

Point Samson Foreshore Management Plan

Prepared for the Shire of Roebourne by Essential Environmental.

With funding from CoastWest.

March 2014



Disclaimer and Limitation

This document is published in accordance with and subject to an agreement between Essential Environmental and the Client, Shire of Roebourne, for who it has been prepared for their exclusive use. It has been prepared using the standard of skill and care ordinarily exercised by environmental professionals in the preparation of such Documents.

This report is a qualitative assessment only, based on the scope of services defined by the Client, budgetary and time constraints imposed by the Client, the information supplied by the Client (and its agents), and the method consistent with the preceding. Essential Environmental has not attempted to verify the accuracy or completeness of the information supplied.

Any person or organisation that relies upon or uses the document for purposes or reasons other than those agreed by Essential Environmental and the Client without first obtaining the prior written consent of Essential Environmental, does so entirely at their own risk and Essential Environmental, denies all liability in tort, contract or otherwise for any loss, damage or injury of any kind whatsoever (whether in negligence or otherwise) that may be suffered as a consequence of relying on this Document for any purpose other than that agreed with the Client.

Copying of this report or parts of this report is not permitted without the authorisation of the Client or Essential Environmental.

Acknowledgement

This report has been substantially prepared using information contained in the *Point Samson Foreshore Enhancement Plan - Masterplan* (2013), prepared for the Point Samson Community Association by UDLA, with information input from Astron Environmental and Damara.

Thanks also to John Graham, Deb Woods, Russell Brady, Greg Grabasch, Fiona Hurse, Patrick Churnside, Keith Churnside, Kerry Churnside, Violet Samson, Jimmy Frederiks, Kaayman Churnside and Vicki Long for all their assistance, information and inspiration!



Contents

Acknowledgement	ii		
Section 1			
1. Introduction	4		
1.1 Purpose of this plan	4		
1.2 Implementation of the plan	4		
1.3 Context for management plan	6		
1.4 Developing this plan	6		
1.5 Planning and policy context	6		
Section 2			
2. Point Samson Foreshore - characteristics	10		
2.1 Location description	10		
2.1.1 Ownership	10		
2.1.2 Existing facilities and infrastructure	10		
2.1.3 Climate	12		
2.2 Environmental values	13		
2.2.1 Landscape	13		
2.2.2 Vegetation	15		
2.2.3 Fauna	15		
2.3 Cultural values	16		
2.3.1 Aboriginal heritage	16		
2.3.2 Non-indigenous heritage	17		
2.4 Recreational values	19		
2.5 Resource values	19		
		Section 3	
		3. Managing the foreshore	21
		3.1 Issues	21
		3.1.1 Flooding, coastal vulnerability and sea level rise	21
		3.1.2 Access and infrastructure	22
		3.1.3 Weeds	22
		3.2 Recommendations	22
		3.2.1 Protect townsite from coastal processes	22
		3.2.2 Improve facilities and infrastructure	23
		3.2.3 Revegetate degraded areas	24
		3.3 Implementation	24
		3.4 Monitoring and review	25
		Section 4	
		4. References	33
		Appendices	
		Appendix 1: NatureMap Search results	35
		Appendix 2: EPBC Protected Matters Search results	39

Contents continued

Figures

Figure 1: Site location and study area	5
Figure 2: Town planning scheme No. 8	11
Figure 3: Topography	14
Figure 4: Heritage	18
Figure 5: Plan overview	26
Figure 6: Node 1 – Mangrove lookout	27
Figure 7: Node 2 – Sam’s Beach	28
Figure 8: Node 3 – Town Beach	29
Figure 9: Node 4 – The Point	30
Figure 10: Node 5 – Honeymoon Cove	31
Figure 11: Node 6: Johns Creek Boat Harbour	32

Plates

Plate 1: Monthly mean maximum temperature at Roebourne Aerodrome	12
--	----

Tables

Table 1: Land tenure of reserve areas in Point Samson	12
Table 2: Threatened species listed on the EPBC Protected Matters database in Point Samson	16
Table 3: Registered Aboriginal sites listed in the AHIS in Point Samson	17
Table 4: Recommended actions for implementation	25

Section 1

Introduction



1. Introduction

Point Samson is well recognised across the Pilbara for its natural coastal beauty. Its attractiveness to tourists and residents is reflected by the growing numbers of users and visitors - numbers which will only increase with the growth of the nearby Wickham townsite and Cape Preston, as well as the future construction of Anketell Port. A foreshore management plan is critically required to provide guidance for continued access and facilities at Point Samson and to identify and protect important natural, recreational and cultural values.

Point Samson is designated as a coastal tourism node in the Shire of Roebourne local planning scheme and local planning strategy (in development).

The Point Samson Community Association is actively engaged in developing a vision for the foreshore area. The Association has been working proactively with RioTinto and UDLA landscape consultants to develop a masterplan for the town beach area. The outcomes of this masterplanning process are based on solid science and are recognised as having significant community support. Accordingly, the work of UDLA and the other consultant teams is acknowledged and incorporated into this Foreshore Management Plan.

This project offers an opportunity to forge a partnership between the coastal manager – the Shire of Roebourne, the community and industry, which will result in a sense of ownership of the plan and a desire to actively manage the area to protect the identified values now and into the future.

1.1 Purpose of this plan

The Point Samson Foreshore Management Plan has been prepared to provide guidance for the management of the coastal foreshore at Point Samson, within the Shire of Roebourne (Figure 1). The foreshore area covered by this Plan is reserved for Conservation, Recreation and Natural Landscapes or for Parks, Recreation and Drainage (see section 2.1) and is managed by the Shire of Roebourne. An area of the foreshore around John's Creek Boat Harbour is also zoned for Industry and managed by the Department of Transport.

The Point Samson foreshore management plan describes the environmental, cultural, recreational and resource values associated with the site, many of which are under threat from climate change and human activities on the coast. The Plan makes recommendations regarding the future management of impacts in order to maintain or enhance the identified values for the long term.

1.2 Implementation of the plan

Specific recommendations for implementation are contained in section 3. It is recognised that further detailed work will be required, including detailed design and costing of infrastructure, to facilitate implementation in some instances.

No commitments have been made as yet regarding the implementation of this foreshore management plan. Its delivery will depend on the availability of resources and priorities identified by the Shire. It is anticipated that implementation of the adopted foreshore management plan will require the formulation of partnerships and the identification of a variety of sources of funding. The lead agency for implementing this Plan will be the Shire of Roebourne.

Shire of Roebourne, Point Samson foreshore management plan

Figure 1 - Site location and study area



* ©2014. While Essential Environmental has taken care to ensure the accuracy of this product, Essential Environmental and client make no representations or warranties about its accuracy, completeness or suitability for any particular purpose. Essential Environmental and client cannot accept liability of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred as a result of the product being inaccurate, incomplete or unsuitable in any way and for any reason. Data source: Landgate, Department of Planning. Created by: H Lamparski. Projection: MGA50: zone 50.

1.3 Context for management plan

Point Samson contains one of the most popular and easily accessible beaches in the Shire of Roebourne. It is known as one of the key holiday destinations in the Pilbara.

Population forecasts for the Pilbara predict a youthful, active population who place disproportional pressure upon available coastal recreational sites. This significantly increased population will require substantially increased facilities, not only to meet expected demand but to prevent random access to vulnerable coastal areas, together with greater active management of this more intensive and active usage of the coastal area. The protection and management of the coastal foreshore areas will therefore require the provision of adequate access to selected sites and an appropriate range of recreational facilities.

Coastal planning must not only consider the dynamic nature of coastal landforms, but ongoing sea level rise due to global warming, and the implications of the potential for surges and waves from tsunamis. *State Planning Policy 2.6: State Coastal Planning Policy* (2013) requires a setback on a sandy coast of 90 metres (an increase of 52 metres over the previous requirement), based on the Fourth Assessment Report of the IPCC (scenario A1F1) and the CSIRO forecast of sea level rise of 0.9 metres by 2110. This means the total setback including allowances for physical processes and other factors such as ecological values and the need for public access will increase from 100 to 150 metres (Landvision, 2011).

There is a need for a transparent management framework to guide the installation of infrastructure along the coast, as well as define the roles, resources and responsibilities for ongoing maintenance and management.

The overarching aims of the Point Samson Foreshore Management Plan are to:

1. Contribute to the implementation of local and regional planning objectives and coastal strategies.
2. Consolidate community partnerships and build community capacity and ownership of the area including working with the area's traditional owners.
3. Foster the sustainable recreational and tourist use of the area through a plan that protects the environmental and cultural values of the area and identifies access arrangements and long term infrastructure needs.

1.4 Developing this plan

This foreshore management plan has been prepared on the basis of available information including the *Point Samson Foreshore Enhancement Plan - Masterplan* (UDLA, 2013), with input from key agencies and the community including on-site meetings with the region's traditional owners, the Ngarluma people.

The values, issues and recommendations are based on a review of the recommendations of UDLA's *Point Samson Foreshore Enhancement Plan - Masterplan*, as well as the outcomes of discussions held with community members in Point Samson during April, 2013.

The draft Foreshore Management Plan was advertised for public comment from 11 September to 2 October 2013. Three submissions were received on the draft plan. All comments were considered and appropriate changes were made to the foreshore management plan in response to the comments received. It is noted that all comments were generally supportive of the recommendations of this foreshore management plan.

1.5 Planning and policy context

Key planning and policy context for Point Samson is provided by the following documents. Key outcomes and implications are summarised where possible.

Pilbara Planning and Infrastructure Framework (WAPC, 2012)

The Pilbara Planning and Infrastructure Framework defines a strategic direction for the future development of the Pilbara region over the next 25 years. It seeks to ensure that development and change in the Pilbara is achieved in a way that improves people's lives and enhances the character and environment of the region.

The Pilbara Planning and Infrastructure Framework notes that the region is highly dependent on outdoor sporting and recreation activities and that due to the climate, water plays an important role in recreation facility provision. Recognised popular coastal activities include recreational fishing and diving facilitated by boat ramps in all the major coastal settlements. The popularity of coastal marine recreation is demonstrated by the Pilbara having some of the highest recreational boat ownership in Australia (WAPC, 2012).

Shire of Roebourne Town Planning Scheme No 8

Shire of Roebourne TPS No. 8 (2011) outlines the Shire of Roebourne's planning aims and intentions for the Shire of Roebourne municipal district. It also aims to control and guide land use and development within the district, as well as facilitating community input into planning. The development objectives for Point Samson, as defined in Part V of TPS No. 8, are:

- (i) Develop an identifiable Town Centre with a coastal aspect.
- (ii) Facilitate the development of Point Samson as a tourist node where compatible with the social and environmental setting.
- (iii) Retain the "fishing village" atmosphere of Point Samson.

Section 7.5 of the Town Planning Scheme also contains a special control area that applies to Point Samson. Clause 7.5, Storm Surge Risk Area requires:

- 7.5.1 When considering applications for planning approval, Council shall have regard to information about the land prone to 1 in 100 year storm surge events and may permit, with or without conditions, or refuse proposals at its discretion.
- 7.5.2 When considering applications for planning approval, Council shall consult the relevant agencies regarding the most up-to-date information available about potential storm surge events which may affect the proposals subject to application.
- 7.5.3 Development within the Residential, Commerce or Health, Welfare and Community categories in the zoning table is not permitted within an area known to be subject to 1 in 100 year storm surge events. Council may approve other development categories subject to considering:
- (a) the sensitivity of the proposal to risk,
 - (b) protection measures to be constructed, and
 - (c) social and cultural values."

State Planning Policy 2.6:

State Coastal Planning Policy (2013)

The purpose of the Policy is to provide guidance for decision-making within the coastal zone including managing development and land use change; establishment of foreshore reserves; and to protect, conserve and enhance coastal values. This policy recognises and responds to regional diversity in coastal types; requires that coastal hazard risk management and adaptation is appropriately planned for; and encourages innovative approaches to managing coastal hazard risk, and provides public ownership of coastal foreshore reserves.

