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ENVIRONMENTAL

## Onslow Fauna, Flora and Vegetation Survey

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Onslow Hedland Plan

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Onslow Hedland Plan

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Shire of Ashburton

**Prepared by**

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## Executive Summary

The Shire of Ashburton commissioned Western Environmental Pty Ltd (WEPL) to undertake a detailed flora and vegetation, and basic terrestrial fauna survey for the proposed development of the 'Onslow Hedland Plan' in Onslow, Western Australia (the Survey Area).

The Survey Area covers an area of 7.73 (ha) and is located immediately to the north of the Onslow townsite in the Carnarvon bioregion (CAR01) of Western Australia.

### *Flora and Vegetation*

The flora desktop assessment identified 20 conservation listed species occurring within 100 km of the Survey Area. A pre-survey likelihood of occurrence assessment was undertaken and determined one species as having a high likelihood of occurrence, two species as having a medium likelihood of occurrence and 16 species as having a low likelihood of occurrence. Post survey, all species were assessed as having a low likelihood of occurrence.

The detailed flora and vegetation survey recorded the floristic composition and vegetation types from four quadrats, mapping notes and opportunistic observations. A total of 43 taxa were recorded from 33 genera across 17 families.

No Threatened flora species pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or gazetted as Threatened Flora pursuant to the *Biodiversity and Conservation Act 2016* (BC Act) and/or Priority Flora species were recorded during the survey or are expected to occur.

Two vegetation types were described and mapped. Vegetation in the Survey Area was representative of existing broad scale vegetation, and soil and land system mapping for the area. None of the vegetation types were representative of Threatened or Priority Ecological Communities.

Four introduced taxa were recorded during the survey with Buffel grass (*\*Cenchrus ciliaris*), birdwood grass (*\*Cenchrus setiger*) and kapok (*\*Aerva javanica*) cumulatively covering 25-40% of the ground stratum in most areas.

Vegetation condition was Degraded throughout the whole Survey Area. Evidence of disturbance includes weed invasion, vehicle tracks, previous clearing and historical infrastructure.

### *Terrestrial Vertebrate Fauna*

The vertebrate fauna desktop assessment identified 66 conservation listed species occurring within 40 km of the Survey Area. An assessment of the likelihood of occurrence within the Survey Area was undertaken and identified that of the potential conservation listed fauna, one was previously recorded, one had a high likelihood of occurrence, six had a medium likelihood of occurrence and 58 had a low likelihood of occurrence.

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Recorded species:

- *Pandion cristatus* (Osprey, eastern osprey)– Migratory (MI).

High likelihood of occurrence:

- *Lerista planiventralis maryani* (Maryan's keeled slider) – Priority 1 (P1).

Medium likelihood of occurrence:

- *Dasyurus hallucatus* (northern quoll) – Endangered (EN).
- *Falco hypoleucos* (grey falcon) –Vulnerable (VU).
- *Falco peregrinus* (peregrine falcon) – Other specially protected (OS).
- *Hirundo rustica* (barn swallow) – (MI).
- *Leggadina lakedownensis* (northern short-tailed mouse) – Priority 4 (P4).
- *Liasis olivaceus barroni* (Pilbara olive python) – VU.

Only evidence of Osprey was recorded during the fauna survey.

Fauna habitat mapping was based on a combination of field observations, fauna habitat assessment data and aerial imagery. Two fauna habitats were mapped within the Survey Area. None of the conservation listed species identified are considered likely to be dependent on habitats within the Survey Area. It is considered that the habitat types described are well represented outside of the Survey Area in the Onslow coastal region.

### ***Migratory Shorebirds and Waders***

The Survey Area occurs directly adjacent to the Onslow Town Beach and Beadon Point tidal flats which are a regional hotspot for shorebird and wader observations. Due to this proximity, a separate likelihood of occurrence assessment for habitats associated with Onslow Town Beach and the Beadon Point tidal flats was undertaken. This identified that of the potential conservation listed species, 18 were previously recorded and 17 had a high-medium likelihood of occurrence in the Onslow Town Beach and Beadon Point tidal flats habitat.

Within the Survey Area, the Acacia and Spinifex beach/primary dunes habitat type (0.4 ha extent) occurs directly adjacent to the Onslow Town Beach and Beadon Point tidal flats habitat and may be infrequently utilised for shelter or resting; however, the habitat is not considered likely to be significant in supporting the local population of the species.

Considering the regular presence of multiple conservation listed species of migratory shorebird and waders present in the Onslow Town Beach and Beadon Point tidal flats adjacent to the Survey Area, consideration should be given in any development of the Survey Area to mitigate potential indirect impacts to this habitat.

## Acronyms and Abbreviations

Abbreviation	Full Title
°C	Degree Celsius
BAM Act	<i>Biosecurity and Agriculture Management Act 2007</i>
BC Act	<i>Biodiversity Conservation Act 2016</i>
CR	Critically Endangered
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEWHA	Department of the Environment, Water Heritage and the Arts
DotE	Department of the Environment
DPIRD	Department of Primary Industries and Regional Development
DRF	Declared Rare Flora
DSEWPaC	Department of Sustainability Environment Water Population and Communities
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessment
EN	Endangered
EP Act	<i>Environmental Protection Act 1986</i>
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection Biodiversity and Conservation Act 1999</i>
ESA	Environmentally Sensitive Area
GDE	Groundwater Dependent Ecosystem
GDE	Groundwater-Dependent Ecosystems
GPS	Global Positioning System
ha	Hectare
IBRA	Interim Biogeographic Regionalisation for Australia
IBSA	Index of Biodiversity Surveys for Assessments
IUCN	International Union for Conservation of Nature
km	Kilometres
m	Metres
MA	Marine
MI	Migratory
MNES	Matters of National Environmental Significance
NVIS	National Vegetation Information System
OS	Other Specially Protected
P	Priority

Abbreviation	Full Title
PEC	Priority Ecological Community
PF	Priority Flora
PMST	Protected Matters Search Tool
T	Threatened
TEC	Threatened Ecological Community
TPFL	Threatened and Priority Flora Database
TPFRF	Threatened and Priority Flora Report Forms
VU	Vulnerable
WA	Western Australia
WAH	Western Australian Herbarium
WC Act	<i>Wildlife Conservation Act 1950</i>
WEPL	Western Environmental Pty Ltd
WoNS	Weeds of National Significance

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# 1. Introduction

## 1.1 Project Background

The Shire of Ashburton commissioned Western Environmental Pty Ltd (WEPL) to undertake a detailed flora and vegetation survey and a basic fauna survey to support the proposed development of the 'Onslow headland plan' in Onslow, Western Australia (the Survey Area).

## 1.2 Location

The Survey Area covers an area of 7.73 ha and is located immediately to the north of the Onslow townsite in the Carnarvon bioregion (CAR01) of Western Australia. See Figure 1 below.

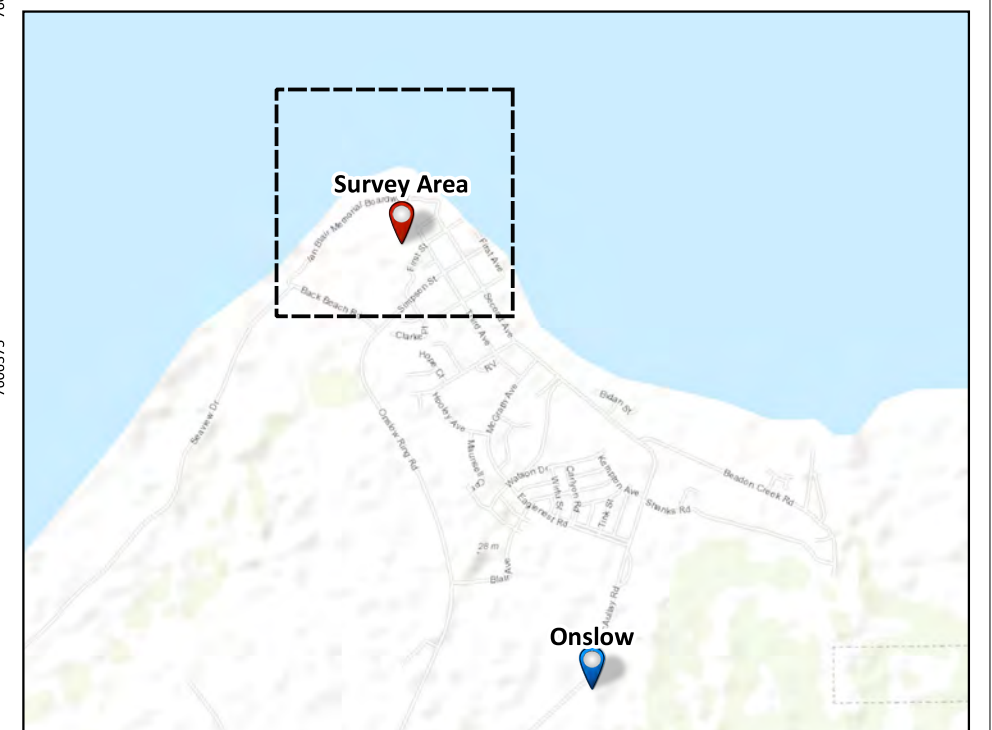
## 1.3 Objectives

The purpose of the survey was to delineate key flora and fauna values within the Survey Area and identify potential environmental sensitivities and values that may occur.




The scope of works included:

- Undertake a biological field survey comprising a detailed flora and vegetation, targeted priority and threatened flora and basic terrestrial fauna survey.
- Provide a combined technical report detailing the findings of the biological survey.
- Include relevant maps and shapefiles that could be used to support a native vegetation clearing permit application or other Environmental Impact Assessment (EIA).
- Supply a geospatial data package prepared in accordance with Index of Biodiversity Surveys for Assessments (IBSA) requirements.

This report presents the results of the field survey undertaken to support the above objectives.



**Figure 1: Site Location**

 	PROJECT/REPORT NAME Fauna, Flora and Vegetation Survey Onslow		<b>Legend</b>  Site Boundary	<table border="1"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>AC</td> <td>AF</td> <td>19/9/2022</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	AC	AF	19/9/2022															
	No	Description			Drawn	Approved	Date																						
A	Original issue	AC	AF	19/9/2022																									
SCALE 1:3,500	SHEET SIZE A3 COLOUR	CLIENT Shire of Asburton	PROJECT NUMBER A22.052	VERSION 0																									
COORDINATE REFERENCE SYSTEM GDA2020 / MGA zone 50		DRAWN BY / REVIEWED BY AC / AF	DATE 19/9/2022																										
DATA SOURCE LANDGATE AERIAL IMAGERY 2022		NOTES: Cadastral boundary (LGATE-002), Base map ESRI Topo. Townsites (LGATE-248).																											



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## 1.4 Relevant Legislation and Guidance

This environmental assessment was conducted in accordance with Commonwealth and State legislation and guidelines:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Western Australian *Environmental Protection Act 1986* (EP Act).
- Western Australian *Biodiversity Conservation Act 2016* (BC Act).
- Western Australian Biodiversity Conservation Regulations 2018.
- Department of the Environment (DotE). (2013). *Matters of National Environmental Significance. Significant Impact Guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999*.
- Department of Sustainability Environment Water Population and Communities (DSEWPaC). (2011). *Survey Guidelines for Australia's Threatened Mammals*.
- Department of the Environment, Water Heritage and the Arts (DEWHA). (2010). *Survey Guidelines for Australia's Threatened Birds*.

As well as those listed above, the assessment complied with Environmental Protection Authority (EPA) requirements for environmental survey and reporting in Western Australia, as outlined in:

- EPA. (2020). *Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment*. Known herein as the 'Fauna Technical Guidance'.
- EPA. (2016). *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment*. Known herein as the 'Flora and Vegetation Technical Guidance'.
- EPA. (2021). *Statement of Environmental Principles, Factors and Objectives*.

A short description of key legislation is provided in Appendix A. Other definitions, including species and ecological community conservation categories, are provided in Appendix B.

## 1.5 Survey Limitations and Constraints

Limitations and constraints of the flora, vegetation and fauna survey as outlined in the Flora and Vegetation Technical Guidance and Fauna Technical Guidance are detailed below in Table 1.

**Table 1: Limitations and Constraints of the Flora, Vegetation and Fauna Survey**

Possible Limitation	Degree of Limitation (Significant, Moderate or Negligible)	Potential Constraints on Survey Outcomes
Survey Level/ Scope	Negligible	<p>The detailed flora and vegetation survey was undertaken in accordance with the Flora and Vegetation Technical Guidance and was considered appropriate to support approvals applications or EIA processes.</p> <p>Targeted searching for flora of conservation significance was undertaken at a sufficient level of detail. A basic terrestrial vertebrate fauna survey was undertaken. A basic survey is a low-intensity survey, conducted at the local scale to gather broad fauna and habitat information. The primary objectives are to verify the overall adequacy of the desktop study, and to map and describe habitats. The survey was adequate to address these requirements.</p>
Availability of contextual information at a regional and local scale	Negligible	<p>All data required to complete the scope of works including regional and local contextual information was available. A significant volume of previous survey reports for the region is available. Fauna desktop assessment was undertaken by Bamford Consulting Ecologists who have undertaken several surveys between 2005 and 2020 in the Onslow region.</p>
Site Access	Negligible	<p>The Survey Area was accessed by vehicle and on foot. The entire the Survey Area was traversed by foot.</p>
Survey Intensity and Extent	Negligible	<p>Four quadrats were sampled across the Survey Area with additional mapping notes undertaken to aid vegetation and condition mapping and delineation. VT02 was sampled at a single quadrat due to the limited extent (0.4 ha) occurring. Sufficient time was allocated to the flora and vegetation survey, given the size and complexity of the Survey Area.</p> <p>The survey effort was considered adequate to assess the flora and vegetation values of the Survey Area and provide information required to support approvals applications.</p> <p>A fauna habitat was assessed concurrently with the vegetation survey. Habitat was defined as per basic survey requirements. A detailed or targeted survey may yield additional fauna species.</p>
Experience	Negligible	<p>The ecologist leading the field survey (Andrew Fry) has been conducting flora and vegetation surveys and fauna surveys in Western Australia for over 10 years, with 10 years' experience in the bioregion.</p>
Timing, weather, season	Negligible	<p>The recommended primary survey period for flora and vegetation surveys for the region as per the EPA Technical Guidance occurs 6 – 8 weeks post wet season. The survey was completed in September which is outside of the typical post wet season survey period however significant rainfall was recorded in the 3 months preceding survey. Observed conditions were optimal with many species in fruit and flower and annuals present. The timing was considered to be optimal.</p>

Possible Limitation	Degree of Limitation (Significant, Moderate or Negligible)	Potential Constraints on Survey Outcomes
		<p>The timing was considered outside of the recommended season for reptiles, birds and mammals according to the EPA guidance (EPA, 2020). The main objective of a basic fauna survey is to delineate fauna habitat values, which is based on vegetation mapping. For these reasons, the timing was not considered a limitation for the fauna vertebrate terrestrial fauna survey.</p>
<p><b>Proportion of the flora and fauna recorded and/or collected, and any identification issues</b></p>	<p>Negligible</p>	<p>43 vascular flora taxa were recorded. All species were identifiable by the field survey team. The low flora diversity recorded is as a result of the degraded condition of the Survey Area.</p> <p>A basic level fauna survey is intended to collect broad fauna desktop information and map habitat types. A fauna inventory was not prepared as part of this survey level.</p>
<p><b>Mapping Reliability</b></p>	<p>Negligible</p>	<p>The entire of the Survey Area was traversed by foot and mapping reliability is considered high.</p>
<p><b>Disturbances (fire, flood etc.)</b></p>	<p>Negligible</p>	<p>Areas of disturbance associated with access tracks, previous clearing and weeds were recorded but were not a constraint on the results of the survey.</p>

## 2. Existing Environment

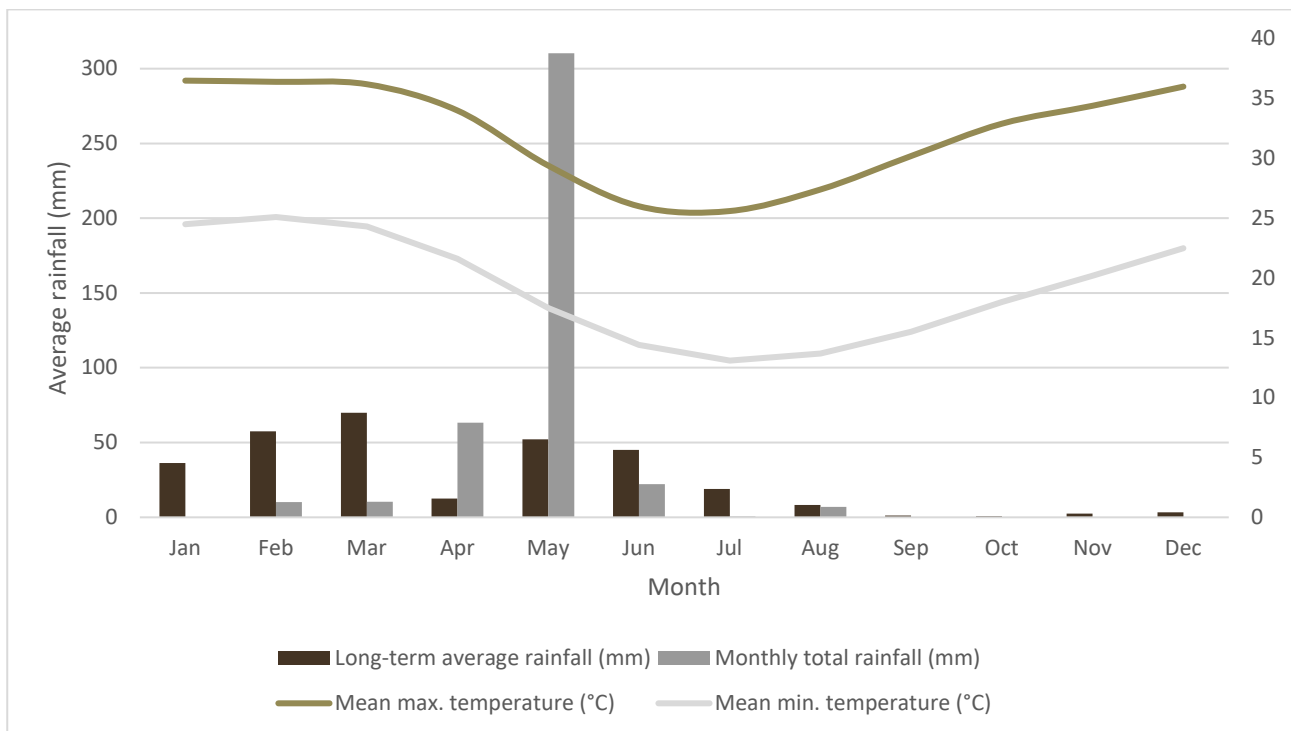
### 2.1 Climate

The closest long-term Bureau of Meteorology weather station with a complete dataset is Onslow Airport WA (Station 5017), located approximately 3 km south of the Survey Area.

Climate statistics were calculated utilising data from the most current climate normal, which is defined as a 30-year interval (Bureau of Meteorology, 2007), where possible. A climate normal is a period long enough to include year-to-year variations while avoiding the influence of longer-term changes in climate.

The long-term mean minimum temperature for Onslow Airport WA ranges from 13.1°C (July) to 25.1°C (February) (1991 to 2022) and the long-term mean maximum temperature ranges from 25.6°C (July) to 36.5°C (January) (Graph 1) (Bureau of Meteorology, 2022).

The Onslow Airport WA weather station recorded 438.8 mm of rainfall in the 12 months prior to the survey (September 2021 to August 2022), which is 135.0 mm above the long-term average of 303.8 mm (Bureau of Meteorology, 2022). In the three months prior to the survey (June to August 2022), 29.8 mm of rainfall was recorded (Bureau of Meteorology, 2022).



