)

Treated pine post with PVC coated steel cable ($20 per m^2)

Treated pine post with ring-lock wire mesh ($30 - 40 per m^2)

EXAMPLES OF HEAVY DUTY FENCING CONFIGURATIONS

Heavy duty steel pole and steel cable fencing ($100 per m^2)

Appendix H Example Ranger Evaluation Form

COASTAL RANGER EVALUATION FORM

"Promoting sustainable behaviour on the coast"

Ranger (name)	Exact Location	Date / Time	Activity witnessed (No.)	Action taken (A, B, C…)

Action witnessed: 1. Vandalism to infrastructure; 2. Unauthorised camping; 3. Driving on vegetated dunes; 4.Trampling on vegetated dunes; 5. Littering; 6. Other

Action taken: A. Educational; B. Infringement; C. Number plates taken and called police; D. Other

Criteria	Recommendations	Actions required by ranger
Safety	Speed limit	
Vehicle Use	No vehicles allowed on coastal dunes No vehicles allowed in no vehicle zones	
Unauthorised Activities	Unauthorised camping	
Vandalism	Monitor priority project sites	
Education	Promoting sustainable behaviours	

Appendix I Indicative Costings

INDICATIVE RATES FOR KEY ITEMS

Item	Unit	Rate
Revegetation		
Brushing (Native Species only)	Per ha	$1,000
Seedlings (Community Nursery)	Each	$1.75 - $3.00
Fencing, Bollards & Gates (Supply Only)		
Treated pine post and rail with cable	Per m^2	$50
Treated pine post with ring-lock wire mesh	Per m^2	$30 - $40
Treated pine post with PVC coated steel cable	Per m^2	$20
Heavy duty steel pole and steel cable fencing	Per m^2	$100
Treated Pine Bollards	Each	$25
Steel Gate	Each	$1,000
Signage		
Directional Sign	Each	$300
Warning / Educational Sign (I.e. No littering)	Each	$200
Interpretive Sign (Depends on design)	Each	$1000
Other		
Treated pine boardwalk	Per m^2	$270
Crushed limestone (5% Cement) for walk trails and gravel roads/carparks (75mm depth)	Per m^2	$50
Toilets (Depends on capacity)	Each	$20,000 - $50,000
Vandal resistant rubbish bin	Each	$300
Surveillance camera (motion detected), installed with vandal resistant case	Each	$2,000
Vehicle counter equipment	Each	$1,500