The policy provides high order guidance for decision making on coastal planning matters and applies state wide. The objectives of this policy are to:

1. ensure that development and the location of coastal facilities takes into account coastal processes, landform stability, coastal hazards, climate change and biophysical criteria;
2. ensure the identification of appropriate areas for the sustainable use of the coast for housing, tourism, recreation, ocean access, maritime industry, commercial and other activities;
3. provide for public coastal foreshore reserves and access to them on the coast; and
4. protect, conserve and enhance coastal zone values, particularly in areas of landscape, biodiversity and ecosystem integrity, indigenous and cultural significance.

Policy measures include clauses relating to:

- Development and settlement;
- Water resources;
- Building height limits;
- Coastal hazard risk management and adaptation planning;
- Coastal protection works;
- Protection of public interests
- Identification of coastal foreshore reserves
- Preparation of coastal strategies and management plans, and
- the precautionary principle.

Shire of Roebourne Coastal Management Strategy Position Paper (Landvison, 2011)

The Shire of Roebourne Coastal Management Strategy Position Paper (Landvison, 2011) sets out the Shire's objectives for the management of its 350km length of coast. The position paper was prepared as an interim step, as a precursor to the development of a comprehensive and final Coastal Management Strategy.

It describes the coastal environments and characteristics; provides for the protection of natural coastal processes; and makes recommendations for the management of human impacts within a proposed coastal management framework. Though subject to review, the management framework is proposed to be implemented immediately to administer coastal management in accordance with the principles in the Position Paper.

The Position Paper identifies a series of projects that are recommended to be commenced immediately as interim measures prior to the preparation of Foreshore Management Plans for the designated recreational activity nodes Dampier Foreshore, Hearson Cove, Karratha Back Beach, Cleaverville, Wickham Back Beach, Point Samson/Sams Creek area and Cossack/ Settlers Beach.

Point Samson Stormwater and coastal management plan (draft)

The draft Point Samson Stormwater and Coastal Management Strategy (Essential Environmental, 2013), recommends an approach to the mitigation and management of coastal and flood risks, highlighting potential limitations to future development and critical stormwater infrastructure required to facilitate development. It notes the following:

A foreshore management plan should be developed for the proposed foreshore reserve area prior to further development of Point Samson to provide a framework for ongoing management of the coastline. Specific mitigation measures identified in the risk assessment presented in section 7 that should be addressed within a foreshore management plan are:

- Minimum setback for permanent infrastructure should include allowance for erosion (including sea level rise) over 100yrs (55-150m)*
- Control beach access through managed access points designed to minimise impacts*
- Developments to allow continued appropriate public access for beach access*
- Design of developments to limit height and consider visual impacts*
- Rehabilitation to remaining coastal access points to reduce risk of damage*

Section 2

Point Samson Foreshore
- Characteristics



2. Point Samson Foreshore - Characteristics

The characteristics of the Point Samson foreshore site are described below, including descriptions of location, tenure, zoning, climate, environmental values (topography, soils, hydrogeology, vegetation and fauna), cultural values and recreational values.

2.1 Location description

Point Samson is a small coastal town located on the north west coast of Western Australia's Pilbara region, 40 km north east of Karratha, 18 km north of Roebourne and 8 km north of Wickham (Figure 1Error! Reference source not found.). The Town is situated on the end of a peninsula and is confined by ocean to the east and mangrove swamps to the south west. Under tidal conditions the point is only connected to the mainland via a causeway over Pope's Nose Creek and could practically be considered an island. Rio Tinto's Cape Lambert is located 4 km away, north west of the townsite. A small boat harbour has been developed by the State Government at Johns Creek at the southern end of the town.

2.1.1 Ownership

The study area for the Point Samson Foreshore Management Plan covers approximately 180ha, stretching for around 4 km from the northern tip of the beach through Town Beach, to the outer edge of the harbour. It is a further 1.6 km from the eastern edge of the harbour to the Point Samson Rd Bridge. The foreshore generally extends up to 250 m inland with the mangrove area being an exception which is up to about 900 m wide.

The area that is the subject of this management plan is reserved for Conservation, Recreation and Natural Landscapes, Parks, Recreation and Drainage, and zoned Industry in Shire of Roebourne Town Planning Scheme No 8 (Figure 2).

Strategic industry zoning adjacent to the Conservation, Recreation and Natural Landscapes reserve to the west of Point Samson townsite relates to a Ministerial Reserve (No. 35813) held by the Department of State Development. This reserve is held for possible future industrial purposes. West and adjacent to this reserve is crown land leased by Rio Tinto for its mining and port activities at Cape Lambert (Figure 2).

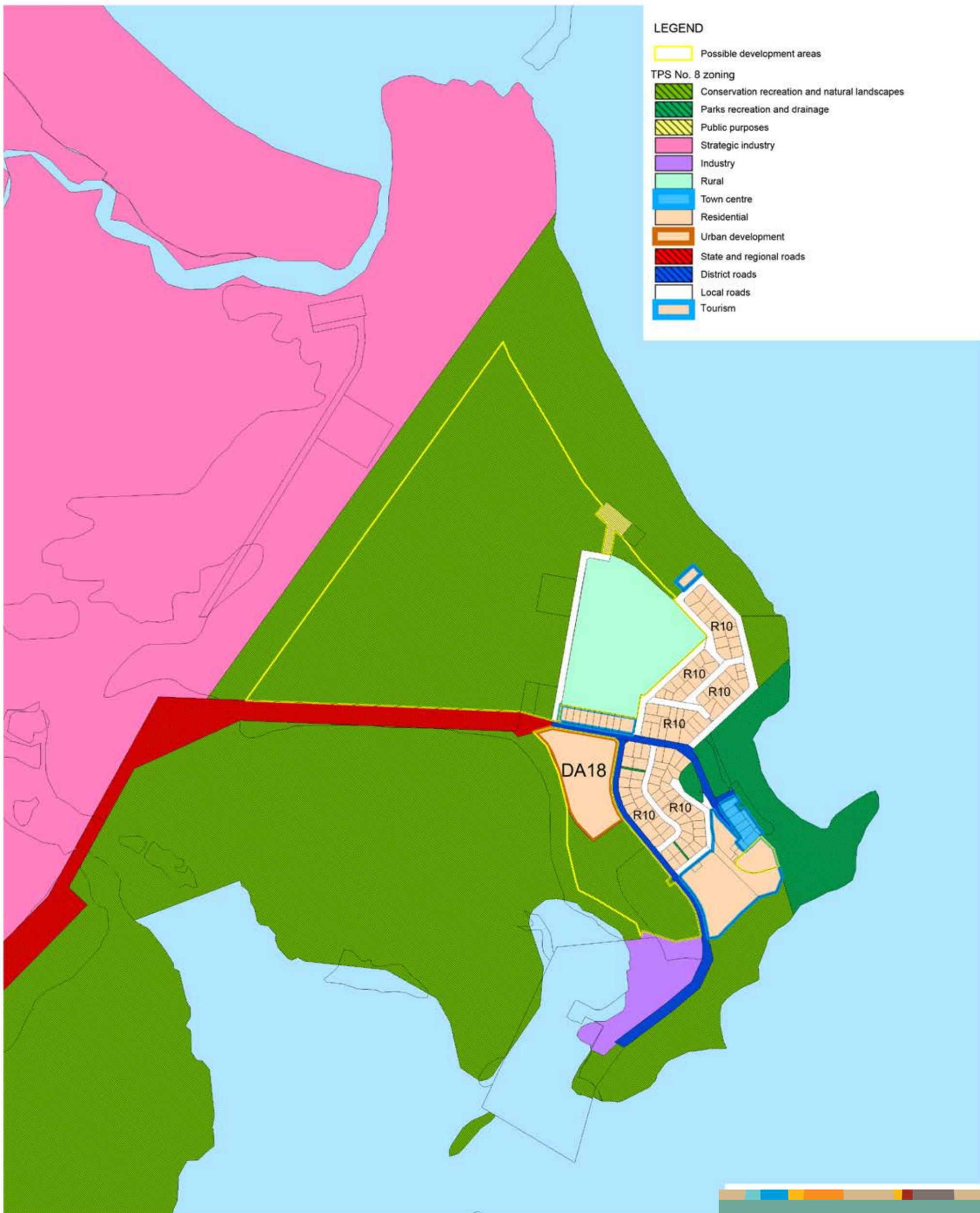
The foreshore reserve comprises 8 lots and is in the ownership of the State. Management responsibility for the foreshore reserve rests with the Shire of Roebourne and the Department of Transport (Table 1). The Ngarluma people are the Traditional Owners who have Native Title rights over the Point Samson area.

2.1.2 Existing facilities and infrastructure

A number of facilities and infrastructure are located within the Foreshore area, which services the local community as well as the region's economic activity. Johns Creek boat harbour, located south of the existing townsite, services the fishing industry and provides a number of boat maintenance, refuelling and oil disposal facilities as well as associated offices, boat ramps, wharf, a public car park and toilets.

Shire of Roebourne, Point Samson foreshore management plan

Figure 2 - Town planning scheme No. 8



*©2014. While Essential Environmental has taken care to ensure the accuracy of this product, Essential Environmental and client make no representations or warranties about its accuracy, completeness or suitability for any particular purpose. Essential Environmental and client cannot accept liability of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred as a result of the product being inaccurate, incomplete or unsuitable in any way and for any reason.
 Data source: Landgate, Shire of Roebourne
 Created by: H. Lamparski Projection: MGA50: zone 50.



Scale 1: 10,000 at A3

0 400 m

Table 1: Land tenure of reserve areas in Point Samson

Parcel Identifier	Reserve No.	Area (ha)	Management Orders	Land Use
Lot 289 on Plan 40335	R23664	22.0	Shire of Roebourne	Recreation
Lot 97 on Plan 168129	R26415	0.5	Shire of Roebourne	Government requirements
Lot 278 on Plan 193182	R43992	0.8	Shire of Roebourne	Community Centre
Lot 7901 on Plan 71098	R51015	n/a	Department of Transport	Harbour purposes
Lot 283 on Plan 220141	R39027	0.8	Department of Transport	Harbour purposes
Lot 287 on Plan 40584	R39027	0.7	Department of Transport	Harbour purposes
Lot 288 on Plan 40584	R39027	4.9	Department of Transport	Harbour purposes
Lot 383 on Plan 52835	R39027	14.4	Department of Transport	Harbour purposes

The Point Samson Community Hall is located within a portion of the Parks, Recreation and Drainage Reserve off Meares drive. This area contains and car park, some vegetated parklands and a playground. Access to the community Hall and car park is via an ungazetted road, part of which also serves as a car park for the Samson Beach Tavern, with access from Miller Close. Another car park is situated above Honeymoon Cove, which also contains a shelter and public toilet.

A historical jetty originally erected in 1902 is situated on the main point of the peninsula and extends from an existing car park south of the tavern. Pedestrian access to Honeymoon Cove is also available via a concrete path from this car park.

Asbestos is likely to occur within the Foreshore area as a result of historical shipping of Wittenoom asbestos through Point Samson.

2.1.3 Climate

Point Samson experiences an arid and semi-arid climate typical of the Pilbara region of Western Australia, with hot summers accompanied by irregular rainfall and milder, dry winters.

The north coast of the Pilbara region experiences occasional tropical cyclones which result in highly variable rainfall patterns in the region. The closest weather stations to Point Samson maintained by the Bureau of Meteorology are at Cossack (rainfall only, operating intermittently from 1881-2013) and Roebourne Aerodrome (operating continuously from 1887-2013).

Mean temperature and rainfall at Roebourne Aerodrome reach their maximum in summer with temperature peaking in December at 39.2°C, and rainfall peaking at 85.7 mm in January. During the winter, the situation is reversed with maximum temperatures reaching their

lowest point in June-July (approximately 28°C) whilst rainfall reaches its lowest amount, of approximately 1.0 mm, later in the year, in August and October (Plate 1).