Source: Bureau of Meteorology, 2022

**Graph 1: Long Term and Monthly Total Rainfall, Maximum and Minimum Temperatures for Onslow Airport WA (5017)**

## 2.2 Interim Biogeographic Regionalisation for Australia

The Interim Biogeographic Regionalisation of Australia (IBRA) divides Australia into 89 bioregions based on major biological, geographical and geological attributes. These bioregions are subdivided into 419 subregions as part of a refinement of the IBRA framework (Commonwealth of Australia, 2012). The Survey Area occurs within the Carnarvon bioregion and the Cape Range (CAR01) subregion.

## 2.3 Geology and Land Systems

According to Department of Primary Industries and Rural Development (DPIRD) (2018) soil landscape mapping, the following land systems intersect the Survey Area (Table 2 and Figure 2).

**Table 2: Land Systems**

Mapping Unit	Land System	Description	Extent (ha)	%
201	Dune System	Dune fields supporting soft spinifex and minor hard spinifex grasslands	7.37	100

## 2.4 Pre-European Vegetation Types

During the 1970s, John Beard and associates conducted a systematic survey of native vegetation, describing the vegetation systems in Western Australia at a scale of 1:250 000 in the south-west and at a scale of 1:1,000,000 in less developed areas (Beard, 1976).

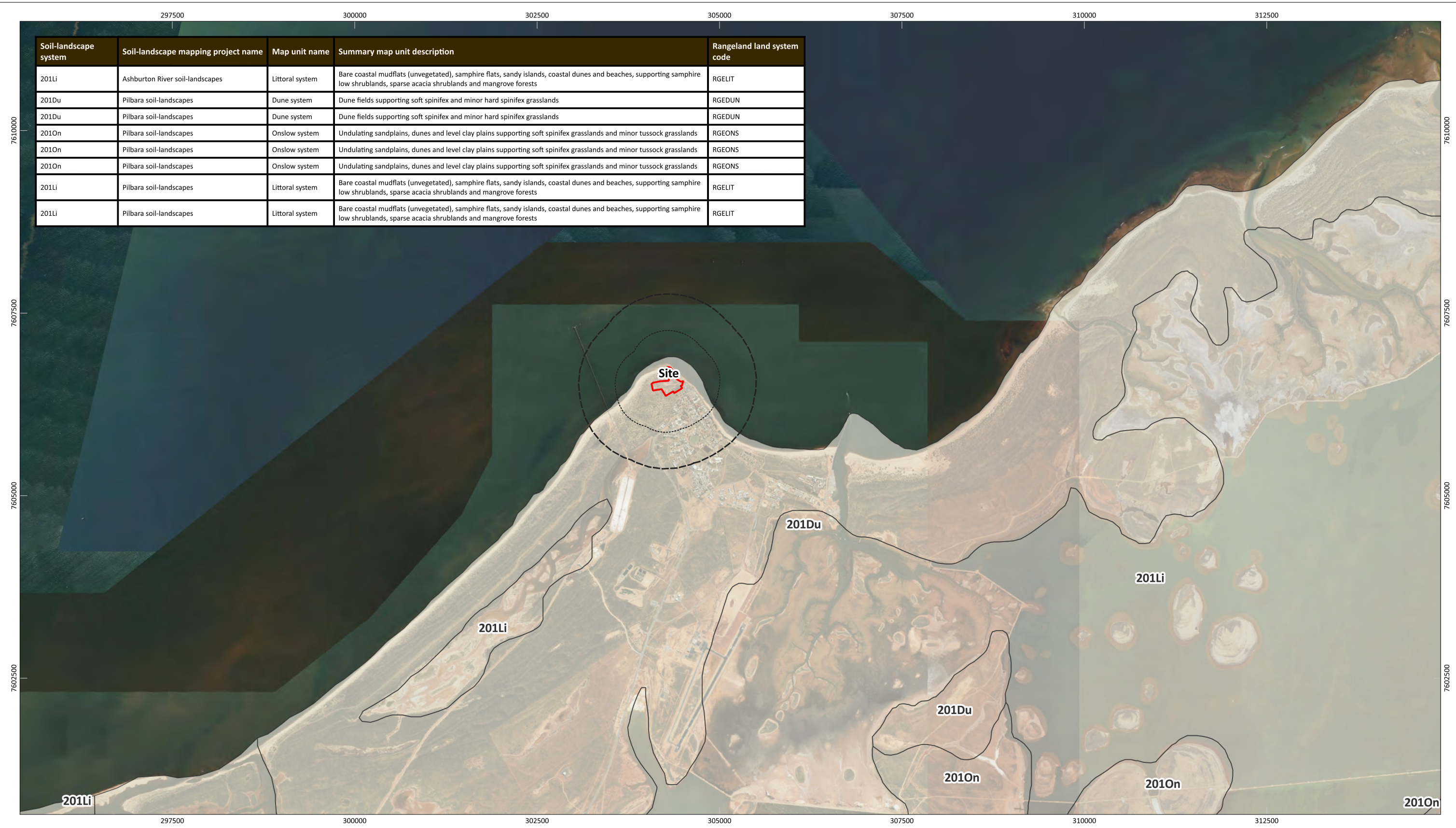
Beard's mapping attempted to depict the native vegetation as it was presumed to be at the time of settlement and is known as the pre-European vegetation type and extent. Beard's vegetation maps are maintained in digital form by DPIRD (2018). Extents are updated periodically by Department of Biodiversity, Conservation and Attractions (DBCA) (DBCA, 2019). This mapping indicates that the Survey Areas intersects one pre-European vegetation associations:

- Cape Yannare Coastal Plains\_117: Hummock grassland, *Triodia* spp.

The pre-European vegetation association identified from the Survey Area (DPIRD, 2018) and its pre-European and current extents are listed in Table 3 (DBCA, 2019).

**Table 3: Pre-European Vegetation Association Representation**

Vegetation Association	Original Extent (ha)	Current Extent (ha)	% Remaining	% Managed for Conservation
Cape Yannare Coastal Plains_117	5,817.46	5,090.80	87.51	0



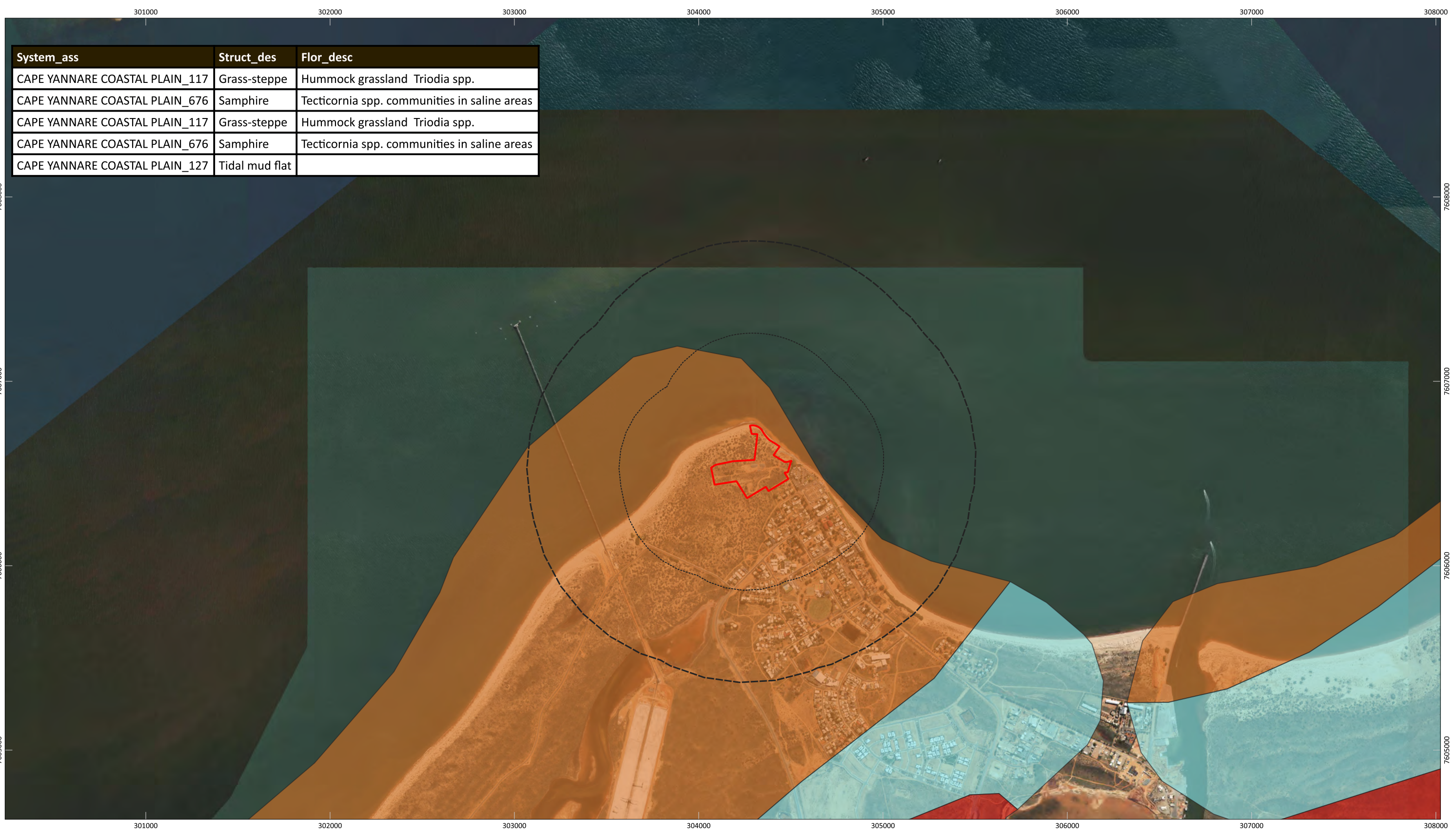
Soil-landscape system	Soil-landscape mapping project name	Map unit name	Summary map unit description	Rangeland land system code
201Li	Ashburton River soil-landscapes	Littoral system	Bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes and beaches, supporting samphire low shrublands, sparse acacia shrublands and mangrove forests	RGELIT
201Du	Pilbara soil-landscapes	Dune system	Dune fields supporting soft spinifex and minor hard spinifex grasslands	RGEDUN
201Du	Pilbara soil-landscapes	Dune system	Dune fields supporting soft spinifex and minor hard spinifex grasslands	RGEDUN
201On	Pilbara soil-landscapes	Onslow system	Undulating sandplains, dunes and level clay plains supporting soft spinifex grasslands and minor tussock grasslands	RGEONS
201On	Pilbara soil-landscapes	Onslow system	Undulating sandplains, dunes and level clay plains supporting soft spinifex grasslands and minor tussock grasslands	RGEONS
201On	Pilbara soil-landscapes	Onslow system	Undulating sandplains, dunes and level clay plains supporting soft spinifex grasslands and minor tussock grasslands	RGEONS
201Li	Pilbara soil-landscapes	Littoral system	Bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes and beaches, supporting samphire low shrublands, sparse acacia shrublands and mangrove forests	RGELIT
201Li	Pilbara soil-landscapes	Littoral system	Bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes and beaches, supporting samphire low shrublands, sparse acacia shrublands and mangrove forests	RGELIT

Figure 2: Geology and Land Systems

	PROJECT/REPORT NAME Fauna, Flora and Vegetation Survey Onslow		<b>Legend</b> Site Boundary <b>Soil Landscape Mapping - Best Available (DPIRD-027)</b> 254	<table border="1"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>AC</td> <td>AF</td> <td>20/9/2022</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	AC	AF	20/9/2022															
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SCALE 1:50,000	SHEET SIZE A3 COLOUR	CLIENT Shire of Asburton	NOTES: Cadastral boundary from LANDGATE 2022																										
COORDINATE REFERENCE SYSTEM GDA2020 / MGA zone 50		PROJECT NUMBER A22.052	VERSION 0																										
DATA SOURCE LANDGATE AERIAL IMAGERY 2022		DRAWN BY / REVIEWED BY AC / AF	DATE 20/9/2022																										



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System_ass	Struct_des	Flor_desc
CAPE YANNARE COASTAL PLAIN_117	Grass-steppe	Hummock grassland Triodia spp.
CAPE YANNARE COASTAL PLAIN_676	Samphire	Tecticornia spp. communities in saline areas
CAPE YANNARE COASTAL PLAIN_117	Grass-steppe	Hummock grassland Triodia spp.
CAPE YANNARE COASTAL PLAIN_676	Samphire	Tecticornia spp. communities in saline areas
CAPE YANNARE COASTAL PLAIN_127	Tidal mud flat	

Figure 3: Pre European Vegetation Types

	PROJECT/REPORT NAME Fauna, Flora and Vegetation Survey Onslow		<b>Legend</b> Site Boundary <b>Pre-European Vegetation (DPIRD-006)</b> CAPE YANNARE COASTAL PLAIN_117 CAPE YANNARE COASTAL PLAIN_127 CAPE YANNARE COASTAL PLAIN_676	<table border="1"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>AC</td> <td>AF</td> <td>19/9/2022</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	AC	AF	19/9/2022															
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NOTES:  
Cadastral boundary from LANDGATE 2022

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 08 6244 2310 | enquiries@western.com.au  
 Level 3/25 Prowse St, West Perth WA 6005  
 western.com.au

## **2.5 Wetlands and Hydrology**

The Survey Area does not intersect any surface wetlands or drainage lines. No wetlands listed under the Ramsar Convention or Commonwealth Wetlands of National Significance program are present in the region (Department of Climate Change, Energy, the Environment and Water [DCCEEW], 2022a; DBCA, 2022a).

## **2.6 Environmentally Sensitive Areas and Conservation Estate**

Environmentally Sensitive Areas (ESAs) are declared by the Department of Water and Environmental Regulation (DWER) to prevent the degradation of important environmental values such as Threatened flora, Threatened Ecological Communities (TECs) or significant wetlands. Conservation estate comprises areas such as national parks, nature reserves and regional parks.

There are no ESAs or conservation estate within 10 km of the Survey Area (DWER, 2022) (Figure 4).

## **2.7 Land Use History**

The Survey Area and surrounds have a history of disturbance associated with clearing and infrastructure to support port activities and an export jetty. The jetty has been out of service since 1982 and now the Survey Area is used for tourism purposes (i.e., look out point, overflow camping and a memorial park and boardwalk). The Survey Area has been subject to heavy weed invasion and soil disturbance from historical activities which has greatly impact remnant vegetation.

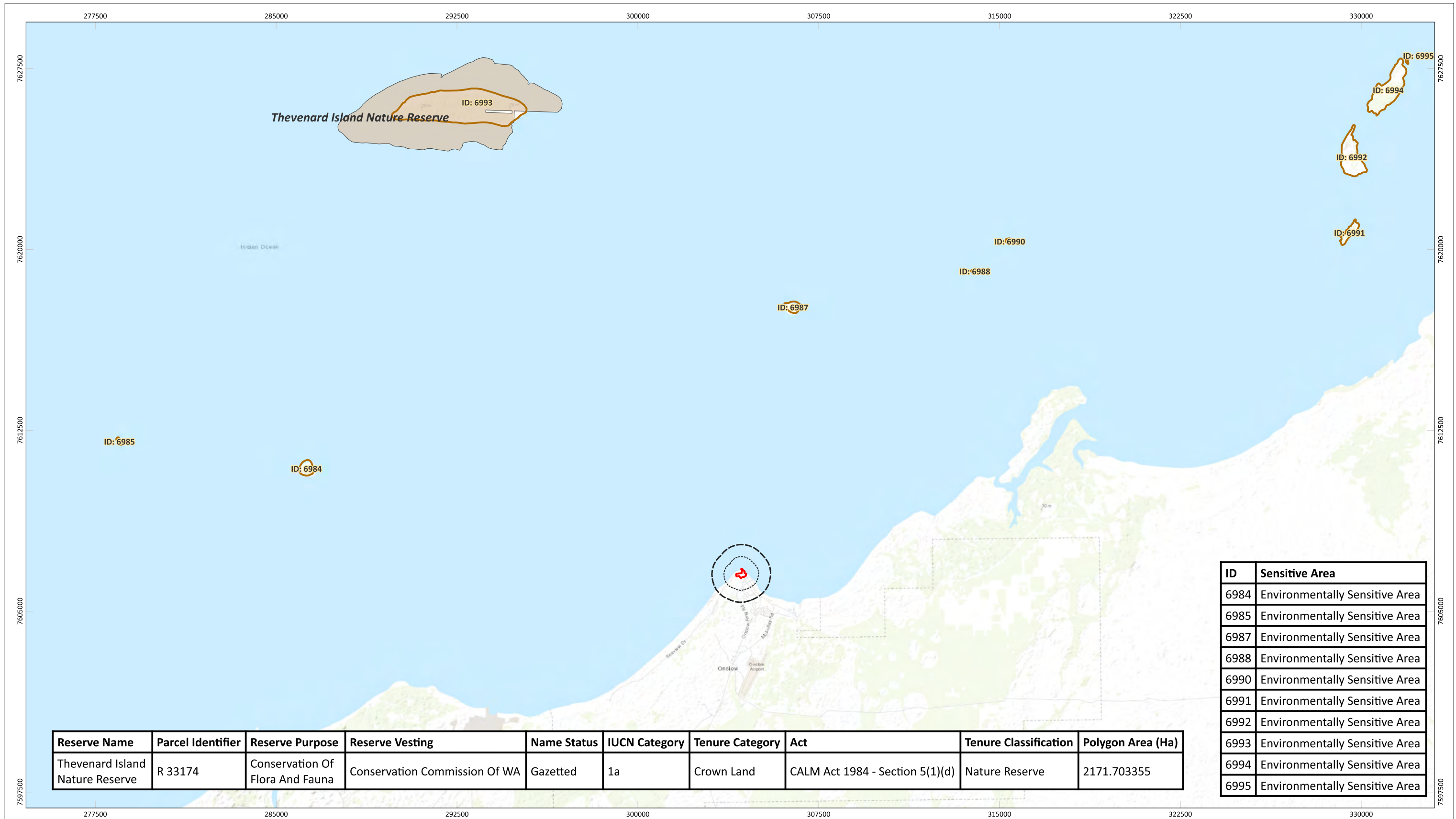


Figure 4: Environmentally Sensitive Areas and Conservation Estate

	PROJECT/REPORT NAME Fauna, Flora and Vegetation Survey Onslow		<b>Legend</b> Site Boundary Clearing Regulations - Environmentally Sensitive Areas (DWER-046) <b>DBCA - Legislated Lands and Waters (DBCA-011)</b> Nature Reserve	<table border="1"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>AC</td> <td>AF</td> <td>20/9/2022</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	AC	AF	20/9/2022																				
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### 3. Methodology

#### 3.1 Desktop Assessment

##### 3.1.1 Literature Review

Background information on the Survey Area and surrounds was reviewed prior to the field survey. The literature review considered a selection of biological reports detailing assessments undertaken in the region, that were either publicly available or provided by client. These included:

- Phoenix Environmental Sciences (2017). *Flora and Vegetation Survey and Terrestrial Fauna Survey for the Pilbara Regional Waste Management Facility*.
- Phoenix Environmental Sciences. (2018). *Detailed Flora and Vegetation Survey for the Pilbara Regional Waste Management Facility*.
- ENV Australia. (2011). *Onslow Townsite Strategy Flora, Vegetation and Fauna Assessment*.
- RPS Group. (2019). *Flora and Vegetation Assessment*.
- 360 Environmental. (2021). *Onslow Township Village Environmental Assessment Report*.
- Bamford et al. (2009). *Survey for Migratory Waterbirds in the Wheatstone LNG Project Area*.
- Bamford. (2022). *Ashburton Infrastructure Project Migratory Bird Desktop Assessment*.