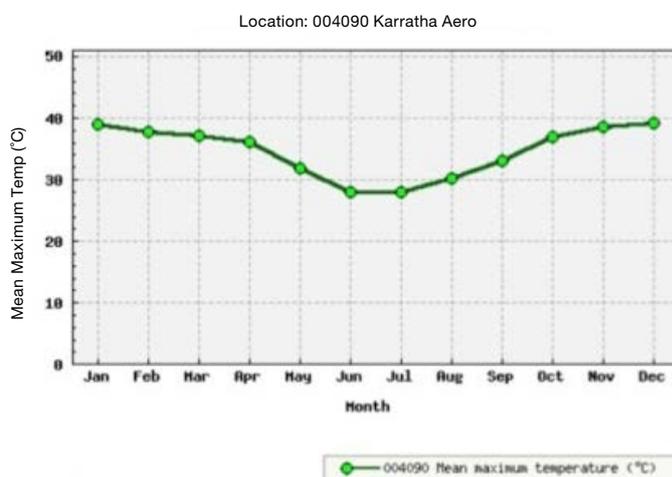


Plate 1: Monthly mean maximum temperature at Roebourne Aerodrome (Source: Bureau of Meteorology)

While Roebourne Aerodrome is located approximately 15 km inland from Point Samson, a better sense of rainfall patterns may be obtained from Cossack which is only 5 km away and like Point Samson, is located on the coast. Data has not been consistently recorded over the operating period of the weather station, however, records from available data shows that average annual rainfall at this location is 299 mm, in contrast to an average annual rainfall recorded at Roebourne Aerodrome of 274 mm. While mean annual rainfall is greater at Cossack, peak monthly rainfall occurs later in March and at a lower volume (64.7 mm compared to Roebourne Aerodrome's 85.7 mm).

2.2 Environmental values

2.2.1 Landscape

Topography

Elevation varies significantly within the Point Samson townsite (Figure 3). Several small hills are located within the study area with a maximum elevation of 37 m AHD and a minimum elevation of 0 m AHD along the beach line and mangrove forests. The highest point occurs in unallocated crown land in the north of the site, directly east of the sand quarry (Figure 3). The highest point within the existing townsite occurs in the north of the developed area, directly next to the coast at an elevation of 17 m AHD.

Coast

The Point Samson peninsula is characterised by its location on a 250 ha area of dune limestone (Pleistocene calcarenite) that projects in a north-northeast direction from the coast of central Pilbara. The existing townsite is built upon a moderately elevated dune field which is thought to be perched on top an underlying rock platform, evident as fringing coastal platforms (Damara, 2013). It is linked to Cape Lambert and the mainland by mangroves and tidal salt flats. This low lying environment and the associated tidal plains is characterised as a “Coastal Lowland” in State Planning Policy 2.6: State Coastal Planning Policy.

The southern foreshore, associated with the lower reaches of Johns Creek, is protected by the southern headland which supports a large area of mangrove forest. Large parts of the foreshore in this area have been modified by installation of levees and seawalls to protect the town access road, and associated with Johns Creek Boat Harbour.

The eastern and northern coastline of the study area varies and can be considered in terms of three types of shorelines. Rocky headlands separate sandy beaches which are influenced by varying amounts of subtidal and intertidal rock. The presence of rock provides some protection to sandy beaches under normal conditions by dissipating wave energy and consequently reducing the potential for erosion. It is important to note that these coastlines are susceptible to extreme events where higher sea levels created by storm surge events will reduce the effectiveness of that protection. As a consequence, this type of coast can be highly sensitive to changes in climate and to acute erosion events that result in dynamic landforms. This coastline would be classified as a “Rocky platform” in State Planning Policy 2.6.

There are four main beaches located within the study area (Figure 1):

North of the town’s main beach, a stretch of sandy beach over 1 km long is paralleled by a section of largely continuous intertidal rock. (We have referred to this beach as Sam’s Beach for ease of reference due to its proximity to Sam’s Creek). The beach is backed by vegetated transgressive dunes at the northern extent of the existing townsite, leaving the land behind the beach undeveloped.

1. The wide sandy beach fronting the townsite (Town Beach) is protected by an area of bedrock extending 100-200 m offshore at the peninsula point. This rock is exposed at low tide. Submerged rock formations extend from the rocky shore immediately north. This beach is comprised of wide ridged-sand flats, backed by a series of low vegetated dunes on which the existing town site is built.
2. Honeymoon Cove, located 500 m south of the Point Samson jetty, is a moderately steep 100 m length of sand that is bordered and backed by approximately 20 m high rugged metasedimentary rocks, with a dune partly blanketing the backing rocks.
3. A second 100 m long beach similar to Honeymoon Cove except composed of cobble and boulders is located another 150 m to the south. It is backed by steep 10-20 m high bedrock bluffs with no formal access to the beach. Johns Creek harbour (also known as the Johns Creek marina) is located 200 m west of the beach.

The potential for coastal erosion in many parts of the study area is limited due to dissipation of wave energy on submerged rock formations. The key impacts of potential coastal erosion will be the loss or migration of coastal dunes and beaches if they are sufficiently exposed to wave action or changes to conditions as a result of sea level rise.

Soils

Most of the existing Point Samson townsite and areas of mangroves are located over shelly sand in coastal dunes and old beach deposits (Qhms). The majority of the unallocated crown land in the centre and north of the peninsula is situated over red-yellow wind-blown eolian sand and local sand ridges (Qs). Pockets of sedimentary rock in the form of banded iron formation, chert and ironstone also exist in this area of unallocated crown land as well as along a narrow section of the end of the peninsula.

Shire of Roebourne, Point Samson foreshore management plan

Figure 3 - Topography



*©2014. While Essential Environmental has taken care to ensure the accuracy of this product, Essential Environmental and client make no representations or warranties about its accuracy, completeness or suitability for any particular purpose. Essential Environmental and client cannot accept liability of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred as a result of the product being inaccurate, incomplete or unsuitable in any way and for any reason.
 Data source: Landgate, Shire of Roebourne
 Created by: H. Lamparski Projection: MGA50: zone 50.



Scale 1: 10,000 at A3

0 400 m

Hydrogeology

Point Samson is situated over the Pilbara fractured rock aquifer within the Pilbara groundwater management area. This aquifer typically consists of undifferentiated volcanic and sedimentary rocks in greenstone belts. Fractured rock aquifers are complex structures comprised of rock with typically low permeability separated by numerous randomly distributed infiltration pathways. In fractured rock aquifers, groundwater is stored in the fractures, joints, and cavities of the rock mass. While groundwater stored in fractured rock aquifers may be available as a water supply, groundwater yield is extremely variable and dependent on the distribution of major fractures.

Recharge in fractured rock aquifers is usually local and intermediate. Given the complex nature and low permeability of fractured rock aquifers, rates of groundwater movement in fractured rock systems are difficult to quantify and this has not been done in the Point Samson area.

2.2.2 Vegetation

A search of the Department of Environment and Conservation's NatureMap database shows that one Priority 1 and one Priority 3 species of flora have been found within a 1.5 km radius of the centre of the Point Samson peninsula (Appendix 1). A report from the EPBC Act Protected Matters database found no listings of Threatened Ecological Communities or threatened species within a 1.5 km radius of the centre of the Point Samson peninsula (Appendix 2).

Buffel grass (*Cenchrus ciliaris*) and prickly pear (*Opuntia spp.*) were identified as weeds likely to occur within the reported area. Buffel grass, kapok (*Aerva javanica*) and tamarisk trees (*Tamarix aphylla*) are weeds that have been documented by UDLA (2013) along the top of the dune of Point Samson main beach.

Other highly disturbed areas have been identified in locations associated with the jetty entrance and tavern, as well as the Eastern Point to Honeymoon Cove. Small narrow sections of the beach support *Spinifex longifolius* grassland with native coastal vine, *Ipomoea pes-caprae* (UDLA, 2013).

Mangroves

Mangrove forests occupy a significant portion of the site south west of the townsite, growing from the south side of the Point Samson-Roebourne Rd to the Point Samson boat harbour around the entrance to Johns Creek estuary. They are positioned in the lowest lying areas of the peninsula and are characterised by intertidal

flats of saltbush, silty muds and clays (UDLA, 2013). Under tidal conditions the mangroves are a rich source of barramundi, mud crabs and other fish (UDLA, 2013).

Mangroves comprise several species of trees and shrubs that grow along sheltered intertidal shores, mainly in tropical & subtropical coastal waterways. They occur most commonly in tide-dominated waterways such as estuaries, tidal creeks and deltas (Geoscience Australia, 2013). Mangroves are adapted to a salt-water environment and to anoxic and sulfidic-rich sediments. Their recognisable breathing roots (pneumatophores) obtain oxygen directly from the atmosphere when exposed at low tide. Changes in the distribution of mangroves have been identified as an important indicator of broader environmental change for *State of the Environment* reporting (Ward et al., 1998).

Mangroves provide a number of functions beneficial to both humans and the environment, including:

- Shoreline protection and sediment accretion
- Major source of primary productivity
- Provide habitat for both marine and terrestrial organisms, including nurseries for commercial fisheries and crustaceans
- Sink for atmospheric carbon
- Capture effluent from terrestrial runoff

2.2.3 Fauna

A search of the Department of Environment and Conservation's NatureMap database shows that five rare or likely to become extinct species classified as Threatened have been identified as present within a 1.5 km radius of the centre of the Point Samson peninsula, however none are listed as endemic to the query areas (Appendix 1). These include the Lesser Sand Plover (*Charadrius mongolus*), Northern Quoll (*Dasyurus hallucatus*), slider/skink (*Lerista neviniae*), Humpback Whale (*Megaptera novaeangliae*) and the Eastern Curlew (*Numenius madagascariensis*). Fifteen species of birds protected under international agreement also occur within a 1.5 km radius of the centre of the Point Samson peninsula (Appendix 1), as well as the specially protected Peregrine Falcon (*Falco peregrinus*).

A report from the EPBC Act Protected Matters database lists 14 threatened marine and terrestrial species with a range of probability of occurrence within a 1.5 km radius of the centre of the Point Samson peninsula (Appendix 2).

Table 2: Threatened species listed on the EPBC Protected Matters database in Point Samson

Status	Taxa	Common Name	Type of presence
Critically Endangered	<i>Aipysurus apraefrontalis</i>	Short-nosed Seasnake	Likely to occur
Endangered	<i>Macronectes giganteus</i>	Southern Giant-Petrel	May occur
	<i>Dasyurus hallucatus</i>	Northern Quoll	Likely to occur
	<i>Notoryctes caurinus</i>	Karkarratul, Northern Marsupial Mole	Likely to occur
	<i>Caretta caretta</i>	Loggerhead Turtle	Known to occur
	<i>Dermochelys coriacea</i>	Leatherback Turtle, Leathery Turtle, Luth	Breeding likely to occur
Vulnerable	<i>Rhinonictis aurantia</i> (Pilbara form)	Pilbara Leaf-nosed Bat	Likely to occur
	<i>Macrotis lagotis</i>	Greater Bilby	Likely to occur
	<i>Megaptera novaeangliae</i>	Humpback Whale	Known to occur
	<i>Chelonia mydas</i>	Green Turtle	Breeding known to occur
	<i>Eretmochelys imbricata</i>	Hawksbill Turtle	Breeding known to occur
	<i>Natator depressus</i>	Flatback Turtle	Breeding known to occur
	<i>Pristis clavata</i>	Dwarf Sawfish, Queensland Sawfish	Likely to occur
	<i>Rhincodon typus</i>	Whale Shark	May occur

The domestic pigeon, eurasian tree sparrow, horse, cat, rabbit, rat and fox are listed as invasive species or species with habitat likely to occur within the 1.5 km radius of the centre of the Point Samson peninsula (Appendix 2).

2.3 Cultural values

2.3.1 Aboriginal heritage

Native Title within the Point Samson foreshore area has been formally recognised as residing with the Ngarluma people. It is understood that *‘the Ngarluma people are the original inhabitants of the coastal areas around Roebourne (West Pilbara WA). Archaeological surveys reveal that continuous occupation & ancestry stretches back more than 30,000 years, and important cultural sites such as the rock art on the Burrup Peninsula (Karratha) show a deep historical and spiritual connection to the land, waterways & rivers & the sea’* (NAC, 2013).

Consultation with the Ngarluma Aboriginal Corporation (NAC) was undertaken to understand cultural values and identify sites of cultural significance within the Point Samson foreshore area.

A site visit to country with four traditional owners and a NAC heritage officer was undertaken at Point Samson on 30th May 2013 as part of this process. This visit allowed the thoughts and wishes of the Ngarluma elders as to

how the study area is currently used by their community and how they would like to see it managed into the future to be vocalised.

The visit to country revealed that fishing and crabbing within the mangroves and off the coast, particularly at low tide, are the major activities undertaken at Point Samson by the Ngarluma people.

Access to significant fishing and heritage sites around the peninsula from Point Samson townsite via a number of dirt roads and sand tracks is of great importance. In particular, the headland at the entrance to Sams Creek, opposite Cape Lambert, is a place where fishing and cooking regularly occurs and local plants from the area were traditionally used to make fishing nets for this purpose. In addition, a burial site registered on the Department of Aboriginal Affairs database is located in close proximity in the dunes next to this headland. Fishing and crabbing activity is also undertaken regularly by the Ngarluma people at Johns Creek harbour and nearby beaches and rocky outcrops.

The Ngarluma elders expressed satisfaction with current facilities at the boat harbour, however, suggested that the installation of fish-cleaning facilities would be a welcome addition to the harbour to support fishing activity at this site. Shade and seating at the lookout at the existing town’s most northern point was also recommended to improve the amenity of the site.

Ngarluma’s Native Title claims over Point Samson are at various stages in the process. A Native Title claim over the mangroves has been determined and recognised. An Indigenous Land Use agreement exists over the foreshore to the north between the Ngarluma Aboriginal Corporation and Rio Tinto Iron Ore for Development, Industrial, Mining and Infrastructure. Any other proponents working in Ngarluma Country must negotiate Heritage Protection Agreements or Indigenous Land Use Agreements with the Ngarluma Aboriginal Corporation directly prior to commencing works. A Native Title Claim has been lodged with the Native Title Tribunal for the Point Samson townsite (Figure 4).

A search of the Department of Aboriginal Affairs Aboriginal Heritage Inquiry System (AHIS) showed that eight Registered Aboriginal heritage sites are located within the study area (Figure 4). These sites are also recognised in a recently prepared draft Desktop study of the Aboriginal and European heritage sites in Point Samson, West Pilbara Region, Western Australia by Anthropos Australis Pty Ltd (June 2013). The desktop study was undertaken as part of the development of a Heritage Management Plan for Aboriginal and European sites in Point Samson by the Shire of Roebourne to support the future preparation of a local structure plan for the townsite. Details of the registered sites are presented in Table 3 and Figure 4.

Unregistered Aboriginal sites are known to exist within this area as determined by the Anthropos Australis Pty Ltd (2013) desktop study (Figure 4). These unregistered Aboriginal sites, and any others that may be located within this area are also protected by the Aboriginal Heritage Act (1972). Any future development within the area requires consultation with the Ngarluma Aboriginal Corporation and the conduct of appropriate Aboriginal Heritage Surveys to locate and record Aboriginal sites.

2.3.2 Non-indigenous heritage

The State Heritage Office online database (inHerit) listed two sites as having heritage value within the study area; the site of the Point Samson jetty (Heritage Place No. 8661) and offshore Bezout Island located off Point Samson (Heritage Place No. 8679). The Solveig Wreck, a sailing ship wrecked off Pt Samson in 1903 is also recognised with associated signage as part of the Emma Withnell Heritage Trail (WA Museum, 2013) (Figure 4).

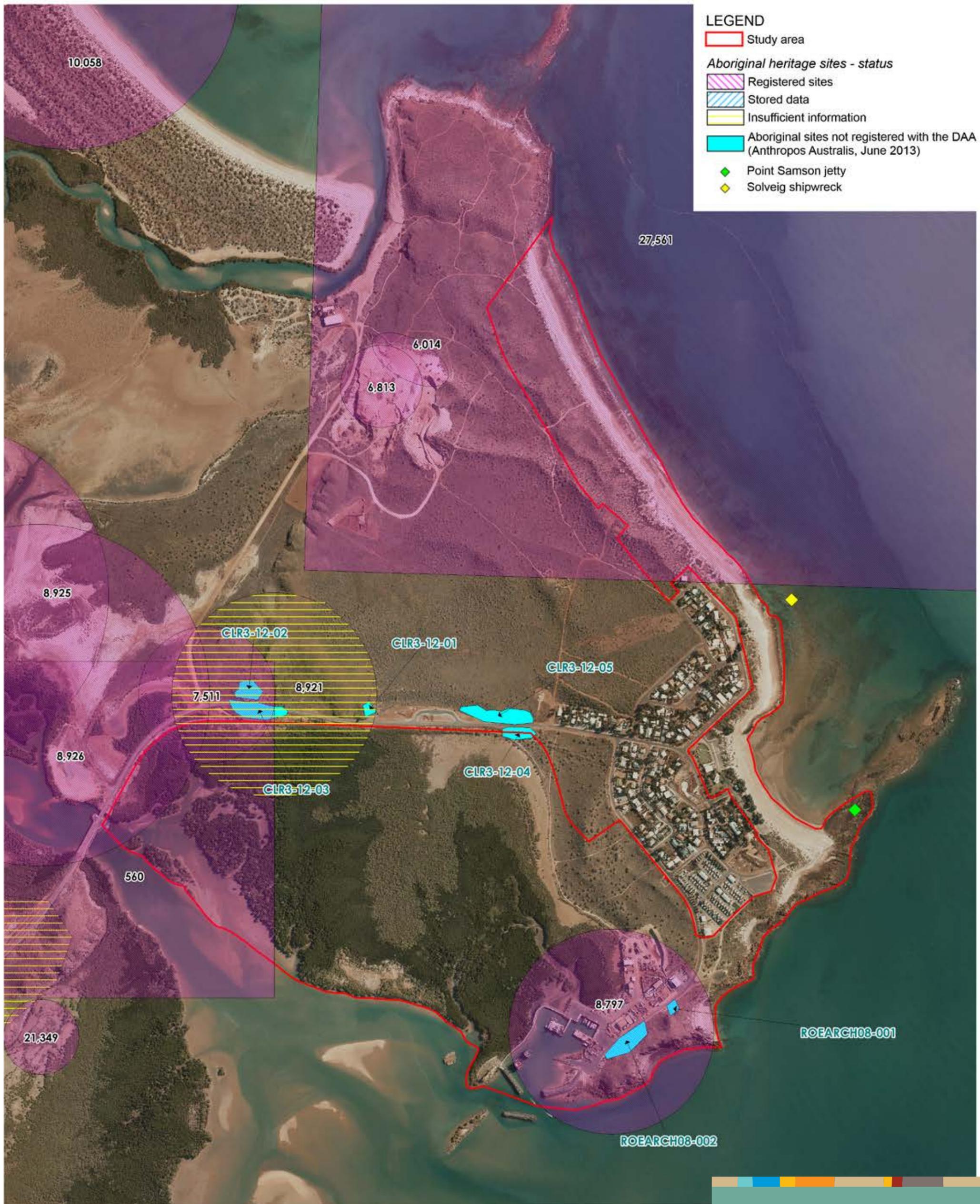
A report from the EPBC Act Protected Matters database found no listings of sites on the Register of National Estate, nor Commonwealth Heritage Places within a 1.5 km radius of the centre of the Point Samson peninsula (Appendix 2).

Table 3: Registered Aboriginal sites listed in the AHIS in Point Samson

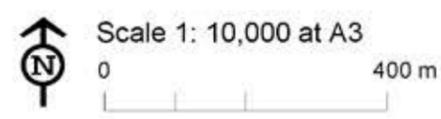
Site ID	Name	Type
27561	Sam’s Creek Burial Site	Skeletal material/Burial
6813	Sam’s Creek Midden	Artefacts/Scatter, Midden/Scatter
8797	Point Samson 1	Artefacts/Scatter, Midden/Scatter (shell)
560	Roebourne Midden	Midden/Scatter
7511	Popes Nose	Quarry, Artefacts/Scatter, Midden/Scatter
8926	Jintupi Midden	Artefacts/Scatter, Midden/Scatter
6014	Able Mine	Artefacts/Scatter, Midden/Scatter
8921	Point Samson 2	Midden/Scatter

Shire of Roebourne, Point Samson foreshore management plan

Figure 4 - Heritage



* ©2014. While Essential Environmental has taken care to ensure the accuracy of this product, Essential Environmental and client make no representations or warranties about its accuracy, completeness or suitability for any particular purpose. Essential Environmental and client cannot accept liability of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred as a result of the product being inaccurate, incomplete or unsuitable in any way and for any reason. Data source: Landgate, Shire of Roebourne, Anthropos Australis. Created by: H. Lamparski Projection: MGA50; zone 50.



2.4 Recreational values

The recreational values of the Point Samson foreshore are of particular importance to the town's local community. The town is recognised as a small, peaceful and picturesque coastal retreat and maintains a strong tourism business, leading to its reputation as a regional and state attraction.

The major attractions at Point Samson include its protected beaches fringed with coral reefs and rocky platforms, rock groins and boat ramps offering easy access to deep water for fishing. The tidal rivers (John's Creek and Sam's Creek) also contain a variety of fish, prawns and mud crabs in and around the mangrove swamps. The Johns Creek boat harbour also holds interest due to its berthing of a large fishing fleet which operate out of the marina all year round.

Access to these locations via different transport methods is important to ensure recreational activity is supported by residents and visitors with varied motivations. Some vehicle access, car parks, and pedestrian walk and cycle ways from the town centre to these sites is currently available, primarily to the main beach and Honeymoon Cove.

A number of caravan parks, chalets, resort and tavern are available to accommodate visitors and encourage recreational activity in the town.

The major recreational activities undertaken at Point Samson include:

- Fishing, crabbing, prawning
- Boating
- Swimming
- Walking and cycling
- Dog-walking

A Fish Habitat Protection Area was established over Point Samson Reef by the Department of Fisheries under Section 43 of the under Fish Resources Management Act. The Point Samson Reef Fish Habitat Protection Area stretches from the point north of Sam's Creek south to the Old Jetty site, and is considered a major asset to the Point Samson community. Only certain limited recreational fishing is allowed in the Protection Area, which is defined as occurring from the high tide mark seaward, including the reef platform.

2.5 Resource values

A few tenements currently exists for the extraction of construction materials from the sand dunes in the north western portion of the conservation, Recreation and Natural Landscapes reserve near Sam's Creek by Karratha Earthmoving and Sand Supplies. These tenements are due to expire between 2020 and 2031. It is expected that the removal of sand will extend to the extent and life of the tenements.

Sand extraction has, in the past, unearthed Aboriginal remains and has the potential to destroy or adversely affect archaeological relics. Some of the sites where this is known to have occurred include Point Samson, Nickol River and Karratha Back Beach. Indiscriminate (illegal) removal of sand also occurs on numerous sites where access is uncontrolled, usually for minor domestic construction and garden landscaping. Both licensed and indiscriminate extraction has the potential to degrade dune systems.

Site selection for proposed quarrying activities must have regard to localised coastal processes. The approval of such quarries on beaches or primary dune systems should be discouraged. Primary dunes are frequently altered during cyclones and offer some protection to inland areas and towns such as Karratha during periods of high-energy storm activity.

Any extractive industries located over Crown land are determined under the *Mining Act 1972*.

Section 3

Managing the Foreshore



3. Managing the Foreshore

Point Samson is highly regarded by the Pilbara community and visitors to the region as a place for recreation associated with coastal activities. The Point Samson community has been working to create an iconic foreshore and active recreational precinct (UDLA, 2013). In order to achieve this vision, there are several key issues that need to be addressed. These are outlined below.

3.1 Issues

Key issues associated with the Point Samson Foreshore area relate to coastal vulnerability; access and infrastructure; and vegetation management.

3.1.1 Flooding, coastal vulnerability and sea level rise

Due to the unreliable and highly variable rainfall experienced in the northwest coast of WA, much of the region is subject to major flooding during cyclonic events due to riverine flooding and local runoff from smaller catchments. Given that the townsite of Point Samson is located directly on the Pilbara coast, it is also exposed to coastal forces associated with tropical cyclones which can cause significant erosion of coastal landforms and infrastructure. In addition, the nature and intensity of storm activity in the region is known to result in significant short term impacts on tides, such that parts of the study area will be at risk of inundation during storm surge events.