Database searches were undertaken to compile a list of potential flora and fauna and identify potential conservation listed flora, fauna, and ecological communities within or surrounding the Survey Area (Table 4). In addition, an EPBC Protected Matters Search (PMST) was undertaken to identify the potential for Matters of National Environmental Significance (MNES) to occur within or surrounding the Survey Area (Department of Agriculture, Water and the Environment, 2022b).

**Table 4: Database Searches of the Survey Area**

Database Name	Date Received and Reference Number	Search Type	Search Area
Threatened and Priority Ecological Communities database search (Department of Biodiversity Conservation and Attractions)	14/09/2022 22-0922EC	TECs and PECs	50 km buffer around the Survey Area
Threatened and Priority Flora (TPFL) database search (Department of Biodiversity Conservation and Attractions)	15/09/2022 60-0922FL	Threatened and Priority Flora	100 km buffer around the Survey Area

Database Name	Date Received and Reference Number	Search Type	Search Area
Western Australian Herbarium (WAHerb) flora database search (Department of Biodiversity Conservation and Attractions)	15/09/2022 60-0922FL	Threatened and Priority Flora	100 km buffer around the Survey Area
DBCA Threatened and Priority Fauna database search (Department of Biodiversity Conservation and Attractions)	09/09/2022 FAUNA#7330	Threatened and Priority Fauna	40 km buffer around the Survey Area
Protected Matters Search Tool Department of Agriculture, Water and the Environment, 2022a)	07/09/2022	Commonwealth listed Threatened flora and fauna and TECs	50 km buffer around the Survey Area

### 3.1.2 Likelihood of Occurrence

Conservation listed flora and fauna species identified from the desktop assessment were assessed to determine the likelihood of their occurrence within the Survey Area, both prior to and post field survey. The assessment was completed based on the likelihood of occurrence criteria presented in Table 5.

Only species either recorded within the Survey Area or considered as having a high or medium likelihood of occurrence in post field survey assessment will be discussed in detail. Species classified as having low likelihood of occurrence will not be discussed unless a justification for this classification is required.

Marine fauna species (e.g. whales, sharks, turtles, sea snakes) are not included as a component of a terrestrial fauna survey and the Survey Area does not contain marine habitat. Marine birds which may use terrestrial habitats are included.

**Table 5: Likelihood of Occurrence Criteria**

Likelihood	Criteria
<b>Recorded</b>	Recorded in the Survey Area from database searches (if confident record is accurate), previous survey by others or by current survey.
<b>High</b>	Suitable habitat occurs within the Survey Area; and <ul style="list-style-type: none"> <li>Records of flora species &lt;5 km from the Survey Area. With record &lt;30 years old.</li> <li>Records of fauna species &lt;10 km from the Survey Area. With record &lt;30 years old.</li> </ul>
<b>Medium</b>	Suitable or marginally suitable habitat occurs within the Survey Area; and <ul style="list-style-type: none"> <li>Records of flora species &lt;25 km from the Survey Area.</li> <li>Records of fauna species &lt;25 km from the Survey Area; or</li> <li>Species is strongly linked to a specific habitat, which occurs within the Survey Area and records are present &lt;50 km from the Survey Area</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>The species has a well understood and specific habitat preference/ requirements, which is absent from the Survey Area.</li> <li>Records are historical only, or are pre mapping procedures (e.g. records assigned to towns or place names).</li> <li>Suitable habitat is present, but there are no existing records of the species from the region despite reasonable previous search effort.</li> <li>There is suitable habitat in the Survey Area, but the species is very infrequently recorded in the locality (e.g. migratory bird species with &lt;10 occurrence records in Australia).</li> </ul>

---

## 3.2 Flora and Vegetation Survey

### 3.2.1 Floristic Quadrats

Quadrat locations were selected using aerial photography, vegetation values and field observations to best represent the vegetation types present. The unmarked quadrats were 50 m x 50 m, as required according to the Flora and Vegetation Technical Guidance.

The following information was collected from within each quadrat:

- Observer.
- Date.
- Quadrat/site number.
- Global Position System (GPS) location (GDA2020) of the north-west corner.
- Digital photograph (spatially referenced with a reference number), taken from the north-west corner, looking diagonally across the quadrat.
- Broad soil type and colour.
- Topography.
- List of flora species recorded with total foliar cover within the quadrat for each species.
- National Vegetation Information System (NVIS) Vegetation description (as per below).
- Vegetation condition.

At least three quadrats per vegetation type were recorded for the detailed survey where there was sufficient extent. Relevés, being an unmeasured area of approximately the same size as quadrats, were used to record vegetation in Degraded or Completely Degraded condition. Whilst unmeasured, the detail recorded for relevés was commensurate with that of quadrats.

All quadrat and relevé locations are displayed on Figure 6.

### 3.2.2 Targeted Searches

Threatened and Priority Flora identified during the desktop analysis and previous surveys as known or having potential to occur were targeted for searches in areas of potential habitat. Searches were undertaken as regularly spaced traverses and meanders through areas of identified suitable habitat. Where target species have specific micro habitat preferences these receive a higher intensity of search effort.

---

The locations of all targeted species collected were recorded using a handheld GPS with the following data recorded:

- Observer, date and time.
- Local abundance/population size and/or population boundary.
- Representative photos of each species and habitat.
- Collection of representative specimens.
- Notes on habitat and vegetation type.

### **3.2.3 Vegetation Description and Classification**

Vegetation was described from each of the quadrats using the height and estimated cover of dominant and characteristic species of each stratum based on NVIS, recorded at Level V (NVIS Technical Working Group, 2017). Up to three species per stratum from each stratum (upper, mid and ground) were used to formulate vegetation descriptions for each quadrat and each vegetation type. Vegetation type descriptions were created by combining quadrat descriptions and modifying, where necessary, based on the wider vegetation. Vegetation types were defined by observation of species dominance and structural composition by the field survey team. Due to the degraded condition and low native species diversity vegetation statistical analysis was not applied to assist in defining vegetating types.

### **3.2.4 Vegetation Condition Assessment**

Vegetation condition was assessed at each quadrat and during traverses of the Survey Area using the Vegetation Condition Scale for the appropriate bioregion as per the Flora and Vegetation Technical Guidance (EPA, 2016). As quadrats are deliberately located in the best condition parts of a vegetation type, the condition rating of the quadrat may not match that of the broader vegetation type due to the scale of mapping.

### **3.2.5 Field Survey Timing and Survey Team**

The field survey was conducted on 15 and 16 September 2022. The survey was undertaken by WEPL senior ecologist Andrew Fry (Flora Licence FB6200002-2) with assistance from WEPL graduate environmental scientist Lovisa Thambert. Andrew has 10 years' experience in undertaking ecology surveys in the north-west region of WA.

### **3.2.6 Flora Taxonomy and Lodgement of Specimens**

Where field identification of plant taxa was not possible, specimens were collected for identification using resources of the Western Australian Herbarium (WAH). Identification of flora collections was completed by senior ecologist Andrew Fry. Where required specimen identifications were confirmed by submission to the WAH.

---

The finalised species list was checked against FloraBase (Western Australian Herbarium, 2022) to determine the conservation status and known distribution of each taxon. Introduced species were compared against the current *Biosecurity and Agriculture Management Act 2007* (BAM Act) Declared Pest list and the Weeds of National Significance (WoNS) list to determine their control status (Department of Agriculture, Water and the Environment, 2022b; Department of Primary Industries and Regional Development, 2022). Any conservation listed flora taxa, including potential Priority taxa, range extensions and potential new taxa were submitted to the WAH for verification and lodgement. Where relevant, Threatened and Priority Flora Report Forms (TPFRFs) were submitted to DBCA for previously unrecorded populations of conservation listed flora.

### 3.3 Fauna Survey

The field survey was conducted on 15 and 16 September 2022 by WEPL senior ecologist Andrew Fry. Technical input for shorebird species was provided by Dr Mike Bamford who has undertaken several surveys for the group in the Onslow region. The basic fauna survey incorporated a number of survey techniques as per the Terrestrial Fauna Technical Guidance (EPA, 2020). A basic survey is a low-intensity survey, conducted at the local scale to gather broad fauna and habitat information. The primary objectives are to verify the overall adequacy of the desktop study, and to map and describe habitats, with a focus on habitat for conservation listed fauna.

Fauna species were identified by secondary evidence searches such as scats, tracks, calls, remains, diggings and other signs, as well as opportunistic searches based on sightings. A fauna inventory was not compiled as part of this survey (not required under basic level survey) however observations are used to inform the fauna habitat type assessment.

Potential habitats for conservation listed species were identified and evaluated and the likelihood of occurrence assessed.

#### 3.3.1 Fauna Habitat Type Assessment

The fauna habitat types present within the Survey Area were defined considering landform, vegetation, structure such as rockpiles and logs and fauna assemblage occupying the area.

The following information was used to define and map all fauna habitat types within the Survey Area at specific fauna habitat assessment points and during traverses of the Survey Area:

- Land systems and landform.
- Vegetation type and condition mapping.
- Soil characteristics.
- Structure such as rockpiles and logs.
- Fauna assemblage information from desktop assessment and field observations.
- Aerial imagery and historic imagery.

Each fauna habitat type is described considering suitability for various fauna species groups or conservation-listed species. In addition, fauna habitat types likelihood to harbour specialised fauna species which are not found in adjacent areas was taken into consideration. Habitat types were delineated in the field and digitised upon return from the field survey.

### **3.3.2 Fauna Taxonomy**

Terrestrial vertebrate fauna taxa were identified in the field by an experienced ecologist.

Taxonomy and nomenclature follow the WA Museum checklist 2022 (Western Australian Museum, 2022). Conservation status follows the DBCA Threatened and priority fauna list (DBCA, 2022b). Where required verification of identification of secondary evidence (tracks, scats, diggings) may be undertaken by a relevant species group expert.

## 4. Results

### 4.1 Literature Review

The key findings for conservation listed flora and fauna species from five previous biological surveys within the region and in proximity to the Survey Area are summarised in Table 6. Shorebird Monitoring Survey results are discussed in detail in Section 4.3.3.

**Table 6: Literature Review**

Survey	Location	Flora Species	No. of individuals	Threatened Ecological Community Present	Fauna Species
Phoenix Environmental Sciences. (2017). <i>Flora and Vegetation Survey and Terrestrial Fauna Survey for the Pilbara Regional Waste Management Facility</i>	Study area is 28 km southeast of Onslow airport	<i>Abutilon</i> sp. Pritzelianum (P3)	3	No	<i>Merops ornatus</i> – Migratory listed under EPBC Act
		<i>Triumfetta echinate</i> (P3)	1		
Phoenix Environmental Sciences. (2018). <i>Flora and Vegetation Survey and Terrestrial Fauna Survey for the Pilbara Regional Waste Management Facility</i>	Study area is 28 km southeast of Onslow airport	<i>Triumfetta echinate</i> (P3)	1 however dead	No	N/A
360 Environmental. (2021). <i>Flora and Fauna Report Lot 300 Black Beach Road, Onslow</i>	3 km north of Onslow airport	None	N/A	No	<i>Larus novaehollandiae</i> – Marine listed under EPBC Act
RPS Group. (2019). <i>Flora and Vegetation Assessment, ANSIA Phase 2 Area</i>	12 km south-west of Onslow	<i>Eremophila forrestii</i> subsp. <i>viridis</i> (P3)	380	No	N/A
ENV Australia. (2011). <i>Onslow Townsite Strategy Flora, Vegetation, and Fauna Assessment</i>	Onslow townsite	None	N/A	No	<i>Hydroprogne caspia</i> , <i>Merops ornatus</i> and <i>Pandion cristatus</i> – all listed as Migratory species under EPBC Act

---

## 4.2 Flora and Vegetation

### 4.2.1 Desktop Assessment

#### *Database Searches*

Database searches identified 20 conservation listed flora species occurring within 100 km of the Survey Area (see Figure 5 and Appendix C), comprising:

- One Threatened species.
- Three Priority 1 species.
- Three Priority 2 species.
- Eleven Priority 3 species.
- Two Priority 4 species.

No State or Commonwealth listed TECs or State listed PECs were identified within the Survey Area by the database searches. The Priority 3 Priority Ecological Community (PEC) “Coastal dune tussock grassland dominate by *Whiteochloa airoides*” was identified in the region however occurrences of this community are restricted to offshore islands.

#### *Likelihood of Occurrence*

The pre-survey likelihood of occurrence assessment identified that of the 20 conservation listed flora species identified by the database searches:

- None had previously been recorded within the Survey Area.
- One was considered to have a high likelihood of occurrence.
- Four were considered to have a medium likelihood of occurrence.
- Fifteen were considered to have a low likelihood of occurrence.

Following the survey, the likelihood of occurrence was re-evaluated and identified that of the 20 conservation listed flora species identified by the database searches all were considered low likelihood of occurrence with no conservation listed flora recorded during the survey.

The likelihood of occurrence assessment is provided in Appendix C.

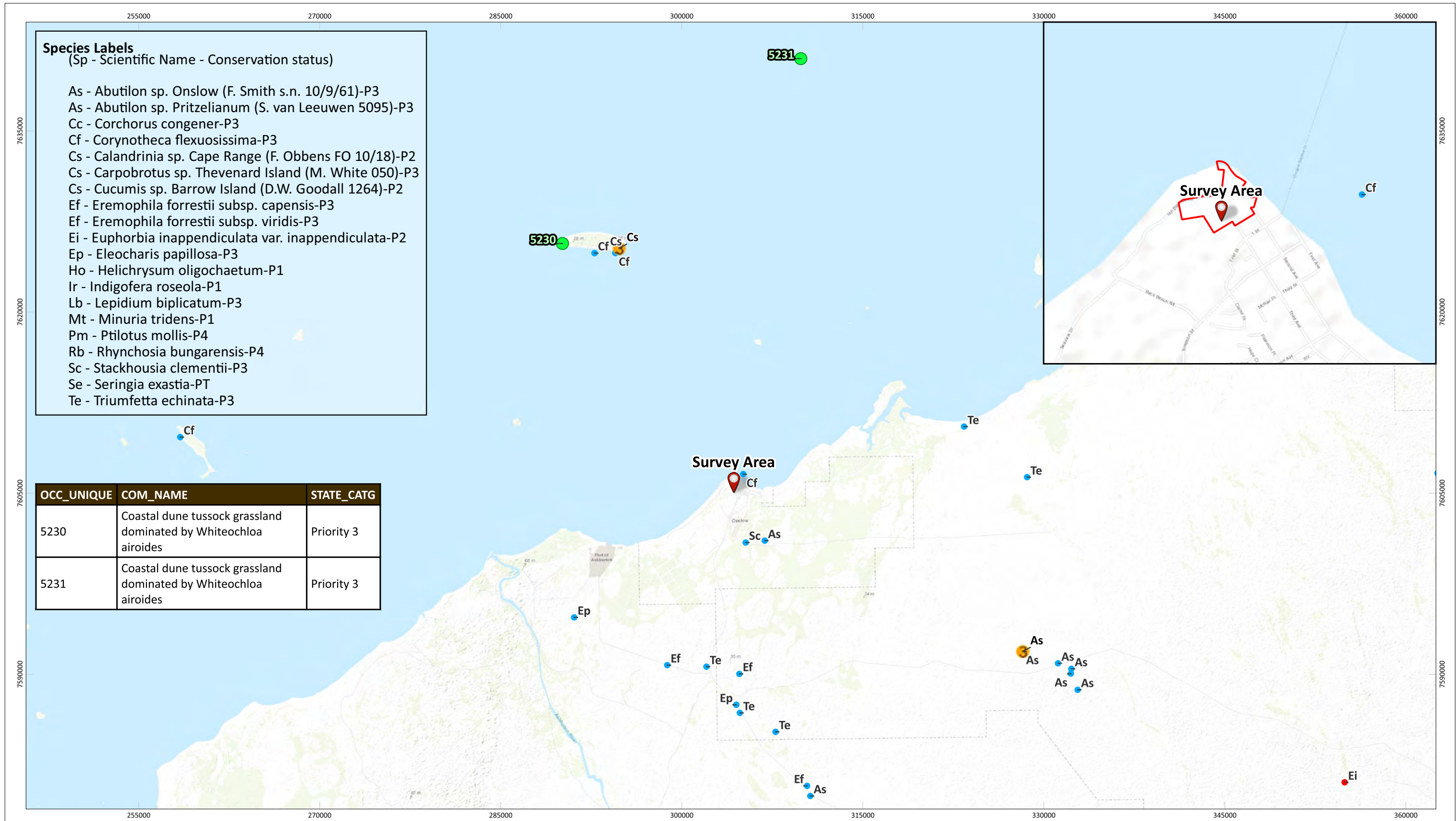


Figure 5: Database Search Results Flora and Communities

	PROJECT/REPORT NAME Fauna, Flora and Vegetation Survey Onslow	<b>Legend</b> Site Boundary Threatened Ecological Communities (DBCAs-038) Priority 3 <b>DBCAs Flora Database</b> Priority 2 Priority 3	<table border="1"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>AC</td> <td>AF</td> <td>20/9/2022</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	AC	AF	20/9/2022															
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## 4.2.2 Flora Survey

### Flora Species

A total of 43 vascular flora species were recorded from within the Survey Area from floristic quadrats, relevés and opportunistic observations. The timing of the field survey, following significant rainfall, was optimal for identifying most species with many flowering or in fruit. Four (9.30%) were introduced species. Native species diversity was low due to the degraded condition of the Survey Area and dominance of the ground stratum by invasive weed species.

The families with the highest number of taxa were Fabaceae (12 taxa), Poaceae (6), Chenopodiaceae and Amaranthaceae (four taxa each) and Asteraceae (3). The most commonly recorded genera were *Acacia* (six taxa), *Ptilotus* (3), *Indigofera* and *Tephrosia* (two each).

The flora inventory, presented as a site by species table showing conservation status and identifying any range extensions, is provided in Flora Inventory and Site x Species table in Appendix D.

### Threatened and Priority Flora

No EPBC Act-listed or *Wildlife Conservation Act 1950* (WC Act)-listed Threatened Flora were recorded in the Survey Area.

No DBCA-listed Priority Flora were recorded in the Survey Area.

### Flora of Other Significance

No flora species of other significance were recorded.

### Introduced Flora

A total of four introduced taxa were recorded within the Survey Area, representing 9.30% of the total taxa recorded (Table 7).

**Table 7: Introduced Flora Species**


Species	Common Name	Status Under BAM Act
<i>Aerva javanica</i>	Kapok bush	-
<i>Cenchrus ciliaris</i>	Buffel grass	-
<i>Cenchrus setiger</i>	Birdwood grass	-
<i>Sonchus oleraceus</i>	Common sowthistle	-

### 4.2.3 Vegetation

#### *Vegetation Types*

Two vegetation types were identified. These are described below in Table 8 and shown in Figure 6. Vegetation types were defined by observation of species dominance and structural composition by the field survey team. Due to the degraded condition and low native species diversity vegetation statistical analysis was not applied to assist in defining vegetating types.