The risks from flooding, sea level rise and storm surge have recently been investigated as part of a number of studies including:

1. The *West Pilbara Cyclonic Storm Surge Study* (GEMS 2009) was prepared for the Shire of Roebourne to refine previous estimates of storm surge in the Cape Lambert area, computing water levels for the 100-year ARI and “design storm” inundation estimates consistent with currently gazetted SPP2.6.
2. *Point Samson Foreshore Assessment* (Damara, 2013), prepared for the Point Samson Community Association examines coastal processes relevant to management of the foreshore associated with the existing townsite.
3. The *Karratha drainage management plan* (GHD 2010) was prepared to examine the condition of drains within the Karratha townsite and to provide guidance for management and future expansion of the drainage network.
4. The *Karratha coastal vulnerability study* (Karratha CVS) (JDA et al. 2011) was recently undertaken to study the impacts of climate change, characterise the hydrology around Karratha, assess shoreline stability in Nickel Bay and model flooding from storm surge and riverine flooding.
5. The *Stormwater and Coastal Management Strategy* prepared for Point Samson (Essential Environmental, 2013) outlines the flood risks and coastal vulnerability of the townsite in the context of current climate conditions and predicted climate change, including increasing variability and sea level rise.

The findings of these studies have been taken into consideration as part of the development of this Foreshore Management Plan. Key findings suggest that areas of the foreshore may be subject to:

1. Inundation risk from flooding and storm surge (specifically the beach foreshore). This may affect the location of permanent structures (toilets, structures, BBQs, footpaths), as well as the type of land uses permitted in proximity to the foreshore
2. Wave action/run-up – which may be a safety concern for pedestrians.
3. Sea level change. This may affect the location of permanent structures, as well as the land use type
4. Tidal influences. This may affect the location of permanent structures and access
5. Areas of erosion, location and movement of foredunes. This may require the establishment of a setback (or coastal foreshore reserve) of 85-150 m, where it is necessary to allow natural erosion processes to take place. It is likely that revegetation will be required within this area.
6. Cyclones. There is a need to ensure that any foreshore infrastructure considers the risk of wind, storm surge and sand movement associated with cyclones and storms
7. Signage is required for all of the above risks

3.1.2 Access and infrastructure

The Town Beach area of the Point Samson foreshore is well utilised by the community and visitors for swimming and passive recreation. Existing access is primarily through the northern carpark opposite the Community Hall, through many informal tracks. It is recommended that pedestrian access onto the beach and foreshore area is controlled through more formal pathways to discourage random access which can destroy sensitive dune structures and vegetation.

There is no vehicle access onto the beaches of Point Samson. This provides a safe environment for pedestrians along the beach. There are also a number of informal paths that exist that join sections of beach with the various car parks. An opportunity exists to improve the definition and connectivity of the pedestrian paths, potentially linking with the Emma Withnell Heritage Trail.

It is noted that a number of car parks are located within the primary foreshore area, and these locations are subject to coastal processes. Consideration needs to be given to the access and movement networks as part of the strategy to address coastal vulnerability, as it is recommended that the un gazetted road is closed and rehabilitated to allow the re-establishment of the primary dune.

Access to the Sam's Creek headland area is important for Traditional Owners to allow them to undertake cultural activities associated with their custodianship of the land, as well as activities associated with the coast, such as fishing.

Long term planning for Johns Creek Boat Harbour is currently being undertaken by the Department of Transport. The implementation of this foreshore management plan will need to consider the outcome of any future planning for the boat harbour, in consultation with the Department of Transport.

3.1.3 Weeds

Much of the vegetation within the foreshore reserve has been impacted by weeds. Key weed species include *Cenchrus ciliaris* (buffel grass) and *Aerva javanica* (kapok) which are found in the dunes in the northern, town beach, and southern areas of the foreshore. Tamarisk trees (*Tamarix aphylla*) are also found along the Town Beach area and these have been recommended by UDLA to be removed to re-establish views and connectivity to the beach. Shade can then be provided by constructed shelters.

3.2 Recommendations

The following recommendations are made in response to the identified impacts of coastal vulnerability, access, infrastructure and weeds within the Point Samson Foreshore, having consideration of information provided by key stakeholders and the community.

The recommendations have been made in order to achieve the following objectives:

- Protect, maintain and where possible, enhance the environmental and cultural values of the site which underpin the enjoyment and usage of the Point Samson Foreshore by Traditional Owners, residents and visitors.
- Provide for a range of active and passive recreational activities and experiences appropriate to the coast without compromising the cultural and environmental values of the area.
- Ensure infrastructure within the foreshore area is located with consideration of coastal vulnerability including sea level rise and storm surge.

The recommendations of the Point Samson Foreshore Management Plan are depicted in Figures 5 to 11. They are supportive of and consistent with the recommendations made by the Point Samson Community Association in their *Point Samson Foreshore Enhancement Plan - Masterplan* (UDLA, 2013).

3.2.1 Protect townsites from coastal processes

The coastal vulnerability and surface water assessments undertaken as part of the draft *Point Samson Stormwater and coastal management strategy* (Essential Environmental, 2013) identify a number of risks associated with the protection of assets and achievement of social outcomes for the Point Samson community along the foreshore. These risks include:

- Erosion of natural systems leading to loss of dune and mangrove ecosystems
- Beach degradation as a result of inadequate space for dune, beach and mangrove migration due to coastline recession
- Inundation of infrastructure or property during storm surge event leading to damage and/or health and safety impacts
- Human activities undermining stability of coastal systems
- Development reducing visual amenity of coastline and reducing access

These risks, which arise mostly from predicted storm surges and sea level rise, require consideration as part of any decision regarding land use and/or development within the foreshore area.

In order to address the risks of inundation and flooding of the coast, the draft *Point Samson Stormwater and coastal management strategy* (Essential Environmental, 2013) recommends the following mitigation measures:

- Minimum setback for permanent infrastructure should include allowance for erosion (including sea level rise) over 100yrs.
- Control beach access through managed access points designed to minimise impacts
- Developments to allow continued appropriate public access for beach access
- Design of developments to limit height and consider visual impacts
- Rehabilitation to remaining coastal access points to reduce risk of damage

In order to address the findings of the report and provide protection to the Point Samson town, it has been recommended that the ungazetted Town Beach foreshore road and turn around area is transformed into a linear park and reinstated foreshore dune revegetation area (Figure 8). The foredune and linear park are to be defined by a strong edge treatment of a dual use path. The linear park could include hardstand areas with shelters, seating and barbeques, break out exercise or play nodes, open grassed areas with shady trees, concrete path and low wall to define the edge of dune system (UDLA, 2013).

It is recognised that the draft *Point Samson Stormwater and coastal management strategy* (Essential Environmental, 2013) has yet to be finalised and it is anticipated that this will occur in consultation with the Shire and the Department of Planning. Any future decisions regarding the provision of infrastructure and location of uses within the foreshore reserve should consider the findings of the final *Point Samson Stormwater and coastal management strategy* and manage the identified risks appropriately.

3.2.2 Improve facilities and infrastructure

The Point Samson community is currently working together to identify opportunities to enhance the recreational experiences that are currently provided by the Point Samson foreshore. Key aspects of this vision include the provision of shade, seating, barbeque facilities, pathways and cycleways, as well as a boat ramp, boat house and storage facility.

There is a strong need to improve the delineation of pathways and provide better pedestrian linkages between the four beaches and link to other tourist destinations along the foreshore including the caravan park, tavern and playground (Figure 5). The pathways should also provide defined access points to the beaches to reduce impacts on dunal systems.

It is desired that the walk trail commences at a viewing platform at the northern beach at the north bend of Meares Drive (which we have named Sam's Beach) (Figure 7), along Meares Drive, through the pedestrian precinct (Figure 8) to a boardwalk amongst the dunes (Figure 9), which connects to Honeymoon Cove (Figure 10) and on to Johns Creek Boat Harbour and the lookout (Figure 10). An additional pathway has been proposed that links John's Creek Boat harbour with the skate park in town, through a series of walk trails and a look out that celebrates the beauty of the mangroves (Figure 6). All pathways and treatments should be robust, low maintenance and reflective of the Pilbara climate and environment (UDLA, 2013).

The *Point Samson Foreshore Enhancement Plan - Masterplan* (UDLA, 2013) also recommends increasing recreational opportunities by providing temporary recreational hubs such as 'pop up' shops and sheds at peak times for fishing, snorkelling or water sports. Opportunities to incorporate cultural and contemporary artwork should also be investigated.

Suitable cultural signage is important for the Ngarluma people and should be constructed at key locations along the proposed walk trail and pathways. Cultural and environmental signage in both English and Ngarluma language should explain the environmental and cultural significance of the area to the Ngarluma people, and outline appropriate practices or behaviour to observe when in the area. The location and wording for signage should be prepared in collaboration with the Ngarluma Aboriginal Corporation and considered by the Ngarluma Elders.

3.2.3 Revegetate degraded areas

As identified in section 3.1, there is a need to revegetate some degraded areas and address existing weeds. The *Point Samson Foreshore Enhancement Plan - Masterplan* (UDLA, 2013) recommends the systematic removal of the existing Tamarisk trees to allow the re-establishment of the fore-dune and appropriate coastal vegetation. However, due to community concerns regarding this recommendation, removal and rehabilitation of Tamarisk trees will only occur when the community is generally in favour of removing of specific trees, or when required for community safety.

Other areas requiring weed management and revegetation include the top of the dune opposite Meares Drive, the Point, particularly outside the Tavern and jetty entrance, and areas of imported gravel towards honeymoon Cove.

3.3 Implementation

The recommendations of the Point Samson Foreshore Management plan are to be undertaken by the Shire of Roebourne in partnership with the Point Samson Community Association and the Traditional Owners, with assistance from the broader community and other stakeholders.

Recommended actions are summarised in table 4. It is recognised that further detailed work will be required, including detailed design and costing of infrastructure, to facilitate implementation in some instances. Implementation of identified priorities will also be dependent on available resources including funding.

Any earthworks undertaken within the foreshore area will need to consider and manage the possibility of the presence of asbestos which has previously been recorded in the vicinity of the foreshore area as a result of historical shipping of Wittenoom asbestos through Point Samson. Activities should be undertaken in accordance with the *Contaminated Sites Act 2003*, the Department of Environment Regulation's Guidelines for Contaminated Sites (see www.der.wa.gov.au) and the Department of Health's Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009) (see http://www.public.health.wa.gov.au/3/1144/2/contaminated_sites.pm).

Any ground disturbing works will also require Aboriginal Heritage Surveys and Section 18 Applications where necessary to meet with the requirements of the *Aboriginal Heritage Act (1972)*. Aboriginal Heritage Monitoring may also be required during the undertaking of the ground disturbing works if heritage sites are identified. Cultural Heritage Management Plans should be produced after the Survey work has been completed and all the Aboriginal sites have been located.

Table 4: Recommended actions for implementation

Recommendation	Location	Priority
Establish joint management framework for implementation actions and ongoing management between the Shire, Community and the Ngarluma people	Point Samson foreshore area	High
Close Town Beach foreshore road and turn around area	Town Beach	High
Rehabilitate the foredune with appropriate fencing and vegetation once established	Town Beach	High
Provide fenced pedestrian access to the beach	Sam's Beach, Town Beach, outside caravan park, Honeymoon Cove	High
Define walk trail including provision of concrete footpath where necessary	Sam's beach to John's Creek John's Creek to Skate Park	High Medium
Provide shade (shelters and trees), seating and BBQs	(3) Town Beach, (4) the Point, (5) Honeymoon Cove	3 - High 4, 5 - Low
Construct lookout	(1) Mangrove Lookout, (2) Sam's Beach	Low Medium
Construct exercise or play area	(3) Town Beach, (4) the Point	Medium
Incorporate Town history, Aboriginal culture and environmental education through installation of interpretive signage	(1) Mangrove Lookout, (2) Sam's Beach, (3) Town Beach, (4) the Point, (5) Honeymoon Cove	Low
Installation of fish cleaning table with dedicated bin	(6) Johns Creek Harbour	High
Provide appropriate signage to control access and activities	Throughout study area	Low
Build Boardwalk	From the Point to Honeymoon Cove	Medium
Design and construct the Boat House as appropriate	Town Beach	Medium
Undertake weed management and revegetation of dunes	(3) Town Beach, (4) the Point, (5) Honeymoon Cove	Medium

3.4 Monitoring and review

It is recommended that the implementation of this Foreshore Management Plan is audited annually and outstanding actions incorporated into the shire's asset management program. The effectiveness of the Foreshore Management Plan should be reviewed in 5 years and updated as required.