**Table 8: Vegetation Types**

Vegetation Unit and Description	Total Area, Proportion (%) of the Survey Area	Sites	Vegetation Condition	Photograph
<p><b><u>VT01</u></b>  <i>Acacia coriacea</i> subsp. <i>coriacea</i> tall open shrubland over *<i>Cenchrus ciliaris</i>, <i>Triodia epactia</i> and <i>Trichodesma zeylanicum</i> mid tussock grassland/hummock grassland/forbland.            Occurring on stable secondary dunes of orange sand.</p>	<p>5.54 ha            75.17%</p>	<p>Q1            Q2            Q3</p>	<p>Degraded</p>	


Vegetation Unit and Description	Total Area, Proportion (%) of the Survey Area	Sites	Vegetation Condition	Photograph
<p><b><u>VT02</u></b>  <i>Acacia coriacea</i> subsp. <i>coriacea</i> and <i>Crotalaria cunninghamii</i> mid open shrubland over <i>Spinifex longifolius</i>, *<i>Cenchrus ciliaris</i> and <i>Salsola australis</i> mid hummock grassland/tussock grassland/chenopod shrubland.</p> <p>Occurring on primary dunes immediately adjacent to the beach.</p>	<p>0.4 ha 5.43%</p>	<p>Q4</p>	<p>Degraded</p>	
<p><b><u>Not Vegetation</u></b> Buildings, roads, firebreaks and other cleared areas.</p>	<p>1.43 ha 19.40%</p>	<p>-</p>	<p>Completely Degraded</p>	<p>-</p>



Figure 6: Vegetation Types

	PROJECT/REPORT NAME Fauna, Flora and Vegetation Survey Onslow	<b>Legend</b> <span style="border: 1px solid red; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Site Boundary <span style="color: red; font-weight: bold; margin-right: 5px;">■</span> Quadrat Releve	<b>Vegetation Type</b> <span style="display: inline-block; width: 15px; height: 10px; background-color: gray; margin-right: 5px;"></span> NV <span style="display: inline-block; width: 15px; height: 10px; background-color: green; margin-right: 5px;"></span> VT01 <span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; margin-right: 5px;"></span> VT02	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>AC</td> <td>AF</td> <td>20/9/2022</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	AC	AF	20/9/2022																				
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SCALE 1:1,914	SHEET SIZE A3 COLOUR	CLIENT Shire of Asburton	PROJECT NUMBER A22.052	VERSION 0	<p><b>WESTERN ENVIRONMENTAL</b></p> <p>Western Environmental Pty Ltd          08 6244 2310   enquiries@western.com.au          Level 3/25 Princes St, West Perth WA 6005          western.com.au</p>																													
COORDINATE REFERENCE SYSTEM GDA2020 / MGA zone 50		DRAWN BY / REVIEWED BY AC / AF	DATE 20/9/2022	NOTES: Cadastral boundary from LANDGATE 2022																														
DATA SOURCE LANDGATE AERIAL IMAGERY 2022																																		

### Vegetation Condition

The vegetation of the Survey Area was Degraded through the whole site. Vegetation condition extents are shown in Figure 7 and Table 9.

**Table 9: Vegetation Condition Extents**

Vegetation Condition	Extent (ha)	Extent (%)
Degraded	5.94	80.60
Not Vegetated	1.42	19.40
<b>Total</b>	<b>7.37</b>	<b>100</b>

The Survey Area has been subject to clearing for historical infrastructure, grazing and holding of animals, access tracks/ 4WD tracks and tourism purposes. The long history of disturbance has resulted in heavy weed invasion predominantly of *\*Cenchrus ciliaris* (buffel grass), *\*Cenchrus setiger* and *\*Aerva javanica* (kapok). Buffel grass is the most dominant species in the ground stratum (typically occurring at >25% cover) and has displaced many native species.

### Threatened and Priority Ecological Communities

No vegetation types were identified as likely comprising a State or Commonwealth listed TEC or State listed PEC.

### Vegetation of Other Significance

As per the Flora and Vegetation Technical Guidance and EPA guidance vegetation may be considered of significance for a range of reasons, other than a listing as a TEC or a PEC, including:

- Pre European vegetation extent being below a threshold level.
- Scarcity.
- Unusual species.
- Novel combinations of species.
- A role as a refuge.
- A role as a key habitat for threatened species or large populations representing a significant proportion of the local to regional total population of a species.
- A restricted distribution.

No vegetation type of other significant was recorded within the Survey Area.

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### ***Groundwater Dependent Ecosystems***

Vegetation in the Survey Area comprised xerophytic species, whose dependence on groundwater is negligible. It is not considered likely that any vegetation types are representative of a potential groundwater-dependent ecosystem (GDE). One of the species recorded was *Eucalyptus camaldulensis* subsp. *refulgens* which is typically found along drainage lines. In this circumstance the trees were planted for shaded purposes at the lookout point and do not represent a GDE.



Figure 7: Vegetation Condition

	PROJECT/REPORT NAME Fauna, Flora and Vegetation Survey Onslow		<b>Legend</b> Site Boundary Tracklogs <b>Vegetation condition</b> Degraded condition Not vegetation	<table border="1"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>AC</td> <td>AF</td> <td>20/9/2022</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	AC	AF	20/9/2022															
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DATA SOURCE LANDGATE AERIAL IMAGERY 2022		DRAWN BY / REVIEWED BY AC / AF	DATE 20/9/2022																										



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## 4.3 Fauna

### 4.3.1 Desktop Assessment

Database searches identified 66 conservation listed fauna species potentially occurring within the Survey Area and region, comprising:

- Fifty-six bird species.
- Seven mammal species.
- Three reptile species.

The results of the DBCA Threatened and Priority Fauna database search are shown in Figure 8. Database searches are summarised in Appendix C.

### 4.3.2 Likelihood of Occurrence

A likelihood of occurrence assessment was undertaken for conservation listed fauna species. Species listed as Marine only under the EPBC Act, as well as marine dependent species including whales, dolphins, turtles, and sea snakes have been excluded from the likelihood of occurrence assessment as they are outside the scope of the terrestrial fauna survey and there is no marine habitat within the Survey Area. Migratory shorebirds and waders were assessed as a distinct group due to shared habitat requirements and the availability of regional shorebird survey data.

For landbirds, mammals and reptile species the likelihood of occurrence assessment found that:

- One species was previously recorded.
- One species had a high likelihood of occurrence.
- Six species had a medium likelihood of occurrence.
- Thirteen species had a low likelihood of occurrence.

For migratory shorebirds and waders, the likelihood of occurrence assessment for habitats within the Survey Area found that:

- Four species have previous records in database search results from within the Survey Area. Considering the habitat preference of the species and that the adjacent Onslow Town Beach is a regionally well used shorebird and wader observation site, it is considered likely that these records are for tidal flats and beaches which are adjacent to the Survey Area.
- Forty-one species had a low likelihood of occurrence due to a lack of suitable habitats (tidal flats, sandbars, mangroves, wetlands).

Due to the Survey Areas location directly adjacent to regionally well used shorebird and wader observation site which comprises suitable habitat, a separate likelihood of occurrence assessment for habitats associated with Onslow Town Beach and the Beadon Point tidal flats was undertaken. This identified that:

- Eighteen species were previously recorded within the Survey Area (likely coordinate locations misplaced) or from counts for Onslow Town Beach/ Beadon Point which abuts the Survey Area.
- Seven species had a high likelihood of occurrence.
- Ten species had a medium likelihood of occurrence.
- Ten species had a low likelihood of occurrence.

The results of the likelihood of occurrence assessments are presented in Appendix C. Species identified as recorded or having a high or medium likelihood of occurrence are discussed further in Section 4.3.3.



Figure 8: Database Search Results Fauna

	PROJECT/REPORT NAME Fauna, Flora and Vegetation Survey Onslow	
	CLIENT Shire of Asburton	
SCALE 1:100,000	SHEET SIZE A3 COLOUR	PROJECT NUMBER A22.052
COORDINATE REFERENCE SYSTEM GDA2020 / MGA zone 50		VERSION 0
DATA SOURCE LANDGATE AERIAL IMAGERY 2022		DATE 20/9/2022

**Legend**

- Site Boundary
- DBCFA Fauna Database**
- ▲ Threatened - Critically endangered
- ▲ Threatened - Endangered
- ▲ Threatened - Vulnerable
- ▲ Specially Protected - migratory
- ▲ Specially Protected - other specially protected
- ▲ Priority

No	Description	Drawn	Approved	Date
A	Original issue	AC	AF	20/9/2022

NOTES:  
Cadastral boundary from LANDGATE 2022

Western Environmental Pty Ltd  
08 6244 2310 | enquiries@westernv.com.au  
Level 3/25 Princes St, West Perth WA 6005  
westernv.com.au

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### 4.3.3 Fauna Survey

#### *Fauna Species Assemblage*

As per the scope of a basic fauna survey under the Technical Guidance for Fauna Surveys the primary objectives are to verify the overall adequacy of the desktop study, and to map and describe habitats, with a focus on habitat for conservation listed fauna.

A desktop assessment of expected terrestrial vertebrate fauna assemblage for the Onslow townsite region was undertaken by Bamford Consulting Ecologists combining public datasets and survey work undertaken by Bamford Consulting Ecologists in 2005, 2009, 2018 and 2020 in the Onslow region. Results are summarised in Appendix D.

#### *Threatened, Priority and Other Conservation Listed Fauna*

There were no observations of, or secondary evidence recorded for threatened and priority fauna within the Survey Area. One species listed as migratory, *Pandion cristatus* (Osprey, eastern osprey) was recorded from database searches and recorded as present from secondary evidence (old nesting site). Database searches returned records for four migratory shorebirds and wader species within the Survey Area, however it is considered likely that the actual location of these observation is in adjacent habitat at Onslow Town Beach due to a lack of suitable habitat within the Survey Area. These species are discussed in the following section.

Species identified as having a high or medium likelihood of occurrence are presented below.

High likelihood of occurrence:

- *Lerista planiventralis maryani* (Maryan's keeled slider (Ashburton)) – P1.

Medium likelihood of occurrence:

- *Dasyurus hallucatus* (northern quoll) – EN.
- *Falco hypoleucos* (grey falcon) – VU
- *Falco peregrinus* (peregrine falcon) – OS
- *Hirundo rustica* (barn swallow) – MI, MA.
- *Leggadina lakedownensis* (northern short-tailed mouse) – P4.
- *Liasis olivaceus barroni* (Pilbara olive python) – VU.

#### *Conservation Listed Migratory Shorebirds and Waders*

Due to the Survey Areas location directly adjacent to a regional hotspot for shorebird and wader observations, a separate likelihood of occurrence assessment for habitats associated with Onslow Town Beach and Beadon Point was undertaken. This was undertaken to identify conservation listed species

potentially occurring outside of, but directly adjacent to the Survey Area, in consideration of the potential for indirect impacts.

The Onslow Town Beach and Beadon Point have a sheltered tidal flat area between the shore and a shallow reef shelf located between 100-300 m offshore. This reef and flats provide foraging and roosting areas at low tide. Bird numbers are likely to be highest in the October to December period (southward migration) but some birds will be present at all times of the year. Numbers can also vary enormously with weather events in the greater region. The area is a monitoring site under the Birdlife Australia Australian Shorebird Monitoring program with regular volunteer survey events undertaken. A compiled list of species recorded or with a high-medium likelihood of occurrence for the area is provided in Table 10. This assessment was prepared from review of previous regional assessments and Birdlife Australia Australian Shorebird Monitoring program data presented in Bamford, 2022 and Bamford, 2009.

**Table 10: Migratory Shorebirds and Waders Recorded or High-Medium Likelihood of Occurrence**

Scientific Name	Common Name	Conservation Status State	Conservation Status Federal	Likelihood of Occurrence
<i>Actitis hypoleucos</i>	Common sandpiper	MI	MI, MA	Recorded
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	MI	MI, MA	Recorded
<i>Calidris alba</i>	Sanderling	MI	MI	Recorded
<i>Calidris ruficollis</i>	Red-necked stint	MI	MI	Recorded
<i>Calidris tenuirostris</i>	Great knot	CR	CR, MI	Recorded
<i>Charadrius leschenaultii</i>	Greater sand plover, Large sand plover	VU	VU, MI, MA	Recorded
<i>Charadrius mongolus</i>	Lesser sand plover	EN	EN, MI	Recorded
<i>Chlidonias leucopterus</i>	White-winged black tern, White-winged tern	MI	MI	Recorded
<i>Gelochelidon nilotica</i>	Gull-billed tern	MI	MI	Recorded
<i>Hydroprogne caspia</i>	Caspian tern	MI	MI, MA	Recorded
<i>Limosa lapponica</i>	Bar-tailed godwit	MI	MI, MA	Recorded
<i>Numenius minutus</i>	Little curlew, little whimbrel	MI	MI	Recorded
<i>Numenius phaeopus</i>	Whimbrel	MI	MI	Recorded
<i>Sterna dougallii</i>	Roseate tern	MI	MI, MA	Recorded
<i>Sterna hirundo</i>	Common tern	MI	MI	Recorded
<i>Thalasseus bergii</i>	Greater crested tern	MI	MI, MA	Recorded
<i>Tringa brevipes</i>	Grey-tailed tattler	P4		Recorded
<i>Tringa nebularia</i>	Common greenshank, Greenshank	MI	MI, MA	Recorded
<i>Charadrius veredus</i>	Oriental plover, Oriental dotterel	MI	MI, MA	High

Scientific Name	Common Name	Conservation Status State	Conservation Status Federal	Likelihood of Occurrence
<i>Glareola maldivarum</i>	Oriental pratincole	MI	MI, MA	High
<i>Limosa lapponica menzbieri</i>	Northern Siberian bar-tailed godwit, Russkoye bar-tailed godwit	CR	CR	High
<i>Numenius madagascariensis</i>	Eastern curlew, Far eastern curlew	CR	CR, MI, MA	High
<i>Pluvialis squatarola</i>	Grey plover	MI	MI	High
<i>Sternula albifrons</i>	Little tern	MI	MI, MA	High
<i>Sternula nereis nereis</i>	Australian fairy tern	VU	VU	High
<i>Anous stolidus</i>	Common noddy	MI	MI, MA	Medium
<i>Calidris canutus</i>	Red knot, Knot	EN	EN, MI, MA	Medium
<i>Calidris ferruginea</i>	Curlew sandpiper	CR	CR, MI, MA	Medium
<i>Calidris melanotos</i>	Pectoral sandpiper	MI	MI, MA	Medium
<i>Limosa limosa</i>	Black-tailed godwit	MI		Medium
<i>Onychoprion anaethetus</i>	Bridled tern	M	MI, MA	Medium
<i>Pluvialis fulva</i>	Pacific golden plover	MI	MI	Medium
<i>Thalassarche carteri</i>	Indian, Yellow-nosed albatross		VU, MI, MA	Medium
<i>Tringa glareola</i>	Wood sandpiper	MI	MI	Medium
<i>Xenus cinereus</i>	Terek sandpiper	MI	MI	Medium

### Introduced Fauna


Evidence of dogs and cats was recorded. Due to the close proximity to the town it is expected that these and other introduced species common on urban fringes would be present.

#### 4.3.4 Fauna Habitat Types

Two fauna habitat types were described for the Survey Area. These align with the mapped vegetation types. The fauna habitat types are described below in Table 11 and shown in Figure 9.

For a given species, habitat types are assessed as either core, supporting or not habitat. As per Commonwealth *Matters of National Environmental Significance - Significant Impact Guidelines 1.1* “core” habitat is defined as that critical to the survival of the species and considered to contain denning/ breeding sites, primary foraging areas and refuge from drought, fire and other stresses (DotE, 2013). Supporting habitat is defined as that which is likely used for occasional foraging and dispersing/ connective habitat which may be used at low intensity on an infrequent basis.

**Table 11: Fauna Habitat Type Descriptions with the Survey Area**

Fauna Habitat Type	Habitat Description	Total Area, Proportion of the Survey Area	Representative Photo
<p><b>Acacia shrublands on stable dunes (VT01)</b></p>	<p><i>Acacia coriacea</i> subsp. <i>coriacea</i> shrubland over *<i>Cenchrus ciliaris</i> and <i>Triodia epactia</i> grassland. Occurring on stable secondary dunes of orange sand. There is limited leaf litter and no rockpiles or large logs as refuges present. The ground is fairly open with sandy patches between grass clumps. The open sandy patches provide habitat for burrowing species and those utilising open areas amongst grass clumps.</p> <p>The close proximity to town, presence of cats, disturbance and invasion by weeds has reduced the quality of the habitat.</p> <p>Core habitat for <i>Lerista planiventralis maryani</i> (P1).</p> <p>Supporting habitat/ foraging only for other species assessed as medium likelihood of occurrence.</p> <p>Not habitat for migratory waders and shorebirds.</p>	<p>5.54 ha 75.17%</p>	




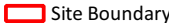



Fauna Habitat Type	Habitat Description	Total Area, Proportion of the Survey Area	Representative Photo
<p><b>Acacia and Spinifex beach/primary dunes (VT02)</b></p>	<p>Sparse <i>Acacia coriacea</i> subsp. <i>coriacea</i> shrubland over <i>Spinifex longifolius</i> and <i>*Cenchrus ciliaris</i> grassland. Occurring on primary dunes of yellow-white beach sand immediately adjacent to the beach. Some areas of open beach sand also present.</p> <p>There is limited leaf litter and no rockpiles or large logs as refuges present. The ground is fairly open with sandy patches between grass clumps. The open sandy patches provide habitat for burrowing species and those utilising open areas amongst grass clumps.</p> <p>The close proximity to town, presence of cats, disturbance and invasion by weeds has reduced the quality of the habitat.</p> <p>Core habitat for <i>Lerista planiventralis maryani</i> (P1).</p> <p>Supporting habitat/ foraging only for other species assessed as medium likelihood of occurrence.</p> <p>May provide infrequently utilised supporting habitat/infrequent refuge for migratory shorebird and wader species.</p>	<p>0.4 ha 5.43%</p>	
<p><b>Not Vegetation</b></p>	<p>Buildings, roads, firebreaks and other cleared areas.</p>	<p>1.43 ha 19.40%</p>	



Figure 9: Fauna Habitat Types

 	PROJECT/REPORT NAME Fauna, Flora and Vegetation Survey Onslow		<b>Legend</b>  Site Boundary <b>Fauna Habitat Types</b>  VT01- Acacia shrubland on stable dunes  VT02- Acacia and Spinifex beach/primary dunes	<table border="1"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>AC</td> <td>AF</td> <td>20/9/2022</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	AC	AF	20/9/2022															
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DATA SOURCE LANDGATE AERIAL IMAGERY 2022	DRAWN BY / REVIEWED BY AC / AF	DATE 20/9/2022																											

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## 5. Discussion

### 5.1 Vegetation Significance

Two vegetation types were recorded as occurring. These two vegetation types correspond with the major soil landscape/ geology units and habitat types present. These are:

- VT01: Stable secondary dunes of *Acacia coriacea* subsp. *coriacea* over \**Cenchrus ciliaris*, *Triodia epactia* grassland.
- VT02: Primary dunes immediately adjacent to the beach with *Acacia coriacea* subsp. *coriacea* shrubland over *Spinifex longifolius* and \**Cenchrus ciliaris* grassland.

The vegetation types identified are not consistent with any known listed vegetation types of conservation significance. These vegetation types identified are considered to be typical of those encountered in the coastal strip for the region and are considered highly likely to be widespread in the region.

All vegetation in the Survey Area was assessed as being in degraded condition. The Survey Area has been subject to clearing for historical infrastructure, grazing and holding of animals, access tracks/ 4WD tracks and tourism purposes. The history of disturbance has resulted in heavy weed invasion predominantly of \**Cenchrus ciliaris* (Buffel Grass) which is occurring at >25% cover and has displaced many native species. This disturbance has reduced the environmental values of vegetation remaining.

### 5.2 Flora Significance

No flora species of conservation significance were recorded in the Survey Area and none were identified by the post survey likelihood of occurrence assessment as being likely to occur. This finding is consistent with that reported by 360 Environmental (2021) and ENV Australia (2011) in biological surveys covering lots directly adjacent to the Survey Area containing similar vegetation types/habitats.

### 5.3 Fauna Habitat Significance

None of the conservation listed species recorded or identified as having a high or medium likelihood of occurrence are considered likely to be dependent on habitats within the Survey Area. It is considered that the habitat types described are well represented outside of the Survey Area within the Onslow coastal region.

Two fauna habitat types were recorded as occurring. These habitat types correspond with the vegetation types and the major soil landscape/ geology units present and have similar characteristics with sandy dunes covered by *Acacia* shrubs and open grasslands. The close proximity to town, presence of cats, disturbance through prior clearing and invasion by weeds has reduced the quality of the habitat across the Survey Area. The two habitat types are expected to support similar assemblages of reptiles, mammals and birds. The key differentiating feature for the fauna habitat types is the proximity of the *Acacia* and *Spinifex* beach/primary dunes habitat type to the ocean, creating the potential for infrequent use by shorebirds/ waders.

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The desktop assessment of terrestrial fauna identified one conservation listed species as previously record and seven having a high or medium likelihood of occurrence. Species either recorded as present or assessed as having a high-medium likelihood of occurrence are discussed further below.

### ***Pandion cristatus* (Osprey, eastern osprey) – MI, MA**

Ospreys are regularly observed in the Onslow townsite and surrounds and records are present from within the Survey Area. Ospreys are found on the coast and in terrestrial wetlands in northern parts of Australia and offshore islands. They nest in natural or artificial sites such as trees, cliffs or radio towers. There is an artificial nest platform present at the lookout point in the central part of the Survey Area (see Figure 1). The platform does not currently contain a nest, but some sticks are present indicating attempted/ previous nesting behaviour. There is a small grove of planted Eucalypts at the lookout which may also provide nesting or feeding locations. Ospreys are currently using a nearby communications tower in the Onslow townsite for nesting and feeding.

Although potential nesting and feeding/ roosting locations are present no activity was recorded. Habitat for this species is widespread and the species is tolerant of disturbance and will readily utilise man-made structures. The habitat present within the Survey Area is not considered likely to be significant in supporting the local population of the species.

### ***Lerista planiventralis maryani* (Maryan's keeled slider) – Priority 1**

Distribution for the species is restricted to coastal areas from Onslow to Barradale with preferred habitat in the dunes (Wilson and Swan, 2021; Bancroft and Bamford, 2005). The species habitat preference is well understood through several previous targeted searching programs with core habitat comprising Acacia shrubs over soft spinifex or *Spinifex longifolius* on beach sand and foredunes or secondary dunes (Bancroft and Bamford, 2005; Mike Bamford pers. com.). Previous records for the species are present < 500 m from the Survey Area near the Onslow townsite.

All areas of intact habitat within the Survey Area comprise core habitat for the species. In order to estimate the potential significance of the habitat within the Survey Area to the regional occurrence of the species potential regional habitat extent was estimated based on the Survey Areas pre-European vegetation association mapping (see Section 2.4). The Cape Yannare Coastal Plains\_117 pre-European vegetation association is considered likely to provide suitable habitat for the species across its mapped extent. The extent of habitat within the survey area (5.94 ha) comprises 0.1 % of the 5,090 ha of pre-European vegetation association Cape Yannare Coastal Plains\_117 present in the Onslow region. Considering the small extent of the habitat present within the Survey Area and the degrading factors present the habitat is not considered likely to be significant in supporting the local population of the species.

### ***Leggadina lakedownensis* (Northern short-tailed mouse, Lakeland Downs mouse, Kerakenga) – Priority 4**

The species has a wide-ranging distribution across much of northern and arid Australia. Preferred habitat comprises areas of cracking clay and adjacent habitats but also in mixed tussock and hummock grasslands (Van Dyck and Strahan, 2008). Records are present within 10 km of the Survey Area.

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Habitat present is not consistent with described core habitat for the species. The species may infrequently utilise the Survey Area however habitat is not considered likely to be significant in supporting the local population of the species.

### ***Dasyurus hallucatus* (Northern quoll) – EN**

Distribution of the species is across northern Australia. Preferred habitat is very varied but includes rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert (Threatened Species Scientific Committee, 2005). An unconfirmed recent record is reported from the Onslow townsite and confirmed records are present from the Wheatstone project area 11 km south west of the Survey Area.

Habitat present is not consistent with described core habitat for the species and does not offer any denning opportunity. The species may infrequently utilise the Survey Area for foraging or dispersal however habitat is not considered likely to be significant in supporting the local population of the species.

### ***Liasis olivaceus barroni* (Pilbara olive python) – VU**

Preferred habitat are escarpments, gorges and water holes in the ranges of the Pilbara region. Macrohabitat preferences are under rock piles, on top of rocks or under spinifex (DEWHA, 2008). An unconfirmed recent record is reported from the Wheatstone project area 21 km south west of the Survey Area.

Habitat present is not consistent with described core habitat for the species and species is not often recorded in sandy coastal areas. The species may infrequently utilise the Survey Area for foraging or dispersal; however, habitat is not considered likely to be significant in supporting the local population of the species.

### ***Falco hypoleucos* (Grey Falcon) – VU and *Falco peregrinus* (Peregrine falcon) – OS**

Both species are wide ranging and uncommon with distributions across much of Australia. The species forage in a range of woodland and grassland habitats and nest in high cliffs, trees and man-made structures. (Menkhorst et al., 2017).

The species are considered potential only to utilise the habitat very infrequently for foraging and the habitat is not considered likely to be significant in supporting the local population of the species.

### ***Hirundo rustica* (Barn swallow) – MI, MA**

The Barn Swallow is an abundant migratory species with a wide distribution. In Australia, the species have been recorded in open country in coastal lowlands, often near water, towns and cities and also in or over freshwater wetlands, paperbark Melaleuca woodland, mesophyll shrub thickets and tussock grassland (DCCEEW, 2022b). The Barn Swallow is common around Onslow townsite in summer but appears to remain within the townsite (M. Bamford pers. obs).

The species are considered potential to utilise the habitat occasionally for foraging or roosting; however, the habitat is not considered likely to be significant in supporting the local population of the species.

### **Migratory Shorebirds and Waders**

The Acacia and Spinifex beach/primary dunes habitat type (0.4 ha extent) occurs directly adjacent to the Onslow Town Beach and Beadon Point tidal flats which are a regional hotspot for shorebird and wader observations. See Table 10 for list of species previously recorded or with a high-medium likelihood of occurrence in the habitat adjacent to the Survey Area. The habitat within the Survey Area may be infrequently utilised for shelter or resting however the habitat is not considered likely to be significant in supporting the local population of the species.

Considering the regular presence of multiple conservation listed species of migratory shorebird and waders present in the Onslow Town Beach and Beadon Point tidal flats adjacent to the Survey Area, consideration should be given in any development of the Survey Area to mitigate potential indirect impacts to this habitat.

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# Appendix A

# Legislation

### ***Environment Protection and Biodiversity Conservation Act 1999***

The EPBC Act aims to protect matters of national environmental significance (MNES). Under the EPBC Act, the Commonwealth Department of Climate Change, Energy and the Environment lists threatened species and communities in categories determined by criteria set out in the EPBC Act.

Projects likely to cause a significant impact on MNES should be referred to the DCCEEW for assessment under the EPBC Act.

### ***Biodiversity Conservation Act 2016***

The Biodiversity Conservation Act 2016 aims to conserve and protect biodiversity and biodiversity components within the State and to promote ecologically sustainable use of biodiversity components in the State.

### ***Environmental Protection Act 1986***

Declared Rare Flora (DRF) and Threatened Ecological Communities (TECs) are given special consideration in environmental impact assessments and have special status as Environmentally Sensitive Areas (ESAs) under the EP Act and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004. Exemptions for a clearing permit do not apply in an ESA. In addition, habitat necessary for the maintenance of indigenous fauna is considered in the clearing principles and assessed during consideration of applications for a clearing permit.

### ***Biosecurity and Agricultural Management Act 2007***

Plants may be 'Declared' by the Minister for Agriculture and Food under the BAM Act. The Western Australian Organism List contains information on the area(s) in which a plant is declared and the control and keeping categories to which it has been assigned in Western Australia. A declaration may apply to the whole State, to districts, individual properties or even to single paddocks. If a plant is 'Declared', landholders are obliged to control that plant on their properties.

### ***Weeds of National Significance***

The Australian Government along with the State and Territory governments has endorsed 32 WoNS. Four major criteria were used in determining WoNS:

- The invasiveness of a weed species.
- A weed's impacts.
- The potential for spread of a weed.
- Socio-economic and environmental values.

Each WoNS has a national strategy and a national coordinator, responsible for implementing the strategy. WoNS are regarded as the worst weeds in Australia because of their invasiveness, potential for spread, and economic and environmental impacts.

### ***Department of Biodiversity, Conservation and Attractions Priority Lists***

DBCA lists 'Priority' flora and fauna that have not been assigned statutory protection as "Threatened" under the BC Act and are under consideration for declaration as Threatened. Flora and fauna assessed as Priority 1-3 are considered to be in urgent need of further survey. Priority 4 flora requires monitoring every 5 -10 years.

DBCA maintains a list of Priority Ecological Communities (PECs) which identifies plant communities that require further investigation before possible nomination for TEC status. Once listed, a community becomes a PEC and, when endorsed by the WA Minister for Environment, becomes a TEC and protected as an ESA under Environmental Protection (Clearing of Native Vegetation) Regulations 2004.

### ***Informal Recognition of Flora and Fauna***

Certain populations or communities of flora and/or fauna may be of local significance or interest because of their patterns of distribution and abundance. For example, specific locations of flora and may be locally significant because they are range extensions to the previously known distribution, or are newly discovered taxa (and have the potential to be of more than local significance). In addition, many species are in decline as a result of threatening processes (land clearing, grazing, and changed fire regimes) and relict populations of such species assume local importance for DBCA. It is not uncommon for DBCA to make comment on these species of interest.

# **Appendix B**

## **Definitions and Criteria**

## EPBC Act Categories for Flora, Fauna and Ecological Communities

Category	Threatened Species	Threatened Ecological Communities
<b>Extinct</b>	A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.	N/A.
<b>Extinct in the wild</b>	<p>A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time:</p> <p>(a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or</p> <p>(b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.</p>	N/A.
<b>Critically Endangered (CE)</b>	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.	An ecological community is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
<b>Endangered (EN)</b>	<p>A native species is eligible to be included in the endangered category at a particular time if, at that time:</p> <p>(a) it is not critically endangered; and</p> <p>(b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.</p>	<p>An ecological community is eligible to be included in the endangered category at a particular time if, at that time:</p> <p>(a) it is not critically endangered; and</p> <p>(b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.</p>
<b>Vulnerable (VU)</b>	<p>A native species is eligible to be included in the vulnerable category at a particular time if, at that time:</p> <p>(a) it is not critically endangered or endangered; and</p> <p>(b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.</p>	<p>An ecological community is eligible to be included in the vulnerable category at a particular time if, at that time:</p> <p>(a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.</p>
<b>Conservation Dependent</b>	<p>A native species is eligible to be included in the conservation dependent category at a particular time if, at that time:</p> <p>(a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or</p> <p>(b) the following subparagraphs are satisfied:</p> <ul style="list-style-type: none"> <li>(i) the species is a species of fish.</li> <li>(ii) the species is the focus of a plan of management that provides for</li> </ul>	N/A.

Category	Threatened Species	Threatened Ecological Communities
	<p>management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long-term survival in nature are maximised.</p> <p>(iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory.</p> <p>(iv) cessation of the plan of management would adversely affect the conservation status of the species.</p>	

### Conservation Codes for Western Australian Flora and Fauna (DBCA)

#### Conservation Codes for Western Australian Flora and Fauna

Threatened, Extinct and Specially Protected fauna or flora<sup>1</sup> are species<sup>2</sup> which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

The Wildlife Conservation (Specially Protected Fauna) Notice 2018 and the Wildlife Conservation (Rare Flora) Notice 2018 have been transitioned under regulations 170, 171 and 172 of the Biodiversity Conservation Regulations 2018 to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the Biodiversity Conservation Act 2016.

Categories of Threatened, Extinct and Specially Protected fauna and flora are:

#### Threatened species

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the Biodiversity Conservation Act 2016 (BC Act).

T Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the Wildlife Conservation (Rare Flora) Notice 2018 for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using International Union for Conservation of Nature (IUCN) Red List categories and criteria as detailed below.

CR	<p><b>Critically endangered species</b></p> <p>Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines".</p> <p>Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.</p>
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#### Endangered species

Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines".

EN Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.

**Conservation Codes for Western Australian Flora and Fauna**

<b>VU</b>	<p><b>Vulnerable species</b></p> <p>Threatened species considered to be “facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines”.</p> <p>Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.</p>
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**Extinct species**

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

<b>EX</b>	<p><b>Extinct species</b></p> <p>Species where “there is no reasonable doubt that the last member of the species has died”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).</p> <p>Published as presumed extinct under schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for extinct fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.</p>
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**Extinct in the wild species**

<b>EW</b>	<p>Species that “is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).</p> <p>Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.</p>
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**Specially protected species**

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

**Migratory species**

<b>MI</b>	<p>Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).</p> <p>Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.</p> <p>Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.</p>
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## Conservation Codes for Western Australian Flora and Fauna

CD	<p><b>Species of special conservation interest (conservation dependent fauna)</b></p> <p>Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).</p> <p>Published as conservation dependent fauna under schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.</p>
OS	<p><b>Other specially protected species</b></p> <p>Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).</p> <p>Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.</p>
P	<p><b>Priority species</b></p> <p>Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.</p> <p>Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.</p> <p>Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.</p>
1	<p><b>Priority 1: Poorly-known species</b></p> <p>Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.</p>
2	<p><b>Priority 2: Poorly-known species</b></p> <p>Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.</p>
3	<p><b>Priority 3: Poorly-known species</b></p> <p>Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.</p>

Conservation Codes for Western Australian Flora and Fauna	
<b>4</b>	<p><b>Priority 4: Rare, Near Threatened and other species in need of monitoring</b></p> <p>(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.</p> <p>(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.</p> <p>(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>

<sup>1</sup> The definition of flora includes algae, fungi and lichens.

### DBCA Definitions and Criteria for TECs and PECs

Criteria	Definition
<b>Threatened Ecological Communities</b>	
<b>Presumed Totally Destroyed (PD)</b>	<p>An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.</p> <p>An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B):</p> <p>A. Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or</p> <p>B. All occurrences recorded within the last 50 years have since been destroyed.</p>
<b>Critically Endangered (CR)</b>	<p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.</p> <p>An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):</p> <p>A. The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii):</p> <ul style="list-style-type: none"> <li>i. geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years).</li> <li>ii. modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated.</li> </ul> <p>B. Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <ul style="list-style-type: none"> <li>i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years).</li> <li>ii. there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes.</li> </ul>

Criteria	Definition
	<p>iii. there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.</p> <p>C. The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).</p> <p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.</p> <p>An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C):</p> <p>A. The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii):</p> <ul style="list-style-type: none"> <li>i. the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short-term future (within approximately 20 years).</li> <li>ii. modification throughout its range is continuing such that in the short-term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated.</li> </ul> <p>B. Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <ul style="list-style-type: none"> <li>i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short-term future (within approximately 20 years).</li> <li>ii. there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes.</li> <li>iii. there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes.</li> </ul> <p>The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).</p>
<b>Endangered (EN)</b>	<p>An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.</p> <p>An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C):</p> <p>A. The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.</p>
<b>Vulnerable (VU)</b>	

Criteria	Definition
	<p>B. The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.</p> <p>C. The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.</p>

### Priority Ecological Communities

Priority One	<p><b>Poorly known ecological communities</b></p> <p>Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.</p>
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Priority Two	<p><b>Poorly known ecological communities</b></p> <p>Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, state forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities, but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.</p>
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Priority Three	<p><b>Poorly known ecological communities</b></p> <p>i. Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or.</p> <p>ii. Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or.</p> <p>iii. Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.</p> <p>Communities may be included if they are comparatively well known from several localities, but do not meet adequacy of survey requirements and /or are not well defined, and known threatening processes exist that could affect them.</p>
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Priority Four	<p><b>Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list.</b> These communities require regular monitoring.</p> <p>i. Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change These communities are usually represented on conservation lands.</p> <p>ii. Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.</p> <p>iii. Ecological communities that have been removed from the list of threatened communities during the past five years.</p>
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Criteria	Definition
<b>Priority Five</b>	<b>Conservation Dependent Ecological Communities</b> Ecological Communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

# **Appendix C**

## **Desktop Assessment Results and Likelihood of Occurrence Assessments**

**Flora Database Search Results (DBCA Database Search using 100 Km Buffer, PMST 50 km buffer), Likelihood and Flora Survey Records**

Species	Conservation Status		Source		Flowering Period	Preferred Habitat	Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence	Recorded
	DBCA	EPBC	PMST	DBCA						
<i>Abutilon</i> sp. Onslow (F. Smith s.n. 10/9/61)	P3			x	May - Oct	Flat hummock grassland with red-brown silty, clay loam or loamy sandplain	No	Low	Low	No
<i>Abutilon</i> sp. Pritzelianum (S. van Leeuwen 5095)	P3			x	Jun or Aug - Sep	Sandy plains	No	Medium	Low	No
<i>Calandrinia</i> sp. Cape Range (F. Obbens FO 10/18)	P2			x	-	-	No	Low	Low	No
<i>Carpobrotus</i> sp. Thevenard Island (M. White 050)	P3			x	Aug	Coarse white sand, dune tops, disturbed areas	Yes	Medium	Low	No
<i>Corchorus congener</i>	P3			x	Apr - Jun or Aug - Nov	Sand, red sandy loam with limestone, sand dunes, plains	No	Low	Low	No
<i>Corynotheca flexuosissima</i>	P3			x	Jan or May or Sep	Red or white sand, limestone, coastal sand dunes	Yes	High	Low	No
<i>Cucumis</i> sp. Barrow Island (D.W. Goodall 1264)	P2			x	-	-	No	Low	Low	No
<i>Eleocharis papillosa</i>	P3			x	Nov	Red clay over granite, open clay flats, claypans	No	Low	Low	No
<i>Eremophila forrestii</i> subsp. <i>capensis</i>	P3			x		Brown rocky soils, limestone, ridges	No	Low	Low	No
<i>Eremophila forrestii</i> subsp. <i>viridis</i>	P3			x	Aug	Red sand, rocky gully	No	Low	Low	No
<i>Euphorbia inappendiculata</i> var. <i>inappendiculata</i>	P2			x	-	-	No	Low	Low	No
<i>Helichrysum oligochaetum</i>	P1			x	Aug-Nov	Red clay, alluvial plains	No	Low	Low	No
<i>Indigofera roseola</i>	P1			x	-	-	No	Low	Low	No

Species	Conservation Status		Source		Flowering Period	Preferred Habitat	Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence	Recorded
	DBCA	EPBC	PMST	DBCA						
<i>Lepidium biplicatum</i>	P3			x	Sep	Coastal regions	Yes	Medium	Low	No
<i>Minuria tridens</i>	P1			x	Sep	Roadsides	No	Low	Low	No
<i>Ptilotus mollis</i>	P4			x	May or Sep	Stony hills, screes	No	Low	Low	No
<i>Rhynchosia bungarensis</i>	P4			x	-	Pebbly, shingly coarse sand amongst boulders. Banks of flow line in the mouth of a gully in a valley wall	No	Low	Low	No
<i>Seringia exastia</i>	T			x	-	-	No	Low	Low	No
<i>Stackhousia clementii</i>	P3			x		Skeletal soils, sandstone hills	No	Low	Low	No
<i>Triumfetta echinata</i>	P3			x	Aug	Red sandy soils, sand dunes	Yes	Medium	Low	No

**Fauna Database Search Results (DBCA Database Search using 100 Km Buffer, PMST 50 km buffer), Likelihood and Fauna Survey Records**