Shire of Roebourne - Point Samson foreshore management plan

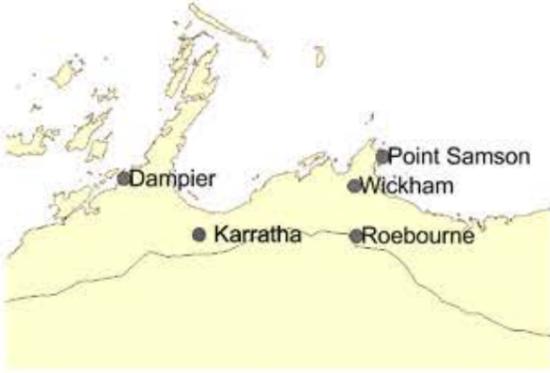
Figure 5 - Plan overview



*©2014. While Essential Environmental has taken care to ensure the accuracy of this product, Essential Environmental and client make no representations or warranties about its accuracy, completeness or suitability for any particular purpose. Essential Environmental and client cannot accept liability of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred as a result of the product being inaccurate, incomplete or unsuitable in any way and for any reason. Data sources: UDLA, Landgate, Geoscience Australia, Created by: H Brookes, Projection: MGA50: zone 50.

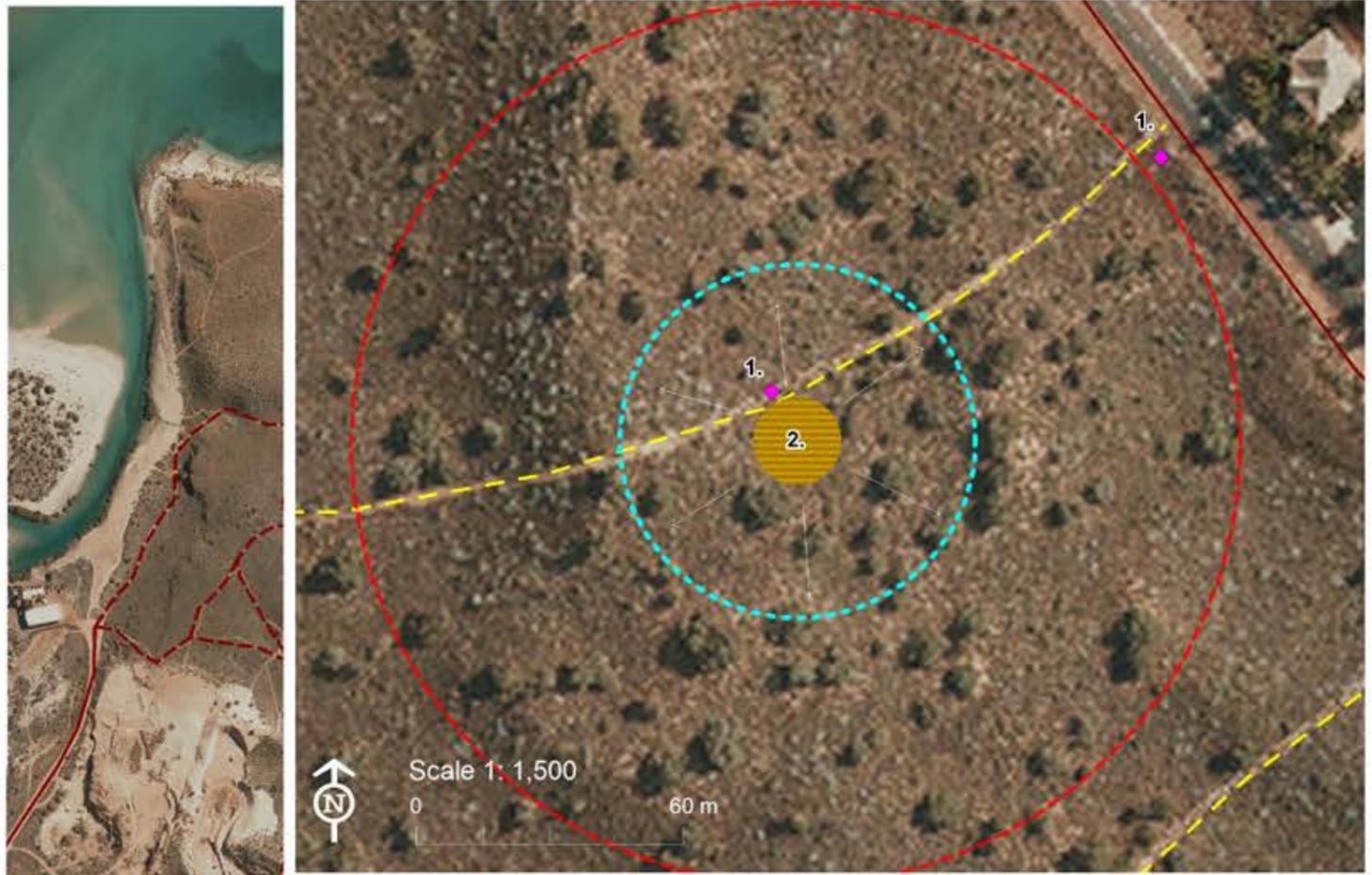
Shire of Roebourne - Point Samson foreshore management plan

Figure 6 - Node 1: Mangrove Lookout

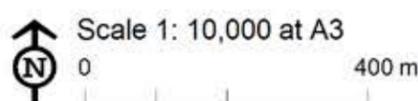


NOTES:

1. Establish signage identifying historic and environmental values of area.
2. Construct lookout with 360 degree views of townsite and mangroves.

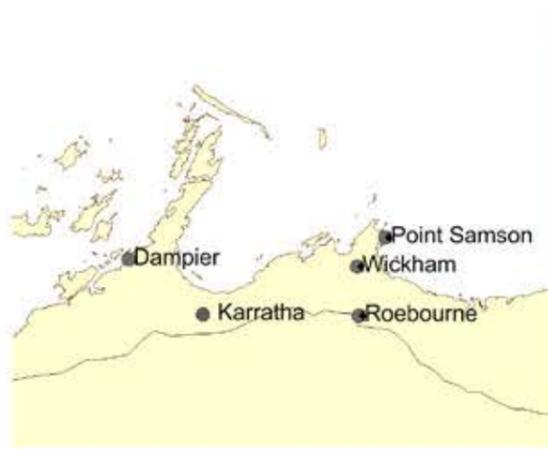


*©2014. While Essential Environmental has taken care to ensure the accuracy of this product, Essential Environmental and client make no representations or warranties about its accuracy, completeness or suitability for any particular purpose. Essential Environmental and client cannot accept liability of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred as a result of the product being inaccurate, incomplete or unsuitable in any way and for any reason. Data sources: UDLA, Landgate, Geoscience Australia, Created by: H Brookes, Projection: MGA50: zone 50.



Shire of Roebourne - Point Samson foreshore management plan

Figure 7 - Node 2: Sam's Beach



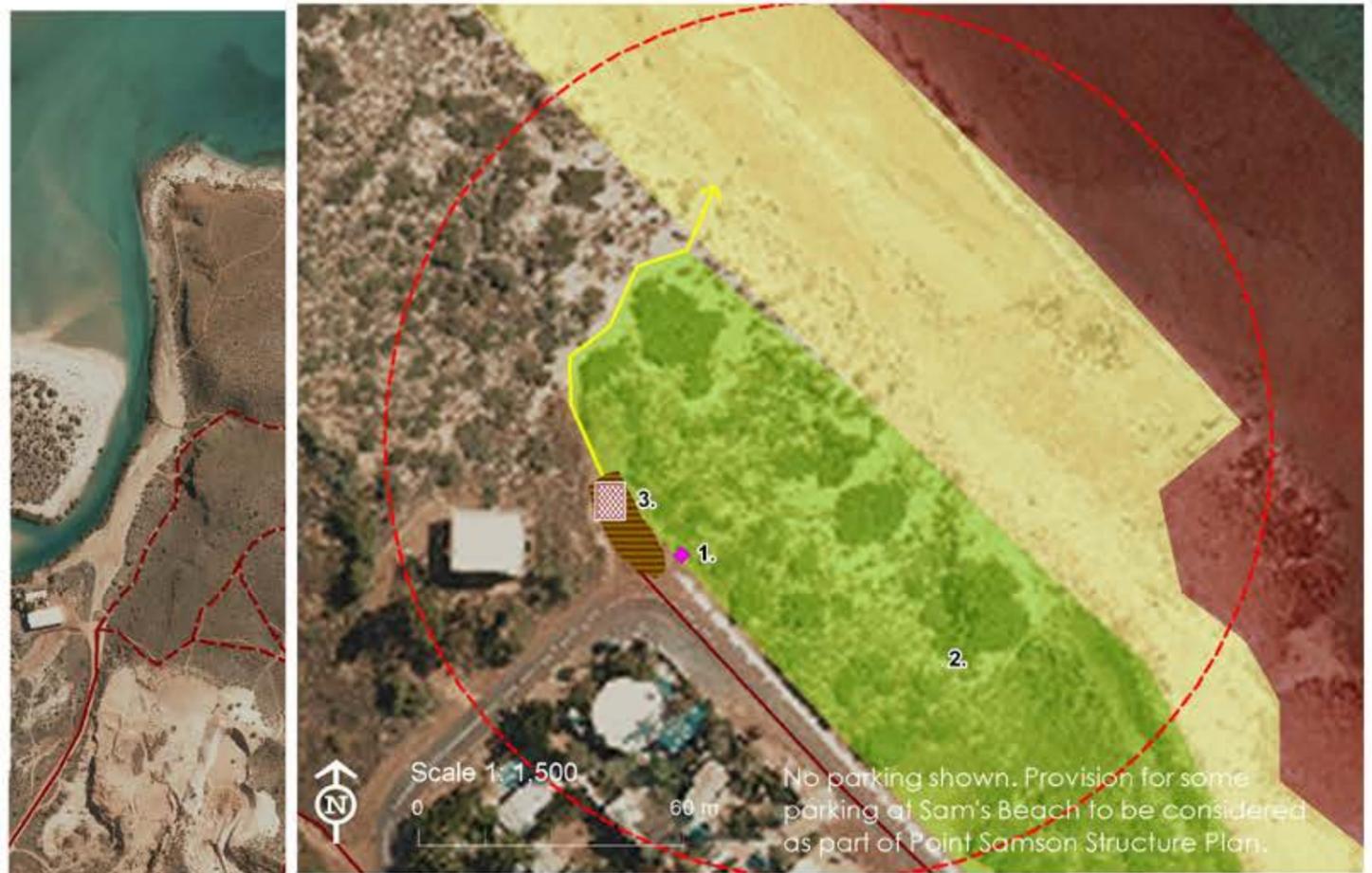
NOTES:

1. Establish signage identifying historic and environmental values of area.
2. Undertake dune restoration and revegetation.
3. Beach access to commence with a decked lookout area with shelter and consider prevailing wind and steps as appropriate

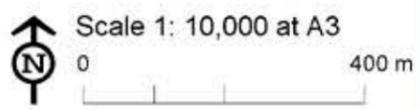


LEGEND

	Mangroves
	Beach
	Rocks
	Dune revegetation area
	Lookout
	Recreation node

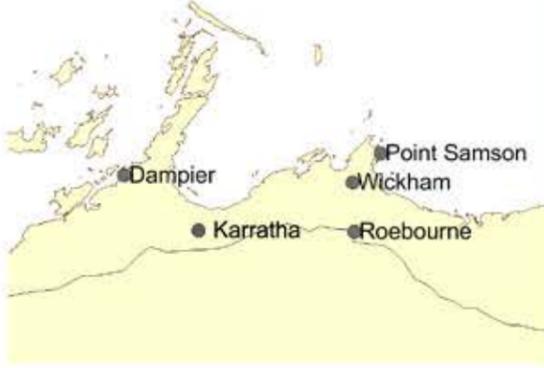


Essential Environmental and client make no representations or warranties about its accuracy, completeness or suitability for any particular purpose. Essential Environmental and client cannot accept liability of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred as a result of the product being inaccurate, incomplete or unsuitable in any way and for any reason. Data sources: UDLA, Landgate, Geoscience Australia, Created by: H Brookes, Projection: MGA50: zone 50.