Scientific Name	Common Name	Conservation Status		Database		Likelihood of Occurrence	Distance to nearest record (km) DBCA database	Justification
		State	Federal	PMST	DBCA			
<b>LAND BIRDS</b>								
<i>Apus pacificus</i>	Fork-tailed Swift	MI	MI, MA	x	x	Low		Aerial species not landing in WA
<i>Elanus scriptus</i>	Letter-winged kite	P4			x	Low	6	Single record from 1979
<i>Erythrotriorchis radiatus</i>	Red Goshawk	VU	VU	x		Low		No suitable habitat present (woodlands and open forest)
<i>Falco hypoleucos</i>	Grey Falcon	VU	VU	x		Medium		Foraging habitat present
<i>Falco peregrinus</i>	Peregrine falcon	OS			x	Medium	13	Foraging habitat present
<i>Hirundo rustica</i>	Barn Swallow	MI	MI, MA	x	x	Medium		Potentially suitable habitat present
<i>Motacilla cinerea</i>	Grey Wagtail	MI	MI, MA	x		Low		Infrequently recorded in Australia
<i>Motacilla flava</i>	Yellow Wagtail	MI	MI, MA	x		Low		Infrequently recorded in Australia
<i>Pandion cristatus</i>	Osprey, eastern osprey	MI	MI, MA		x	Recorded	0	Recorded by database search and observation of secondary evidence
<i>Pezoporus occidentalis</i>	Night Parrot	CR	CR		x	Low	0.7	Record is from 1960s associated with place name. Species now locally extinct, no suitable habitat present
<i>Plegadis falcinellus</i>	Glossy ibis	MI	MI		x	Low		No suitable habitat present
<b>SHOREBIRDS/WADERS/ MARINE BIRDS (For Habitat Within the Survey Area)</b>								
<i>Actitis hypoleucos</i>	Common Sandpiper	MI	MI, MA	x	x	Recorded	0	No suitable habitat present. Record likely for adjacent habitat on beach/ tidal flats
<i>Anous stolidus</i>	Common Noddy	MI	MI, MA	x	x	Low	34	No suitable habitat present
<i>Ardenna carneipes</i>	Flesh-footed Shearwater, Fleshy-footed Shearwater		MI, MA	x		Low		No suitable habitat present
<i>Ardenna pacifica</i>	Wedge-tailed Shearwater	MI	MI, MA	x	x	Low		No suitable habitat present
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	MI	MI, MA	x	x	Low	<1	No suitable habitat present
<i>Calidris alba</i>	Sanderling	MI	MI		x	Recorded	0	No suitable habitat present. Record likely for adjacent habitat on beach/ tidal flats
<i>Calidris canutus</i>	Red Knot, Knot	EN	EN, MI, MA	x	x	Low	19	No suitable habitat present
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR	CR, MI, MA	x	x	Low	<1	No suitable habitat present
<i>Calidris melanotos</i>	Pectoral Sandpiper	MI	MI, MA	x	x	Low	19	No suitable habitat present
<i>Calidris ruficollis</i>	Red-necked stint	MI	MI		x	Low	<1	No suitable habitat present
<i>Calidris tenuirostris</i>	Great knot	CR	CR, MI		x	Low	2	No suitable habitat present
<i>Calonectris leucomelas</i>	Streaked Shearwater	MI	MI, MA	x		Low		No suitable habitat present
<i>Charadrius leschenaultii</i>	Greater Sand Plover, Large Sand Plover	VU	VU, MI, MA	x	x	Low	<1	No suitable habitat present
<i>Charadrius mongolus</i>	Lesser Sand Plover	EN	EN, MI		x	Low	<1	No suitable habitat present
<i>Charadrius veredus</i>	Oriental Plover, Oriental Dotterel	MI	MI, MA	x	x	Low	17	No suitable habitat present
<i>Chlidonias leucopterus</i>	White-winged black tern, white-winged tern	MI	MI, MA		x	Low	<1	No suitable habitat present
<i>Fregata ariel</i>	Lesser Frigatebird, Least Frigatebird	MI	MI, MA	x		Low		No suitable habitat present
<i>Gelochelidon nilotica</i>	Gull-billed tern	MI	MI, MA		x	Low	<1	No suitable habitat present
<i>Glareola maldivarum</i>	Oriental Pratincole	MI	MI, MA	x	x	Low	12	No suitable habitat present
<i>Hydroprogne caspia</i>	Caspian Tern	MI	MI, MA	x	x	Low	<1	No suitable habitat present
<i>Limnodromus semipalmatus</i>	Asian Dowitcher	MI	MI, MA	x		Low		Infrequently recorded
<i>Limosa lapponica</i>	Bar-tailed Godwit	MI	MI, MA	x	x	Low	23	No suitable habitat present
<i>Limosa lapponica menzbieri</i>	Northern Bar-tailed Godwit, Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit	CR	CR	x	x	Low	<1	No suitable habitat present
<i>Limosa limosa</i>	Black-tailed godwit	MI	MI		x	Low	23	No suitable habitat present
<i>Macronectes giganteus</i>	Southern Giant-Petrel, Southern Giant Petrel	EN	EN, MI, MA	x		Low		No suitable habitat present
<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew	CR	CR, MI, MA	x	x	Low	<1	No suitable habitat present

Scientific Name	Common Name	Conservation Status		Database		Likelihood of Occurrence	Distance to nearest record (km) DBCA database	Justification
		State	Federal	PMST	DBCA			
<i>Numenius minutus</i>	Little curlew, little whimbrel	MI	MI, MA		x	Recorded	0	No suitable habitat present. Record likely for adjacent habitat on beach/ tidal flats
<i>Numenius phaeopus</i>	Whimbrel	MI	MI		x	Low	<1	No suitable habitat present
<i>Oceanites oceanicus</i>	Wilson's storm-petrel	MI	MI		x	Low	3	No suitable habitat present
<i>Onychoprion anaethetus</i>	Bridled Tern	M	MI, MA	x	x	Low	18	No suitable habitat present
<i>Phaethon lepturus</i>	White-tailed Tropicbird		MI, MA	x		Low		No suitable habitat present
<i>Pluvialis fulva</i>	Pacific golden plover	MI	MI		x	Low	22	No suitable habitat present
<i>Pluvialis squatarola</i>	Grey plover	MI	MI		x	Low	<1	No suitable habitat present
<i>Rostratula australis</i>	Australian Painted Snipe	CR	EN	x		Low		No suitable habitat present
<i>Sterna dougallii</i>	Roseate Tern	MI	MI, MA	x	x	Low	<1	No suitable habitat present
<i>Sterna hirundo</i>	Common tern	MI	MI		x	Low	<1	No suitable habitat present
<i>Sternula albifrons</i>	Little Tern	MI	MI, MA	x	x	Low	<1	No suitable habitat present
<i>Sternula nereis nereis</i>	Australian Fairy Tern	VU	VU	x	x	Low	<1	No suitable habitat present
<i>Sula leucogaster</i>	Brown booby	MI	MI		x	Low	22	No suitable habitat present
<i>Thalassarche carteri</i>	Indian, Yellow-nosed Albatross	VU	VU, MI, MA	x		Low	14	No suitable habitat present
<i>Thalasseus bergii</i>	Greater Crested Tern	MI	MI, MA	x	x	Low	<1	No suitable habitat present
<i>Tringa brevipes</i>	Grey-tailed tattler	P4			x	Recorded	0	No suitable habitat present. Record likely for adjacent habitat on beach/ tidal flats
<i>Tringa glareola</i>	Wood sandpiper	MI	MI, MA		x	Low	14	No suitable habitat present
<i>Tringa nebularia</i>	Common Greenshank, Greenshank	MI	MI, MA	x	x	Low	<1	No suitable habitat present
<i>Xenus cinereus</i>	Terek sandpiper	MI	MI, MA		x	Low	22	No suitable habitat present
MAMMALS								
<i>Dasyurus hallucatus</i>	Northern Quoll	VU	VU	x	x	Medium	11	Unconfirmed record present from Onslow townsite. Confirmed record present from Wheatstone project area
<i>Leggadina lakedownensis</i>	northern short-tailed mouse, Lakeland Downs mouse, kerakenga	P4			x	Medium	10	Confirmed records present 10 km west
<i>Macroderma gigas</i>	Ghost Bat	VU	VU	x		Low	-	No suitable habitat (caves and cliff crevasses)
<i>Mormopterus cobourgianus</i>	North-western free-tailed bat	P1			x	Low	22	No suitable habitat, restricted to mangroves and surroundings
<i>Rhinonicteris aurantia (Pilbara form)</i>	Pilbara Leaf-nosed Bat	VU	VU	x		Low	-	No suitable habitat (caves and cliff crevasses)
<i>Perameles bougainville</i>	Western barred bandicoot, little marl, Shark Bay bandicoot	VU	VY		x	Low	20	Restricted to offshore islands and fenced enclosures
<i>Pseudomys chapmani</i>	Western pebble-mound mouse, ngadji	P4			x	Low	17	No suitable habitat present
REPTILES								
<i>Ctenotus angusticeps</i>	Airlie Island Ctenotus, Northwestern coastal Ctenotus	P3			x	Low	23	Restricted to offshore islands in the region
<i>Lerista planiventralis maryani</i>	Maryan's keeled slider (Ashburton)	P1			x	High	0.5	Habitat present, records 500 m from Onslow town site
<i>Liasis olivaceus barroni</i>	Pilbara olive python	VU	VU		x	Medium	21	Unconfirmed record 21 km from survey area associated with Wheatstone area

**Shorebird Database Search Results (DBCA Database search using 100 Km Buffer, PMST 50 km buffer and shorebird records from literature review) for Habitat Adjacent to Survey Area**

Scientific Name	Common Name	Conservation Status		Database		Likelihood of Occurrence	Distance to nearest record (km) DBCA database	Justification
		State	Federal	PMST	DBCA			
<b>SHOREBIRDS/WADERS/ MARINE BIRDS (for habitat adjacent to the Survey Area)</b>								
<i>Actitis hypoleucos</i>	Common Sandpiper	MI	MI, MA	x	x	Recorded	0	Recorded by Bamford, 2009 at Onslow Town Beach
<i>Anous stolidus</i>	Common Noddy	MI	MI, MA	x	x	Medium	34	Suitable habitat present
<i>Ardenna carneipes</i>	Flesh-footed Shearwater, Flesh-footed Shearwater	MI	MI, MA	x		Low		No suitable habitat present
<i>Ardenna pacifica</i>	Wedge-tailed Shearwater	MI	MI, MA	x	x	Low		No suitable habitat present
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	MI	MI, MA	x	x	Recorded	<1	Recorded in DBCA database
<i>Calidris alba</i>	Sanderling	MI	MI		x	Recorded	0	Recorded by Bamford, 2009 at Onslow Town Beach
<i>Calidris canutus</i>	Red Knot, Knot	EN	EN, MI, MA	x	x	Medium	19	Suitable habitat present
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR	CR, MI, MA	x	x	Medium	<1	Recorded by Bamford 2022 in Onslow region
<i>Calidris melanotos</i>	Pectoral Sandpiper	MI	MI, MA	x	x	Medium	19	Suitable habitat present
<i>Calidris ruficollis</i>	Red-necked stint	MI	MI		x	Recorded	<1	Recorded by Bamford, 2009 at Onslow Town Beach
<i>Calidris tenuirostris</i>	Great knot	CR	CR, MI		x	Recorded	2	Recorded by Bamford, 2009 at Beadon Point to 4 Mile Creek
<i>Calonectris leucomelas</i>	Streaked Shearwater		MI, MA	x		Low		No suitable habitat present
<i>Charadrius leschenaultii</i>	Greater Sand Plover, Large Sand Plover	VU	VU, MI, MA	x	x	Recorded	<1	Recorded by Bamford, 2009 at Onslow Town Beach
<i>Charadrius mongolus</i>	Lesser Sand Plover	EN	EN, MI, MA		x	Recorded	<1	Recorded by Bamford, 2009 at Onslow Town Beach
<i>Charadrius veredus</i>	Oriental Plover, Oriental Dotterel	MI	MI, MA	x	x	High	17	Potentially suitable habitat present
<i>Chlidonias leucopterus</i>	White-winged black tern, white-winged tern	MI	MI, MA		x	Recorded	<1	Recorded by Bamford, 2009 at Onslow Town Beach
<i>Fregata ariel</i>	Lesser Frigatebird, Least Frigatebird		MI, MA	x		Low		No suitable habitat present
<i>Gelochelidon nilotica</i>	Gull-billed tern	MI	MI, MA		x	Recorded	<1	Recorded by Bamford, 2009 at Onslow Town Beach
<i>Glareola maldivarum</i>	Oriental Pratincole	MI	MI, MA	x	x	High	12	Potentially suitable habitat present
<i>Hydroprogne caspia</i>	Caspian Tern	MI	MI, MA	x	x	Recorded	<1	Recorded by Bamford, 2009 at Onslow Town Beach
<i>Limnodromus semipalmatus</i>	Asian Dowitcher		MI, MA	x		Low		Infrequently recorded
<i>Limosa lapponica</i>	Bar-tailed Godwit	MI	MI, MA	x	x	Recorded	23	Recorded by Bamford, 2009 at Onslow Town Beach
<i>Limosa lapponica menzbieri</i>	Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit	CR	CR, MI	x	x	High	<1	Suitable habitat present
<i>Limosa limosa</i>	Black-tailed godwit	MI	MI, MA		x	Medium	23	Suitable habitat present
<i>Macronectes giganteus</i>	Southern Giant-Petrel, Southern Giant Petrel		EN, MI, MA	x		Low		No suitable habitat present
<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew		CR, MI, MA	x	x	High	<1	Recorded by Bamford, 2022 Onslow region
<i>Numenius minutus</i>	Little curlew, little whimbrel	MI	MI, MA		x	Recorded	0	Recorded by DBCA database
<i>Numenius phaeopus</i>	Whimbrel	MI	MI, MA		x	Recorded	<1	Recorded by Bamford, 2009 at Onslow Town Beach
<i>Oceanites oceanicus</i>	Wilson's storm-petrel	MI	MI, MA		x	Low	3	No suitable habitat present
<i>Onychoprion anaethetus</i>	Bridled Tern	M	MI, MA	x	x	Medium	18	Suitable habitat present
<i>Phaethon lepturus</i>	White-tailed Tropicbird		MI, MA	x		Low		No suitable habitat present
<i>Pluvialis fulva</i>	Pacific golden plover	MI	MI, MA		x	Medium	22	Suitable habitat present
<i>Pluvialis squatarola</i>	Grey plover	MI	MI, MA		x	High	<1	Suitable habitat present
<i>Rostratula australis</i>	Australian Painted Snipe	CR	EN	x		Low		No suitable habitat present
<i>Sterna dougallii</i>	Roseate Tern	MI	MI, MA	x	x	Recorded	<1	Recorded by Bamford, 2009 at Onslow Town Beach
<i>Sterna hirundo</i>	Common tern	MI	MI, MA		x	Recorded	<1	Recorded by Bamford, 2009 at Onslow Town Beach

Scientific Name	Common Name	Conservation Status		Database		Likelihood of Occurrence	Distance to nearest record (km) DBCA database	Justification
		State	Federal	PMST	DBCA			
<i>Sternula albifrons</i>	Little Tern	MI	MI, MA	x	x	High	<1	Suitable habitat present
<i>Sternula nereis nereis</i>	Australian Fairy Tern	VU	VU	x	x	High	<1	Suitable habitat present
<i>Sula leucogaster</i>	Brown booby	MI	MI, MA		x	Low	22	No suitable habitat present
<i>Thalassarche carteri</i>	Indian, Yellow-nosed Albatross		VU, MI, MA	x		Medium	14	Suitable habitat present
<i>Thalasseus bergii</i>	Greater Crested Tern	MI	MI, MA	x	x	Recorded	<1	Recorded by Bamford, 2009 at Beadon Point to 4 Mile Creek
<i>Tringa brevipes</i>	Grey-tailed tattler	P4			x	Recorded	0	Recorded in DBCA database
<i>Tringa glareola</i>	Wood sandpiper	MI	MI, MA		x	Medium	14	Suitable habitat present
<i>Tringa nebularia</i>	Common Greenshank, Greenshank	MI	MI, MA	x	x	Recorded	<1	Recorded by Bamford, 2009 at Onslow Town Beach
<i>Xenus cinereus</i>	Terek sandpiper	MI	MI, MA		x	Medium	22	Suitable habitat present



# 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. Please see the caveat for interpretation of information provided here.

Report created: 07-Sep-2022

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

# Summary

## Matters of National Environment 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](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance (Ramsar)</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	1
<a href="#">Listed Threatened Ecological Communities:</a>	None
<a href="#">Listed Threatened Species:</a>	34
<a href="#">Listed Migratory Species:</a>	57

## 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

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

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.

<a href="#">Commonwealth Lands:</a>	3
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	91
<a href="#">Whales and Other Cetaceans:</a>	26
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None
<a href="#">Habitat Critical to the Survival of Marine Turtles:</a>	3

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	11
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Nationally Important Wetlands:</a>	1
<a href="#">EPBC Act Referrals:</a>	31
<a href="#">Key Ecological Features (Marine):</a>	3
<a href="#">Biologically Important Areas:</a>	20
<a href="#">Bioregional Assessments:</a>	None
<a href="#">Geological and Bioregional Assessments:</a>	None

# Details

## Matters of National Environmental Significance

### Commonwealth Marine Area

[\[ Resource Information \]](#)

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

#### Feature Name

#### Buffer Status

EEZ and Territorial Sea

In buffer area only

### Listed Threatened Species

[\[ Resource Information \]](#)

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

#### Scientific Name

#### Threatened Category

#### Presence Text

#### Buffer Status

#### BIRD

#### [Calidris canutus](#)

Red Knot, Knot [855]

Endangered

Species or species habitat may occur within area

In feature area

#### [Calidris ferruginea](#)

Curlew Sandpiper [856]

Critically Endangered

Species or species habitat known to occur within area

In feature area

#### [Charadrius leschenaultii](#)

Greater Sand Plover, Large Sand Plover [877]

Vulnerable

Species or species habitat known to occur within area

In feature area

#### [Erythrotriorchis radiatus](#)

Red Goshawk [942]

Vulnerable

Species or species habitat may occur within area

In feature area

#### [Falco hypoleucos](#)

Grey Falcon [929]

Vulnerable

Species or species habitat likely to occur within area

In feature area

#### [Limosa lapponica menzbieri](#)

Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]

Critically Endangered

Species or species habitat known to occur within area

In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Pezoporus occidentalis</a> Night Parrot [59350]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Sternula nereis nereis</a> Australian Fairy Tern [82950]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Thalassarche carteri</a> Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In feature area
<b>FISH</b>			
<a href="#">Thunnus maccoyii</a> Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
<b>MAMMAL</b>			
<a href="#">Balaenoptera borealis</a> Sei Whale [34]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Balaenoptera physalus</a> Fin Whale [37]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Dasyurus hallucatus</a> Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Species or species habitat may occur within area	In buffer area only
<a href="#">Macroderma gigas</a> Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Rhinonicteris aurantia (Pilbara form)</a> Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat may occur within area	In buffer area only
<b>REPTILE</b>			
<a href="#">Aipysurus apraefrontalis</a> Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Aipysurus foliosquama</a> Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In feature area
<b>SHARK</b>			
<a href="#">Carcharias taurus (west coast population)</a> Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Pristis clavata</a> Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Pristis pristis</a> Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Pristis zijsron</a> Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Sphyrna lewini</a> Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat known to occur within area	In feature area

Listed Migratory Species [ [Resource Information](#) ]

Scientific Name	Threatened Category	Presence Text	Buffer Status
<b>Migratory Marine Birds</b>			
<a href="#">Anous stolidus</a> Common Noddy [825]		Species or species habitat may occur within area	In feature area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
<a href="#">Ardenna carneipes</a> Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat may occur within area	In buffer area only
<a href="#">Ardenna pacifica</a> Wedge-tailed Shearwater [84292]		Breeding known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Calonectris leucomelas</a> Streaked Shearwater [1077]		Species or species habitat likely to occur within area	In feature area
<a href="#">Fregata ariel</a> Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area
<a href="#">Hydroprogne caspia</a> Caspian Tern [808]		Breeding known to occur within area	In buffer area only
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Onychoprion anaethetus</a> Bridled Tern [82845]		Breeding known to occur within area	In buffer area only
<a href="#">Phaethon lepturus</a> White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
<a href="#">Sterna dougallii</a> Roseate Tern [817]		Breeding likely to occur within area	In buffer area only
<a href="#">Sternula albifrons</a> Little Tern [82849]		Species or species habitat may occur within area	In feature area
<a href="#">Thalassarche carteri</a> Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In feature area
<b>Migratory Marine Species</b>			
<a href="#">Anoxypristis cuspidata</a> Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat likely to occur within area	In feature area
<a href="#">Balaenoptera borealis</a> Sei Whale [34]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Balaenoptera physalus</a> Fin Whale [37]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Carcharhinus longimanus</a> Oceanic Whitetip Shark [84108]		Species or species habitat likely to occur within area	In feature area
<a href="#">Carcharodon carcharias</a> White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Dugong dugon</a> Dugong [28]		Breeding known to occur within area	In feature area
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Eubalaena australis as Balaena glacialis australis</a> Southern Right Whale [40]	Endangered	Species or species habitat may occur within area	In buffer area only
<a href="#">Isurus oxyrinchus</a> Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area	In buffer area only
<a href="#">Isurus paucus</a> Longfin Mako [82947]		Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]		Breeding known to occur within area	In feature area
<a href="#">Mobula alfredi as Manta alfredi</a> Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area	In feature area
<a href="#">Mobula birostris as Manta birostris</a> Giant Manta Ray [90034]		Species or species habitat known to occur within area	In feature area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
<a href="#">Physeter macrocephalus</a> Sperm Whale [59]		Species or species habitat may occur within area	In buffer area only
<a href="#">Pristis clavata</a> Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Pristis pristis</a> Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Pristis zijsron</a> Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Sousa sahalensis as Sousa chinensis</a> Australian Humpback Dolphin [87942]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Tursiops aduncus (Arafura/Timor Sea populations)</a> Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area	In feature area
<b>Migratory Terrestrial Species</b>			
<a href="#">Hirundo rustica</a> Barn Swallow [662]		Species or species habitat may occur within area	In feature area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
<b>Migratory Wetlands Species</b>			
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat likely to occur within area	In feature area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Charadrius veredus</a> Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Glareola maldivarum</a> Oriental Pratincole [840]		Species or species habitat may occur within area	In feature area
<a href="#">Limnodromus semipalmatus</a> Asian Dowitcher [843]		Species or species habitat may occur within area	In feature area
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area	In feature area
<a href="#">Thalasseus bergii</a> Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In feature area

## Other Matters Protected by the EPBC Act

### Commonwealth Lands [\[ Resource Information \]](#)

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Unknown		
Commonwealth Land - [51887]	WA	In buffer area only
Commonwealth Land - [51104]	WA	In feature area
Commonwealth Land - [50385]	WA	In feature area

### Listed Marine Species [\[ Resource Information \]](#)

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
<a href="#">Anous stolidus</a> Common Noddy [825]		Species or species habitat may occur within area	In feature area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
<a href="#">Ardenna carneipes as Puffinus carneipes</a> Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat may occur within area	In buffer area only
<a href="#">Ardenna pacifica as Puffinus pacificus</a> Wedge-tailed Shearwater [84292]		Breeding known to occur within area	In buffer area only
<a href="#">Bubulcus ibis as Ardea ibis</a> Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
<a href="#">Calidris canutus</a> Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Calonectris leucomelas</a> Streaked Shearwater [1077]		Species or species habitat likely to occur within area	In feature area
<a href="#">Chalcites osculans as Chrysococcyx osculans</a> Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Charadrius leschenaultii</a> Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Charadrius veredus</a> Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Chroicocephalus novaehollandiae as Larus novaehollandiae</a> Silver Gull [82326]		Breeding known to occur within area	In buffer area only
<a href="#">Fregata ariel</a> Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In feature area
<a href="#">Glareola maldivarum</a> Oriental Pratincole [840]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
<a href="#">Hirundo rustica</a> Barn Swallow [662]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Hydroprogne caspia as Sterna caspia</a> Caspian Tern [808]		Breeding known to occur within area	In buffer area only
<a href="#">Limnodromus semipalmatus</a> Asian Dowitcher [843]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Limosa lapponica</a> Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
<a href="#">Macronectes giganteus</a> Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Onychoprion anaethetus as Sterna anaethetus</a> Bridled Tern [82845]		Breeding known to occur within area	In buffer area only
<a href="#">Onychoprion fuscatus as Sterna fuscata</a> Sooty Tern [90682]		Breeding known to occur within area	In buffer area only
<a href="#">Pandion haliaetus</a> Osprey [952]		Breeding known to occur within area	In feature area
<a href="#">Phaethon lepturus</a> White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In feature area
<a href="#">Rostratula australis as Rostratula benghalensis (sensu lato)</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Sterna dougallii</a> Roseate Tern [817]		Breeding likely to occur within area	In buffer area only
<a href="#">Sternula albifrons as Sterna albifrons</a> Little Tern [82849]		Species or species habitat may occur within area	In feature area
<a href="#">Sternula nereis as Sterna nereis</a> Fairy Tern [82949]		Breeding known to occur within area	In buffer area only
<a href="#">Thalassarche carteri</a> Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Thalasseus bengalensis as Sterna bengalensis</a> Lesser Crested Tern [66546]		Breeding known to occur within area	In feature area
<a href="#">Thalasseus bergii as Sterna bergii</a> Greater Crested Tern [83000]		Breeding known to occur within area	In buffer area only
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In feature area
<b>Fish</b>			
<a href="#">Acentronura larsonae</a> Helen's Pygmy Pipehorse [66186]		Species or species habitat may occur within area	In buffer area only
<a href="#">Bulbonaricus brauni</a> Braun's Pughead Pipefish, Pug-headed Pipefish [66189]		Species or species habitat may occur within area	In feature area
<a href="#">Campichthys tricarinatus</a> Three-keel Pipefish [66192]		Species or species habitat may occur within area	In feature area
<a href="#">Choeroichthys brachysoma</a> Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area	In feature area
<a href="#">Choeroichthys latispinosus</a> Muiron Island Pipefish [66196]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Choeroichthys suillus</a> Pig-snouted Pipefish [66198]		Species or species habitat may occur within area	In feature area
<a href="#">Doryrhamphus dactyliophorus</a> Banded Pipefish, Ringed Pipefish [66210]		Species or species habitat may occur within area	In buffer area only
<a href="#">Doryrhamphus janssi</a> Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area	In feature area
<a href="#">Doryrhamphus multiannulatus</a> Many-banded Pipefish [66717]		Species or species habitat may occur within area	In buffer area only
<a href="#">Doryrhamphus negrosensis</a> Flagtail Pipefish, Masthead Island Pipefish [66213]		Species or species habitat may occur within area	In feature area
<a href="#">Festucalex scalaris</a> Ladder Pipefish [66216]		Species or species habitat may occur within area	In feature area
<a href="#">Filicampus tigris</a> Tiger Pipefish [66217]		Species or species habitat may occur within area	In feature area
<a href="#">Halicampus brocki</a> Brock's Pipefish [66219]		Species or species habitat may occur within area	In feature area
<a href="#">Halicampus grayi</a> Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area	In feature area
<a href="#">Halicampus nitidus</a> Glittering Pipefish [66224]		Species or species habitat may occur within area	In feature area
<a href="#">Halicampus spinirostris</a> Spiny-snout Pipefish [66225]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Haliichthys taeniophorus</a> Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area	In feature area
<a href="#">Hippichthys penicillus</a> Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus angustus</a> Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus histrix</a> Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus kuda</a> Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus planifrons</a> Flat-face Seahorse [66238]		Species or species habitat may occur within area	In feature area
<a href="#">Hippocampus trimaculatus</a> Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area	In feature area
<a href="#">Micrognathus micronotopterus</a> Tidepool Pipefish [66255]		Species or species habitat may occur within area	In feature area
<a href="#">Phoxocampus belcheri</a> Black Rock Pipefish [66719]		Species or species habitat may occur within area	In buffer area only
<a href="#">Solegnathus hardwickii</a> Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area	In feature area
<a href="#">Solegnathus lettiensis</a> Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Solenostomus cyanopterus</a> Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In feature area
<a href="#">Syngnathoides biaculeatus</a> Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In feature area
<a href="#">Trachyrhamphus bicoarctatus</a> Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In feature area
<a href="#">Trachyrhamphus longirostris</a> Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area	In feature area
<b>Mammal</b>			
<a href="#">Dugong dugon</a> Dugong [28]		Breeding known to occur within area	In feature area
<b>Reptile</b>			
<a href="#">Acalyptophis peronii</a> Horned Seasnake [1114]		Species or species habitat may occur within area	In feature area
<a href="#">Aipysurus apraefrontalis</a> Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Aipysurus duboisii</a> Dubois' Seasnake [1116]		Species or species habitat may occur within area	In feature area
<a href="#">Aipysurus eydouxii</a> Spine-tailed Seasnake [1117]		Species or species habitat may occur within area	In feature area
<a href="#">Aipysurus foliosquama</a> Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Aipysurus laevis</a> Olive Seasnake [1120]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Astrotia stokesii</a> Stokes' Seasnake [1122]		Species or species habitat may occur within area	In feature area
<a href="#">Caretta caretta</a> Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Chitulia ornata as Hydrophis ornatus</a> Spotted Seasnake, Ornate Reef Seasnake [87377]		Species or species habitat may occur within area	In feature area
<a href="#">Dermochelys coriacea</a> Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
<a href="#">Disteira kingii</a> Spectacled Seasnake [1123]		Species or species habitat may occur within area	In feature area
<a href="#">Disteira major</a> Olive-headed Seasnake [1124]		Species or species habitat may occur within area	In feature area
<a href="#">Emydocephalus annulatus</a> Turtle-headed Seasnake [1125]		Species or species habitat may occur within area	In feature area
<a href="#">Ephalophis greyi</a> North-western Mangrove Seasnake [1127]		Species or species habitat may occur within area	In feature area
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Hydrophis elegans</a> Elegant Seasnake [1104]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Leioselasma czeblukovi</a> as <a href="#">Hydrophis czeblukovi</a> Fine-spined Seasnake, Geometrical Seasnake [87374]		Species or species habitat may occur within area	In feature area
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area	In feature area
<a href="#">Pelamis platurus</a> Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area	In feature area

## Whales and Other Cetaceans

[ [Resource Information](#) ]

Current Scientific Name	Status	Type of Presence	Buffer Status
<b>Mammal</b>			
<a href="#">Balaenoptera acutorostrata</a> Minke Whale [33]		Species or species habitat may occur within area	In feature area
<a href="#">Balaenoptera borealis</a> Sei Whale [34]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Balaenoptera edeni</a> Bryde's Whale [35]		Species or species habitat likely to occur within area	In feature area
<a href="#">Balaenoptera musculus</a> Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
<a href="#">Balaenoptera physalus</a> Fin Whale [37]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
<a href="#">Delphinus delphis</a> Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
<a href="#">Eubalaena australis</a> Southern Right Whale [40]	Endangered	Species or species habitat may occur within area	In buffer area only
<a href="#">Feresa attenuata</a> Pygmy Killer Whale [61]		Species or species habitat may occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
<a href="#">Globicephala macrorhynchus</a> Short-finned Pilot Whale [62]		Species or species habitat may occur within area	In buffer area only
<a href="#">Grampus griseus</a> Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
<a href="#">Kogia breviceps</a> Pygmy Sperm Whale [57]		Species or species habitat may occur within area	In buffer area only
<a href="#">Kogia sima as Kogia simus</a> Dwarf Sperm Whale [85043]		Species or species habitat may occur within area	In buffer area only
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]		Breeding known to occur within area	In feature area
<a href="#">Orcinus orca</a> Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
<a href="#">Peponocephala electra</a> Melon-headed Whale [47]		Species or species habitat may occur within area	In buffer area only
<a href="#">Physeter macrocephalus</a> Sperm Whale [59]		Species or species habitat may occur within area	In buffer area only
<a href="#">Pseudorca crassidens</a> False Killer Whale [48]		Species or species habitat likely to occur within area	In buffer area only
<a href="#">Sousa sahalensis as Sousa chinensis</a> Australian Humpback Dolphin [87942]		Species or species habitat likely to occur within area	In feature area
<a href="#">Stenella attenuata</a> Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
<a href="#">Stenella coeruleoalba</a> Striped Dolphin, Euphrosyne Dolphin [52]		Species or species habitat may occur within area	In buffer area only
<a href="#">Stenella longirostris</a> Long-snouted Spinner Dolphin [29]		Species or species habitat may occur within area	In buffer area only
<a href="#">Steno bredanensis</a> Rough-toothed Dolphin [30]		Species or species habitat may occur within area	In buffer area only
<a href="#">Tursiops aduncus</a> Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
<a href="#">Tursiops aduncus (Arafura/Timor Sea populations)</a> Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area	In feature area
<a href="#">Tursiops truncatus s. str.</a> Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area
<a href="#">Ziphius cavirostris</a> Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area	In buffer area only

### Habitat Critical to the Survival of Marine Turtles

Scientific Name	Behaviour	Presence	Buffer Status
Aug - Sep			
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Nesting	Known to occur	In feature area
Dec - Jan			
<a href="#">Chelonia mydas</a> Green Turtle [1765]	Nesting	Known to occur	In feature area
Nov - May			
<a href="#">Eretmochelys imbricata</a> Hawksbill Turtle [1766]	Nesting	Known to occur	In feature area

## Extra Information

State and Territory Reserves			[ Resource Information ]
Protected Area Name	Reserve Type	State	Buffer Status
Airlie Island	Nature Reserve	WA	In buffer area only
Bessieres Island	Nature Reserve	WA	In buffer area only
Cane River (Mount Minnie and Nanutarra)	NRS Addition - Gazettal in Progress	WA	In buffer area only
Great Sandy Island	Nature Reserve	WA	In buffer area only
Little Rocky Island	Nature Reserve	WA	In buffer area only
Locker Island	Nature Reserve	WA	In buffer area only
Round Island	Nature Reserve	WA	In buffer area only
Serrurier Island	Nature Reserve	WA	In buffer area only
Thevenard Island	Nature Reserve	WA	In buffer area only
Unnamed WA40322	5(1)(h) Reserve	WA	In buffer area only
Unnamed WA44665	5(1)(h) Reserve	WA	In buffer area only

Nationally Important Wetlands		[ Resource Information ]
Wetland Name	State	Buffer Status
<a href="#">Exmouth Gulf East</a>	WA	In buffer area only

EPBC Act Referrals					[ Resource Information ]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status	
<a href="#">Controlled action</a>					
<a href="#">Ashburton Infrastructure Project</a>	2021/9064	Controlled Action	Guidelines Issued	In buffer area only	
<a href="#">Construct and operate LNG &amp; domestic gas plant including onshore and offshore facilities - Wheatston</a>	2008/4469	Controlled Action	Post-Approval	In feature area	
<a href="#">Construction and operation of a Solar Salt Project, SW Onslow, WA</a>	2016/7793	Controlled Action	Assessment Approach	In buffer area only	
<a href="#">Greater Gorgon Development - Optical Fibre Cable, Mainland to Barrow Island</a>	2005/2141	Controlled Action	Completed	In feature area	
<a href="#">Proposed West Pilbara Iron Ore Project</a>	2009/4706	Controlled Action	Post-Approval	In buffer area only	

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
<b>Controlled action</b>				
<a href="#">Yannarie Solar Salt Project</a>	2004/1679	Controlled Action	Completed	In buffer area only
<b>Not controlled action</b>				
<a href="#">Airlie Island soil and groundwater investigations, Exmouth Gulf, offshore Pilbara coast</a>	2014/7250	Not Controlled Action	Completed	In buffer area only
<a href="#">Baniyas-1 Exploration Well, EP-424, near Onslow</a>	2007/3282	Not Controlled Action	Completed	In buffer area only
<a href="#">Construct 110km buried natural gas pipeline from Onslow, connecting to Dampier/Bunbury natural gas p</a>	2013/7039	Not Controlled Action	Completed	In buffer area only
<a href="#">Exploration Well (Taunton-2)</a>	2002/731	Not Controlled Action	Completed	In buffer area only
<a href="#">HCA05X Macedon Experimental Survey</a>	2004/1926	Not Controlled Action	Completed	In buffer area only
<a href="#">Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia</a>	2015/7522	Not Controlled Action	Completed	In feature area
<a href="#">Infill Production Well (Griffin-9)</a>	2001/417	Not Controlled Action	Completed	In buffer area only
<a href="#">Klammer 2D Seismic Survey</a>	2002/868	Not Controlled Action	Completed	In buffer area only
<a href="#">Onslow Power Infrastructure Upgrade Project, Onslow, WA</a>	2014/7314	Not Controlled Action	Completed	In buffer area only
<a href="#">Onslow Rare Earths Plant</a>	2021/9046	Not Controlled Action	Completed	In buffer area only
<a href="#">Onslow Water Supply Infrastructure Upgrade Project, Onslow, WA</a>	2014/7329	Not Controlled Action	Completed	In buffer area only
<a href="#">Subsea Gas Pipeline From Stybarrow Field to Griffin Venture Gas Export Pipeline</a>	2005/2033	Not Controlled Action	Completed	In buffer area only
<a href="#">Thevenard Island Retirement Project</a>	2015/7423	Not Controlled Action	Completed	In buffer area only
<a href="#">To construct and operate an offshore submarine fibre optic cable, WA</a>	2014/7373	Not Controlled Action	Completed	In feature area
<a href="#">Wanda Offshore Research Project, 80 km north-east of Exmouth, WA</a>	2018/8293	Not Controlled Action	Completed	In buffer area only
<b>Not controlled action (particular manner)</b>				

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
<b>Not controlled action (particular manner)</b>				
<a href="#">'Kate' 3D marine seismic survey, exploration permits WA-320-P and WA-345-P, 60km</a>	2005/2037	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<a href="#">2D and 3D seismic surveys</a>	2005/2151	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
<a href="#">Babylon 3D Marine Seismic Survey, Commonwealth Waters, nr Exmouth WA</a>	2013/7081	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<a href="#">Huzzas MC3D Marine Seismic Survey (HZ-13) Carnarvon Basin, offshore WA</a>	2013/7003	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<a href="#">Huzzas phase 2 marine seismic survey, Exmouth Plateau, Northern Carnarvon Basin, WA</a>	2013/7093	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<a href="#">Macedon Gas Field Development</a>	2008/4605	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<a href="#">Munmorah 2D seismic survey within permits WA-308/9-P</a>	2003/970	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<a href="#">Ocean Bottom Cable Seismic Survey</a>	2005/2017	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
<a href="#">Onslow Seawater Desalination Plant Marine Geophysical Investigation</a>	2020/8794	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
<b>Referral decision</b>				
<a href="#">3D Marine Seismic Survey in the offshore northwest Carnarvon Basin</a>	2011/6175	Referral Decision	Completed	In buffer area only

## Key Ecological Features

[ [Resource Information](#) ]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
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Name	Region	Buffer Status
<a href="#">Ancient coastline at 125 m depth contour</a>	North-west	In buffer area only
<a href="#">Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula</a>	North-west	In buffer area only
<a href="#">Continental Slope Demersal Fish Communities</a>	North-west	In buffer area only

## Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
<b>Dugong</b>			
<a href="#">Dugong dugon</a>			
Dugong [28]	Breeding	Known to occur	In buffer area only
<a href="#">Dugong dugon</a>			
Dugong [28]	Calving	Known to occur	In buffer area only
<a href="#">Dugong dugon</a>			
Dugong [28]	Foraging (high density seagrass beds)	Known to occur	In buffer area only
<a href="#">Dugong dugon</a>			
Dugong [28]	Nursing	Known to occur	In buffer area only
<b>Marine Turtles</b>			
<a href="#">Chelonia mydas</a>			
Green Turtle [1765]	Aggregation	Known to occur	In buffer area only
<a href="#">Chelonia mydas</a>			
Green Turtle [1765]	Foraging	Known to occur	In buffer area only
<a href="#">Eretmochelys imbricata</a>			
Hawksbill Turtle [1766]	Foraging	Known to occur	In buffer area only
<a href="#">Eretmochelys imbricata</a>			
Hawksbill Turtle [1766]	Internesting buffer	Known to occur	In feature area
<a href="#">Eretmochelys imbricata</a>			
Hawksbill Turtle [1766]	Nesting	Known to occur	In buffer area only
<a href="#">Natator depressus</a>			
Flatback Turtle [59257]	Foraging	Known to occur	In buffer area only
<a href="#">Natator depressus</a>			
Flatback Turtle [59257]	Internesting buffer	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
<a href="#">Natator depressus</a> Flatback Turtle [59257]	Nesting	Known to occur	In feature area
<b>Seabirds</b>			
<a href="#">Ardena pacifica</a> Wedge-tailed Shearwater [84292]	Breeding	Known to occur	In feature area
<a href="#">Sterna dougallii</a> Roseate Tern [817]	Breeding	Known to occur	In buffer area only
<a href="#">Sternula nereis</a> Fairy Tern [82949]	Breeding	Known to occur	In buffer area only
<a href="#">Thalasseus bengalensis</a> Lesser Crested Tern [66546]	Breeding	Known to occur	In feature area
<b>Sharks</b>			
<a href="#">Rhincodon typus</a> Whale Shark [66680]	Foraging	Known to occur	In buffer area only
<b>Whales</b>			
<a href="#">Balaenoptera musculus brevicauda</a> Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Migration (north and south)	Known to occur	In feature area
<a href="#">Megaptera novaeangliae</a> Humpback Whale [38]	Resting	Known to occur	In buffer area only

# Caveat

## 1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

## 2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

## 3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and 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.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

## 4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

# 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:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian 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, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

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

Please feel free to provide feedback via the [Contact Us](#) page.