Shire of Roebourne - Point Samson foreshore management plan

Figure 8 - Node 3: Town Beach



NOTES:

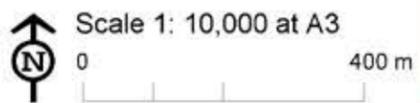
1. Removal of Tamarisk Trees to occur under community direction.
2. Remove existing road and undertake dune restoration and revegetation.
3. Install sawtooth dune stabilisation structures.
4. Landscaping and tree planting to improve amenity.



- LEGEND**
- Mangroves
 - Beach
 - Rocks
 - Dune revegetation area
 - Lookout
 - Recreation node



* ©2014. While Essential Environmental has taken care to ensure the accuracy of this product, Essential Environmental and client make no representations or warranties about its accuracy, completeness or suitability for any particular purpose. Essential Environmental and client cannot accept liability of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred as a result of the product being inaccurate, incomplete or unsuitable in any way and for any reason. Data sources: UDLA, Landgate, Geoscience Australia, Created by: H Brookes, Projection: MGA50: zone 50.



Shire of Roebourne - Point Samson foreshore management plan

Figure 9 - Node 4: The Point



NOTES:

1. Construct feature walk to Jetty with signage.
2. Remove existing road and undertake dune restoration and revegetation.
3. Install sawtooth dune stabilisation structures.
4. Landscaping and tree planting to improve amenity
5. Construct shelter/barbeque area



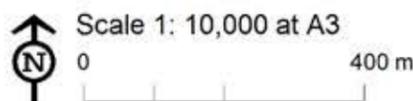
LEGEND

	Mangroves
	Beach
	Rocks
	Dune revegetation area
	Lookout
	Recreation node

SYMBOLOLOGY

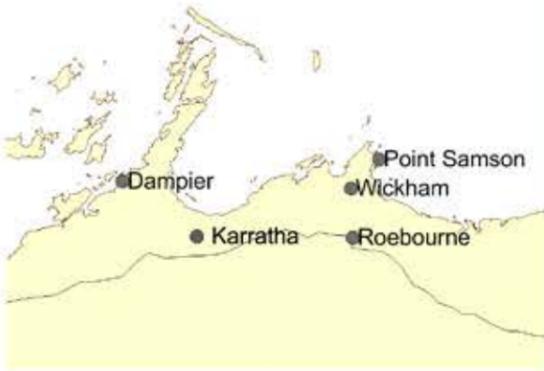
	Car parking		Planted tree
	Landscaped area		Signage
	Boat ramp		Sawtooth dune stabilisation
	Boatshed		Barbeques
	Footpath		Rubbish bins
	Road		Toilets
	Track		Fish cleaning facilities
	Pedestrian access to beach		Shelter
	Boardwalk/decking		Exercise or play area
			Historic locomotive

*©2014. While Essential Environmental has taken care to ensure the accuracy of this product, Essential Environmental and client make no representations or warranties about its accuracy, completeness or suitability for any particular purpose. Essential Environmental and client cannot accept liability of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred as a result of the product being inaccurate, incomplete or unsuitable in any way and for any reason. Data sources: UDLA, Landgate, Geoscience Australia, Created by: H Brookes, Projection: MGA50; zone 50.



Shire of Roebourne - Point Samson foreshore management plan

Figure 10 - Node 5: Honeymoon Cove



NOTES:

1. Construct boardwalk connection to Jetty with signage.
2. Landscaping and tree planting to improve amenity.
3. Retain existing toilets, shelters/barbeque area.



LEGEND

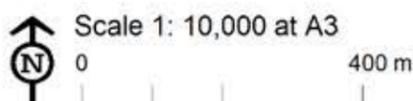
	Mangroves
	Beach
	Rocks
	Dune revegetation area
	Lookout
	Recreation node



SYMBOLOLOGY

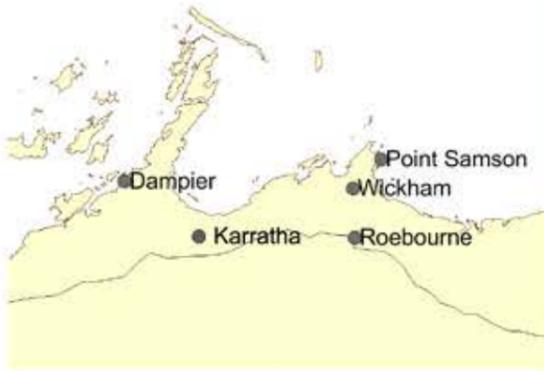
	Car parking
	Landscaped area
	Boat ramp
	Boatshed
	Footpath
	Road
	Track
	Pedestrian access to beach
	Boardwalk/decking
	Planted tree
	Signage
	Barbeques
	Rubbish bins
	Toilets
	Fish cleaning facilities
	Shelter

*©2014. While Essential Environmental has taken care to ensure the accuracy of this product, Essential Environmental and client make no representations or warranties about its accuracy, completeness or suitability for any particular purpose. Essential Environmental and client cannot accept liability of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred as a result of the product being inaccurate, incomplete or unsuitable in any way and for any reason. Data sources: UDLA, Landgate, Geoscience Australia, Created by: H Brookes, Projection: MGA50: zone 50.



Shire of Roebourne - Point Samson foreshore management plan

Figure 11 - Node 6: Johns Creek Boat Harbour



NOTES:

1. Provide safe marked footpaths through harbour area.
2. Construct fish cleaning facilities and shelter.
3. Retain existing toilets, shelters and bins.



LEGEND

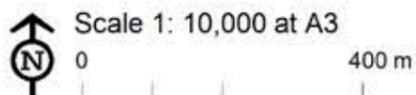
	Mangroves
	Beach
	Rocks
	Dune revegetation area
	Lookout
	Recreation node



SYMBOLY

	Car parking
	Landscaped area
	Boat ramp
	Boatshed
	Footpath
	Road
	Track
	Pedestrian access to beach
	Boardwalk/decking
	Planted tree
	Signage
	Barbeques
	Rubbish bins
	Toilets
	Fish cleaning facilities
	Shelter

Essential Environmental and client make no representations or warranties about its accuracy, completeness or suitability for any particular purpose. Essential Environmental and client cannot accept liability of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred as a result of the product being inaccurate, incomplete or unsuitable in any way and for any reason. Data sources: UDLA, Landgate, Geoscience Australia, Created by: H Brookes, Projection: MGA50: zone 50.



4. References

Anthropos Australis Pty Ltd, 2013, The report of a desktop study of the Aboriginal and European Heritage sites in Point Samson, West Pilbara region, Western Australia (draft). For the Shire of Roebourne and the Ngarluma Aboriginal Corporation (Registered Native Title Body Corporate), June 2013

Damara WA Pty Ltd, *Point Samson Foreshore Assessment for the Point Samson Community Association – draft, Perth.*

Department of Health 2009, *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, Perth.*

Essential Environmental 2013, *Point Samson Stormwater and coastal management strategy, prepared for the Shire of Roebourne, draft, May 2013.*

GEMS 2009 - Global Environmental Modelling Systems Pty Ltd (GEMS), 2009, *West Pilbara Cyclonic Surge Inundation Study for the Shire of Roebourne*

Geoscience Australia 2013 – Geoscience Australia 2013, *OzCoasts Australian Online Coastal Information - Changes in mangrove areas.* Available from: <http://www.ozcoasts.gov.au/indicators/mangrove_areas.jsp> [2nd July 2013]

GHD 2010 – GHD Pty Ltd 2010, *Karratha drainage management plan*, prepared for the Shire of Roebourne, GHD, Perth.

JDA et al 2011 - JDA Consultant Hydrologists, Global Environmental Modelling Systems, Damara WA Pty Ltd, Coastal Zone Management, DHI Water & Environment, 2011, *Karratha coastal vulnerability study*, prepared for LandCorp, Perth WA

Landvision, 2011, *Shire of Roebourne Coastal Management Strategy Position Paper.*

Ngarluma Aboriginal Corporation (NAC) 2013, *About NAC.* Available from: <<http://www.ngarluma.com.au/about-nac/>> [29th May 2013].

UDLA, 2013, *Point Samson Foreshore Enhancement Plan – Masterplan.* Prepared by UDLA for the Point Samson Community Association, 2013.

WAPC, 2012, *Pilbara Planning and Infrastructure Framework*, Western Australian Planning Commission, Perth.

Ward et al 1998 – Ward T., Butler E. and Hill B., 1998, *Environmental Indicators for National State of the Environment Reporting – Estuaries and the Sea, Australia: State of the Environment (Environmental Indicator Reports)*, Department of the Environment, Canberra.

Western Australian (WA) Museum 2013, *Shipwrecks Databases Solveig (1903/02/19) Point Samson.* Available from: <<http://museum.wa.gov.au/maritime-archaeology-db/wrecks/id-1381>> [29th May 2013].

Appendix 1

Naturemap
Search Results



NatureMap Species Report

Created By Guest user on 27/05/2013

Current Names Only Yes
 Core Datasets Only Yes
 Method 'By Circle'
 Centre 117°11' 16" E,20°37' 32" S
 Buffer 1.5km
 Group By Conservation Status

Conservation Status	Species	Records
Rare or likely to become extinct	5	10
Protected under international agreement	15	39
Other specially protected fauna	1	1
Priority 1	1	1
Priority 3	1	2
Non-conservation taxon	117	324
TOTAL	140	377

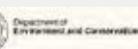
Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Rare or likely to become extinct				
1.	25576 <i>Charadrius mongolus</i> (Lesser Sand Plover)		T	
2.	24093 <i>Dasyurus hallucatus</i> (Northern Quoll)		T	
3.	30921 <i>Lerista neviniae</i> (slider, skink)		T	
4.	24051 <i>Megaptera novaeangliae</i> (Humpback Whale)		T	
5.	24798 <i>Numerius madagascariensis</i> (Eastern Curlew)		T	
Protected under international agreement				
6.	41323 <i>Actitis hypoleucos</i> (Common Sandpiper)		IA	
7.	41324 <i>Ardea modesta</i> (Eastern Great Egret)		IA	
8.	25736 <i>Arenaria interpres</i> (Ruddy Turnstone)		IA	
9.	24780 <i>Calidris alba</i> (Sanderling)		IA	
10.	25738 <i>Calidris canutus</i> (Red Knot)		IA	
11.	24788 <i>Calidris ruficollis</i> (Red-necked Stint)		IA	
12.	25575 <i>Charadrius leschenaultii</i> (Greater Sand Plover)		IA	
13.	24293 <i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)		IA	
14.	30932 <i>Limosa lapponica</i> (Bar-tailed Godwit)		IA	
15.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)		IA	
16.	25742 <i>Numerius phaeopus</i> (Whimbrel)		IA	
17.	24382 <i>Pluvialis fulva</i> (Pacific Golden Plover)		IA	
18.	25642 <i>Sterna hirundo</i> (Common Tern)		IA	
19.	24803 <i>Tringa brevipes</i> (Grey-tailed Tattler)		IA	
20.	24809 <i>Tringa stagnatilis</i> (Marsh Sandpiper)		IA	
Other specially protected fauna				
21.	25624 <i>Falco peregrinus</i> (Peregrine Falcon)		S	
Priority 1				
22.	41920 <i>Tephrosia rosea</i> var. <i>Port Hedland</i> (A.S. George 1114)		P1	
Priority 3				
23.	17427 <i>Eragrostis lanicaulis</i>		P3	
Non-conservation taxon				
24.	13500 <i>Acacia coriacea</i> subsp. <i>coriacea</i>			
25.	3356 <i>Acacia gregorii</i> (Gregory's Wattle)			
26.	15203 <i>Acacia sabulosa</i>			
27.	25349 <i>Acalyptophis peronii</i>			
28.	6478 <i>Aegiceras corniculatum</i> (River Mangrove)			
29.	2646 <i>Aerva javanica</i> (Kapok Bush)	Y		
30.	20018 <i>Amaranthus undulatus</i>			
31.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
32.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
33.	25567 <i>Artamus leucorhynchus</i> (White-breasted Woodswallow)			
34.	24355 <i>Artamus minor</i> (Little Woodswallow)			

NatureMap is a collaborative project of the Department of Environment and Conservation, Western Australia, and the Western Australian Museum.



Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
35.	-18013 <i>Broghammerus reticulatus</i>			Y
36.	25716 <i>Cacatua sanguinea</i> (Little Corella)			
37.	3749 <i>Canavalia rosea</i> (Wild Jack Bean)			
38.	11670 <i>Capparis spinosa</i> var. <i>nummularia</i> (Coastal Caper)			
39.	39680 <i>Ceriops australis</i>			
40.	24377 <i>Charadrius ruficapillus</i> (Red-capped Plover)			
41.	2988 <i>Cleome viscosa</i> (Tickweed, Tjinduwadhu)			
42.	24399 <i>Columba livia</i> (Domestic Pigeon)	Y		
43.	2776 <i>Commicarpus australis</i> (Perennial Tar Vine)			
44.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
45.	4862 <i>Corchorus parviflorus</i>			
46.	4867 <i>Corchorus walcottii</i> (Woolly Corchorus)			
47.	25701 <i>Coturnix ypsilophora</i> (Brown Quail)			
48.	24420 <i>Cracticus nigrogularis</i> (Pied Butcherbird)			
49.	3774 <i>Crotalaria cunninghamii</i> (Green Birdflower, Bilbun)			
50.	24874 <i>Ctenophorus isolepis</i> subsp. <i>citrinus</i> (Crested Dragon, Military Dragon)			
51.	25073 <i>Ctenotus saxatilis</i> (Rock Ctenotus)			
52.	25077 <i>Ctenotus serventyi</i>			
53.	15714 <i>Cullen stipulaceum</i>			
54.	13733 <i>Cuscuta victoriana</i>			
55.	24631 <i>Emblema pictum</i> (Painted Finch)			
56.	357 <i>Erneapogon caerulescens</i> (Limestone Grass)			
57.	24653 <i>Eopsaltria pulverulenta</i> (Mangrove Robin)			
58.	25362 <i>Ephalophis greyae</i>			
59.	25578 <i>Ephippiorhynchus asiaticus</i> (Black-necked Stork)			
60.	378 <i>Eragrostis dielsii</i> (Mallee Lovegrass)			
61.	380 <i>Eragrostis eriopoda</i> (Woollybutt Grass, Wangumu)			
62.	408 <i>Eriachne flaccida</i> (Claypan Grass)			
63.	413 <i>Eriachne mucronata</i> (Mountain Wanderrie Grass)			
64.	414 <i>Eriachne obtusa</i> (Northern Wandarie Grass)			
65.	24360 <i>Esacus neglectus</i> (Beach Stone-curlew)			
66.	11011 <i>Eulalia aurea</i>			
67.	11200 <i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			
68.	25622 <i>Falco cenchroides</i> (Australian Kestrel)			
69.	35558 <i>Flaveria trinervia</i> (Speedy Weed)	Y		
70.	25327 <i>Fordonia leucobalia</i> (White-bellied Mangrove Snake)			
71.	24958 <i>Gehyra punctata</i>			
72.	24402 <i>Geopelia humeralis</i> (Bar-shouldered Dove)			
73.	25585 <i>Geopelia striata</i> (Zebra Dove)			
74.	24276 <i>Gerygone tenebrosa</i> (Dusky Gerygone)			
75.	18363 <i>Gomphrena canescens</i> subsp. <i>canescens</i>			
76.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
77.	25627 <i>Haematopus fuliginosus</i> (Sooty Oystercatcher)			
78.	24487 <i>Haematopus longirostris</i> (Pied Oystercatcher)			
79.	25541 <i>Haliastur indus</i> (Brahminy Kite)			
80.	24295 <i>Haliastur sphenurus</i> (Whistling Kite)			
81.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
82.	-12000 <i>Holconia neglecta</i>			
83.	3980 <i>Indigofera linifolia</i>			
84.	-12507 <i>Isopedella gibsandi</i>			
85.	3989 <i>Isotropis atropurpurea</i> (Poison Sage)			
86.	25562 <i>Ixobrychus flavicollis</i> (Black Bittern)			
87.	25125 <i>Lerista bipes</i>			
88.	30928 <i>Lerista clara</i>			
89.	25005 <i>Lialis burtonis</i>			
90.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
91.	30933 <i>Lucasium stenodactylum</i>			
92.	25651 <i>Malurus lamberti</i> (Variegated Fairy-wren)			
93.	25652 <i>Malurus leucopterus</i> (White-winged Fairy-wren)			
94.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
95.	6490 <i>Muellerolimon salicorniaceum</i>			
96.	17158 <i>Myoporum montanum</i> (Native Myrtle)			
97.	2573 <i>Neobassia astrocarpa</i>			
98.	11856 <i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			
99.	25430 <i>Notaden nicholli</i> (Desert Spadefoot)			
100.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
101.	24620 <i>Pachycephala lanioides</i> (White-breasted Whistler)			
102.	25678 <i>Pachycephala melanura</i> (Mangrove Golden Whistler)			
103.	24648 <i>Pelecanus conspicillatus</i> (Australian Pelican)			
104.	25699 <i>Phalacrocorax varius</i> (Pied Cormorant)			

NatureMap is a collaborative project of the Department of Environment and Conservation, Western Australia, and the Western Australian Museum.



Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
105.	24234 <i>Pseudomys delicatulus</i> (Delicate Mouse)			
106.	24237 <i>Pseudomys hermannsburgensis</i> (Sandy Inland Mouse)			
107.	2699 <i>Ptilotus axillaris</i> (Mat Mulla Mulla)			
108.	2746 <i>Ptilotus nobilis</i> (Tall Mulla Mulla)			
109.	2766 <i>Ptilotus villosiflorus</i>			
110.	25277 <i>Ramphotyphlops grypus</i>			
111.	24776 <i>Recurvirostra novaehollandiae</i> (Red-necked Avocet)			
112.	11240 <i>Rhagodia preissii</i> subsp. <i>obovata</i>			
113.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
114.	24457 <i>Rhipidura phasiana</i> (Mangrove Grey Fantail)			
115.	4191 <i>Rhynchosia minima</i> (Rhynchosia)			
116.	2357 <i>Santalum lanceolatum</i> (Northern Sandalwood, Yarnguli)			
117.	7606 <i>Scaevola crassifolia</i> (Thick-leaved Fan-flower)			
118.	7643 <i>Scaevola sericophylla</i>			
119.	7644 <i>Scaevola spinescens</i> (Currant Bush, Maroon)			
120.	12280 <i>Senna artemisioides</i> subsp. <i>oligophylla</i>			
121.	625 <i>Spinifex longifolius</i> (Beach Spinifex)			
122.	635 <i>Sporobolus virginicus</i> (Marine Couch)			
123.	24924 <i>Strophurus ciliaris</i> subsp. <i>aberrans</i>			
124.	3182 <i>Stylobasium spathulatum</i> (Pebble Bush)			
125.	4242 <i>Swainsona pterostylis</i>			
126.	30870 <i>Taeniopygia guttata</i> (Zebra Finch)			
127.	33318 <i>Tecticornia indica</i> subsp. <i>leiostachya</i> (Samphire)			
128.	4280 <i>Tephrosia rosea</i> (Flinders River Poison, Bungoo'dah)			
129.	19531 <i>Tephrosia rosea</i> var. <i>clementii</i>			
130.	2644 <i>Threlkeldia diffusa</i> (Coast Bonefruit)			
131.	25548 <i>Todiramphus chloris</i> (Collared Kingfisher)			
132.	25549 <i>Todiramphus sanctus</i> (Sacred Kingfisher)			
133.	24309 <i>Todiramphus sanctus</i> subsp. <i>sanctus</i> (Sacred Kingfisher)			
134.	2833 <i>Trianthema turgidifolia</i>			
135.	4375 <i>Tribulus cistoides</i>			
136.	4380 <i>Tribulus occidentalis</i> (Perennial Caltrop)			
137.	679 <i>Triodia angusta</i>			
138.	13131 <i>Triodia epactia</i>			
139.	728 <i>Whiteochloa cymbiformis</i>			
140.	24857 <i>Zosterops luteus</i> (Yellow White-eye)			

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 wholly 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 2

EPBC Protected
Matters Search Results





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.

Report created: 27/05/13 14:15:51

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
©Commonwealth of Australia
(Geoscience Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 1.5Km



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:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	14
Listed Migratory Species:	21

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 and the heritage values of a place on the Register of the National Estate.

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.

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:	59
Whales and Other Cetaceans:	11
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

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

Place on the RNE:	None
State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	9
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Mammals		
Dasyurus hallucatus Northern Quoll [331]	Endangered	Species or species habitat likely to occur within area
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Notoryctes caurinus Karkarratul, Northern Marsupial Mole [295]	Endangered	Species or species habitat likely to occur within area
Rhinonictis aurantia (Pilbara form) Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Aipysurus apraefrontalis Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely 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	Breeding known to occur within area

Name	Status	Type of Presence
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area

Sharks

Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat likely 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
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area

Migratory Marine Species

Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Dugong dugon Dugong [28]		Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding 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
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Tursiops aduncus (Arafura/Timor Sea populations)		
Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundo rustica		
Barn Swallow [662]		Species or species habitat may 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]		Species or species habitat known to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Charadrius veredus		
Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum		
Oriental Pratincole [840]		Species or species habitat may 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		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Charadrius veredus		
Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum		
Oriental Pratincole [840]		Species or species habitat may occur within area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundo rustica		
Barn Swallow [662]		Species or species habitat may occur within

Name	Threatened	Type of Presence area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	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]		Species or species habitat known to occur within area
Fish		
Bulbonaricus brauni Braun's Pughead Pipefish, Pug-headed Pipefish [66189]		Species or species habitat may occur within area
Campichthys tricarinatus Three-keel Pipefish [66192]		Species or species habitat may occur within area
Choeroichthys brachysoma Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
Doryrhamphus janssi Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area
Doryrhamphus negrosensis Flagtail Pipefish, Masthead Island Pipefish [66213]		Species or species habitat may occur within area
Festucalex scalaris Ladder Pipefish [66216]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Halicampus nitidus Glittering Pipefish [66224]		Species or species habitat may occur within area
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area
Haliichthys taeniophorus Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		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

Name	Threatened	Type of Presence area
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Micrognathus micronotopterus Tidepool Pipefish [66255]		Species or species habitat may occur within area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paegnius Rough-snout Ghost Pipefish [68425]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Trachyrhamphus longirostris Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area
Mammals		
Dugong dugon Dugong [28]		Species or species habitat known to occur within area
Reptiles		
Acalyptophis peronii Horned Seasnake [1114]		Species or species habitat may occur within area
Aipysurus apraefrontalis Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area
Aipysurus duboisii Dubois' Seasnake [1116]		Species or species habitat may occur within area
Aipysurus eydouxii Spine-tailed Seasnake [1117]		Species or species habitat may occur within area
Aipysurus laevis Olive Seasnake [1120]		Species or species habitat may occur within area
Aipysurus tenuis Brown-lined Seasnake [1121]		Species or species

Name	Threatened	Type of Presence
Astrotia stokesii Stokes' Seasnake [1122]		habitat may occur within area Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area
Disteira major Olive-headed Seasnake [1124]		Species or species habitat may occur within area
Emydocephalus annulatus Turtle-headed Seasnake [1125]		Species or species habitat may occur within area
Ephalophis greyi North-western Mangrove Seasnake [1127]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Hydrelaps darwiniensis Black-ringed Seasnake [1100]		Species or species habitat may occur within area
Hydrophis czeblukovi Fine-spined Seasnake [59233]		Species or species habitat may occur within area
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area
Hydrophis mcdowelli null [25926]		Species or species habitat may occur within area
Hydrophis ornatus a seasnake [1111]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may 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

Name	Status	Type of Presence
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Mammals		
Equus caballus Horse [5]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Felis catus Cat, House Cat, Domestic Cat [19]		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
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area

Coordinates

-20.62556 117.18778

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 Heritage and Register of National Estate properties, Wetlands of International 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.

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.

[© Commonwealth of Australia](#)

Department of Sustainability, Environment, Water, Population and Communities

GPO Box 787

Canberra ACT 2601 Australia

+61 2 6274 1111

Shire of Roebourne

Lot 1083 Welcome Road
PO Box 219
Karratha WA 6714
(08) 9186 8555
sor@roebourne.wa.gov.au