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# Appendix D

## Flora and Fauna Inventory

### Flora Inventory and Site x Species

Family	Species	Naturalised	Cons. Code	Range Extension	Opps	Q01	Q02	Q03	Q04
Amaranthaceae	<i>Aerva javanica</i>	*				*	*	*	
	<i>Ptilotus axillaris</i>							*	*
	<i>Ptilotus exaltatus</i>				*				
	<i>Ptilotus polystachyus</i>				*				
Asteraceae	<i>Chrysocephalum apiculatum</i>						*	*	
	<i>Pluchea dunlopia</i>						*		
	<i>Sonchus oleraceus</i>	*			*				
Boraginaceae	<i>Trichodesma zelyanicum</i>					*	*	*	*
Chenopodiaceae	<i>Enchylaena tomentosa</i>				*				
	<i>Rhagodia preissii</i> subsp. <i>obovata</i>					*	*	*	*
	<i>Salsola australis</i>					*	*	*	*
	<i>Threlkeldia diffusa</i>				*	*		*	
Convolvulaceae	<i>Ipomoea pes-caprae</i>								*
Euphorbiaceae	<i>Adriana tomentosa</i> Gaudich. var. <i>tomentosa</i>				*	*	*		
	<i>Euphorbia myrtoides</i>					*	*	*	*
Fabaceae	<i>Acacia bivenosa</i>					*			
	<i>Acacia coriacea</i> DC. subsp. <i>coriacea</i>					*	*	*	*
	<i>Acacia sclerosperma</i>					*			
	<i>Acacia stellaticeps</i>					*			
	<i>Acacia tetragonophylla</i>				*				

Family	Species	Naturalised	Cons. Code	Range Extension	Opps	Q01	Q02	Q03	Q04
	<i>Acacia trachycarpa</i>					*			
	<i>Crotalaria cunninghamii</i>					*	*	*	*
	<i>Cullen martinii</i>				*				
	<i>Indigofera colutea</i>					*			
	<i>Indigofera monophylla</i>					*			
	<i>Tephrosia gardneri</i>					*		*	*
	<i>Tephrosia rosea</i> var. <i>clementii</i>					*			
<b>Goodeniaceae</b>	<i>Scaevola crassifolia</i>								*
<b>Hemerocallidaceae</b>	<i>Corynotheca pungens</i>						*	*	
<b>Lamiaceae</b>	<i>Quoya loxocarpa</i>					*	*		
<b>Lauraceae</b>	<i>Cassytha aurea</i> J.Z.Webber var. <i>aurea</i>						*	*	
<b>Malvaceae</b>	<i>Abutilon</i> sp. <i>Dioicum</i> (A.A. Mitchell PRP 1618)					*	*		
	<i>Sida echinocarpa</i>						*		
<b>Myrtaceae</b>	<i>Eucalyptus camaldulensis</i> subsp. <i>Refulgens</i>				*				
<b>Nyctaginaceae</b>	<i>Boerhavia coccinea</i>						*		
<b>Poaceae</b>	<i>Cenchrus ciliaris</i>	*				*	*	*	*
	<i>Cenchrus setiger</i>	*				*			
	<i>Eriachne aristidea</i>								*
	<i>Eulalia aurea</i>						*		*
	<i>Spinifex longifolius</i>						*	*	*
	<i>Triodia epactia</i>					*	*		
<b>Solanaceae</b>	<i>Solanum lasiophyllum</i>						*	*	

### Potential Fauna Assemblage (Prepared by Bamford Consulting Ecologists)

The list is derived from the results of database and literature searches, and from previous field surveys conducted in the local area. The sources are: ALA = Atlas of Living Australia database search; BCE (2005) = Bancroft and Bamford (2005a); BCE (2009) = ENV (2012) and NatureMap database search

EPBC Act listings: E = Endangered, V = Vulnerable, MI = Migratory, MA = Marine (see Appendix B).

DBCAs Priority species: P1 to P4 = Priority 1 to 4 (see Appendix B).

Int = introduced species.

SPECIES	COMMON NAME	STATUS	EXPECTED OCCURRENCE
<b>FROGS</b>			
<i>Cyclorana maini</i>	Sheep Frog		Resident
<i>Cyclorana occidentalis</i>	Western Water-holding Frog		Irregular visitor
<i>Litoria rubella</i>	Little Red Tree Frog		Regular visitor
<i>Neobatrachus aquilonius</i>	Northern Burrowing Frog		Resident
<i>Neobatrachus fulvus</i>	Northern Burrowing Frog		Resident
<i>Notaden nichollsi</i>	Desert Spadefoot		Resident
<b>REPTILES</b>			
<i>Nephrurus levis occidentalis</i>			Resident
<i>Crenadactylus occidentalis</i>	Western Clawless Gecko		Resident
<i>Crenadactylus pilbarensis</i>	Pilbara Clawless Gecko		Resident
<i>Diplodactylus bilybara</i>	Western Fat-tailed Gecko		Resident
<i>Diplodactylus pulcher</i>			Resident
<i>Lucasium stenodactylum</i>			Resident
<i>Rhynchoedura ornata</i>	Western Beaked Gecko		Resident
<i>Strophurus jeanae</i>			Resident
<i>Strophurus strophurus</i>			Resident
<i>Gehyra crypta</i>			Resident
<i>Gehyra pilbara</i>			Resident
<i>Gehyra purpurascens</i>			Resident
<i>Gehyra variegata</i>			Resident
<i>Hemidactylus frenatus</i>	Asian House Gecko		
<i>Heteronotia binoei</i>	Bynoe's Gecko		Resident
<i>Delma borea</i>			Resident
<i>Delma butleri</i>			Resident
<i>Delma nasuta</i>			Resident

SPECIES	COMMON NAME	STATUS	EXPECTED OCCURRENCE
<i>Delma pax</i>			Resident
<i>Delma tincta</i>			Resident
<i>Lialis burtonis</i>	Burton's Legless-Lizard		Resident
<i>Pygopus nigriceps</i>	Hooded Scalefoot		Resident
<i>Ctenophorus clayi</i>	Collared Dragon		Resident
<i>Ctenophorus femoralis</i>	Dune Dragon		Resident
<i>Ctenophorus isolepis isolepis</i>	Central Military Dragon		Resident
<i>Ctenophorus nuchalis</i>	Central Netted Dragon		Resident
<i>Ctenophorus reticulatus</i>	Western Netted Dragon		Resident
<i>Ctenophorus rubens</i>	Red Dragon		Resident
<i>Diporiphora adductus</i>	Carnarvon Dragon		Resident
<i>Gowidon longirostris</i>	Long-nosed Dragon		Resident
<i>Lophognathus gilberti</i>	Ta-Ta or Gilbert's Dragon		Irregular visitor
<i>Pogona minor minor</i>	Western Bearded Dragon		Resident
<i>Tympanocryptis cephalus</i>	Coastal Pebble-mimic Dragon		Resident
<i>Carlia munda</i>			Resident
<i>Cryptoblepharus plagiocephalus</i>			Resident
<i>Ctenotus calurus</i>			Resident
<i>Ctenotus duricola</i>			Resident
<i>Ctenotus grandis titan</i>			Resident
<i>Ctenotus hanloni</i>			Resident
<i>Ctenotus helenae</i>			Resident
<i>Ctenotus iapetus</i>			Resident
<i>Ctenotus maryani</i>			Resident
<i>Ctenotus pantherinus ocellifer</i>			Resident
<i>Ctenotus rufescens</i>			Resident
<i>Ctenotus saxatilis</i>	Rock Ctenotus		Irregular Visitor
<i>Ctenotus schomburgkii</i>			Resident
<i>Ctenotus serventyi</i>			Resident
<i>Cyclodomorphus melanops melanops</i>			Resident
<i>Egernia depressa</i>	Southern Pygmy Spiny-tailed Skink		Resident

SPECIES	COMMON NAME	STATUS	EXPECTED OCCURRENCE
<i>Eremiascincus isolepis</i>			Resident
<i>Eremiascincus pallidus</i>	Western Narrow-banded Skink		Resident
<i>Lerista baynesi</i>			Resident
<i>Lerista bipes</i>			Resident
<i>Lerista clara</i>			Resident
<i>Lerista elegans</i>			Resident
<i>Lerista muelleri</i>			Resident
<i>Lerista onsloviana</i>			Resident
<i>Lerista planiventralis maryani</i>	Maryan's keeled slider (Ashburton)	P1	Resident
<i>Lerista uniduo</i>			Resident
<i>Menetia greyii</i>	Dwarf Skink		Resident
<i>Morethia ruficauda exquisita</i>			Resident
<i>Notoscincus ornatus ornatus</i>			Resident
<i>Tiliqua multifasciata</i>	Central Blue-tongue		Resident
<i>Varanus acanthurus</i>	Spiny-tailed Goanna		Resident
<i>Varanus breviceauda</i>	Short-tailed Pygmy Goanna		Resident
<i>Varanus caudolineatus</i>			Resident
<i>Varanus eremius</i>	Pygmy Desert Goanna		Resident
<i>Varanus gouldii</i>	Bungarra or Sand Goanna		Resident
<i>Varanus panoptes rubidus</i>	Spotted Monitor		Resident
<i>Varanus tristis tristis</i>	Tree Goanna		Resident
<i>Anilios ammodytes</i>			Resident
<i>Anilios grypus</i>			Resident
<i>Anilios hamatus</i>			Resident
<i>Anilios pilbarensis</i>			Resident
<i>Antaresia perthensis</i>	Pygmy Python		Resident
<i>Antaresia stimsoni stimsoni</i>	Stimson's Python		Resident
<i>Aspidites melanocephalus</i>	Black-headed Python		Resident
<i>Liasis olivaceus barroni</i>	Pilbara Olive Python	VU	Irregular Visitor
<i>Acanthophis pyrrhus</i>	Desert Death Adder		Resident
<i>Acanthophis wellsi</i>	Pilbara Death Adder		Resident

SPECIES	COMMON NAME	STATUS	EXPECTED OCCURRENCE
<i>Brachyuropis approximans</i>			Resident
<i>Demansia psammophis cupreiceps</i>	Yellow-faced Whipsnake		Resident
<i>Demansia rufescens</i>	Rufous Whipsnake		Resident
<i>Furina ornata</i>	Moon Snake		Resident
<i>Pseudechis australis</i>	Mulga Snake		Resident
<i>Pseudonaja mengdeni</i>	Gwardar; Western Brown Snake		Resident
<i>Pseudonaja modesta</i>	Ringed Brown Snake		Resident
<i>Simoselaps anomalus</i>	Desert Banded Snake		Resident
<i>Suta fasciata</i>	Rosen's Snake		Resident
<i>Suta punctata</i>	Spotted Snake		Resident
<b>BIRDS</b>			
<i>Dromaius novaehollandiae</i>	Emu		Resident
<i>Cygnus atratus</i>	Black Swan		Irregular Visitor
<i>Dendrocygna eytoni</i>	Plumed Whistling-Duck		Irregular Visitor
<i>Malacorhynchus membranaceus</i>	Pink-eared Duck		Irregular Visitor
<i>Tadorna tadornoides</i>	Australian Shelduck		Irregular Visitor
<i>Aythya australis</i>	Hardhead		Irregular Visitor
<i>Anas superciliosa</i>	Pacific Black Duck		Irregular Visitor
<i>Anas gracilis</i>	Grey Teal		Irregular Visitor
<i>Chenonetta jubata</i>	Australian Wood Duck		Irregular Visitor
<i>Coturnix pectoralis</i>	Stubble Quail		Resident
<i>Coturnix ypsilophora</i>	Brown Quail		Resident
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe		Vagrant
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe		Vagrant
<i>Columba livia</i>	Rock Dove/Feral Pigeon	Int	
<i>Geophaps plumifera</i>	Spinifex Pigeon		Resident
<i>Phaps chalcoptera</i>	Common Bronzewing		Resident
<i>Phaps histrionica</i>	Flock Bronzewing		Regular Visitor
<i>Ocyphaps lophotes</i>	Crested Pigeon		Resident
<i>Geopelia cuneata</i>	Diamond Dove		Resident
<i>Geopelia striata</i>	Peaceful Dove		Resident

SPECIES	COMMON NAME	STATUS	EXPECTED OCCURRENCE
<i>Geopelia humeralis</i>	Bar-shouldered Dove		Resident
<i>Centropus phasianinus</i>	Pheasant Coucal		Irregular Visitor
<i>Chalcites basal</i>	Horsfield's Bronze-Cuckoo		Regular Visitor
<i>Chalcites osculans</i>	Black-eared Cuckoo		Regular Visitor
<i>Cacomantis pallidus</i>	Pallid Cuckoo		Regular Visitor
<i>Ardeotis australis</i>	Australian Bustard		Resident
<i>Podargus strigoides</i>	Tawny Frogmouth		Resident
<i>Eurostopodus argus</i>	Spotted Nightjar		Resident
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar		Resident
<i>Apus pacificus</i>	Fork-tailed Swift	MI, MA	Vagrant
<i>Tribonyx ventralis</i>	Black-tailed Native-hen		Irregular Visitor
<b>Gruidae (Cranes)</b>			
<i>Grus rubicunda</i>	Brolga		Irregular Visitor
<i>Burhinus grallarius</i>	Bush Stone-curlew		Irregular Visitor
<i>Cladorhynchus leucocephalus</i>	Banded Stilt		Irregular Visitor
<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet		Irregular Visitor
<i>Himantopus leucocephalus</i>	Pied Stilt		Irregular Visitor
<i>Pluvialis squatarola</i>	Grey Plover	MI	Irregular Visitor
<i>Pluvialis fulva</i>	Pacific Golden Plover	MI	Irregular Visitor
<i>Charadrius ruficapillus</i>	Red-capped Plover		Irregular Visitor
<i>Charadrius mongolus</i>	Lesser Sand Plover	EN, MI, MA	Irregular Visitor
<i>Charadrius leschenaultii</i>	Greater Sand Plover	VU, MI, MA	Irregular Visitor
<i>Charadrius veredus</i>	Oriental Plover	MI, MA	Irregular Visitor
<i>Euseyornis melanops</i>	Black-fronted Dotterel		Irregular Visitor
<i>Vanellus tricolor</i>	Banded Lapwing		Irregular Visitor
<i>Erythrogonys cinctus</i>	Red-kneed Dotterel		Irregular Visitor
<i>Numenius phaeopus</i>	Whimbrel	MI	Irregular Visitor
<i>Numenius minutus</i>	Little Curlew	MI	Irregular Visitor
<i>Numenius madagascariensis</i>	Eastern Curlew	CR, MI, MA	Irregular Visitor

SPECIES	COMMON NAME	STATUS	EXPECTED OCCURRENCE
<i>Limosa lapponica</i>	Bar-tailed Godwit	MI, MA	Irregular Visitor
<i>Limosa limosa</i>	Black-tailed Godwit	MI	Irregular Visitor
<i>Calidris tenuirostris</i>	Great Knot	CR, MI, MA	Irregular Visitor
<i>Calidris canutus</i>	Red Knot	MI, MA	Irregular Visitor
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	MI, MA	Vagrant
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	MI, MA	Irregular Visitor
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR, MI, MA	Irregular Visitor
<i>Calidris subminuta</i>	Long-toed Stint	MI, MA	Irregular Visitor
<i>Calidris ruficollis</i>	Red-necked Stint	MI	Irregular Visitor
<i>Calidris melanotos</i>	Pectoral Sandpiper	MI, MA	Vagrant
<i>Xenus cinereus</i>	Terek Sandpiper	MI, MA	Vagrant
<i>Actitis hypoleucos</i>	Common Sandpiper	MI, MA	Irregular Visitor
<i>Tringa nebularia</i>	Common Greenshank	MI, MA	Irregular Visitor
<i>Tringa glareola</i>	Wood Sandpiper	MI, MA	Irregular Visitor
<i>Tringa stagnatilis</i>	Marsh Sandpiper	MI, MA	Irregular Visitor
<i>Phalaropus lobatus</i>	Red-necked Phalarope	MI	Vagrant
<i>Turnix velox</i>	Little Button-quail		Resident
<i>Stiltia isabella</i>	Australian Pratincole		Irregular Visitor
<i>Glareola maldivarum</i>	Oriental Pratincole	MI, MA	Irregular Visitor
<i>Chroicocephalus novaehollandiae</i>	Silver Gull		Irregular Visitor
<i>Gelochelidon nilotica</i>	Common Gull-billed Tern	MI	Irregular Visitor
<i>Hydroprogne caspia</i>	Caspian Tern	MI, MA	Irregular Visitor
<i>Chlidonias hybrida</i>	Whiskered Tern		Irregular Visitor
<i>Chlidonias leucopterus</i>	White-winged Black Tern	MI	Irregular Visitor
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork		Irregular Visitor
<i>Ardea ibis</i>	Cattle Egret		Irregular Visitor
<i>Ardea pacifica</i>	White-necked Heron		Irregular Visitor
<i>Ardea modesta</i>	Great Egret		Irregular Visitor
<i>Ardea intermedia</i>	Intermediate Egret		Irregular Visitor
<i>Egretta novaehollandiae</i>	White-faced Heron		Irregular Visitor

SPECIES	COMMON NAME	STATUS	EXPECTED OCCURRENCE
<i>Egretta garzetta</i>	Little Egret		Irregular Visitor
<i>Threskiornis moluccus</i>	Australian White Ibis		Irregular Visitor
<i>Threskiornis spinicollis</i>	Straw-necked Ibis		Irregular Visitor
<i>Platalea flavipes</i>	Yellow-billed Spoonbill		Irregular Visitor
<i>Platalea regia</i>	Royal Spoonbill		Irregular Visitor
<i>Plegadis falcinellus</i>	Glossy Ibis	MI	Irregular Visitor
<i>Elanus axillaris</i>	Black-shouldered Kite		Resident
<i>Hamirostra melanosternon</i>	Black-breasted Buzzard		Regular Visitor
<i>Lophoictinia isura</i>	Square-tailed Kite		Irregular Visitor
<i>Aquila audax</i>	Wedge-tailed Eagle		Resident
<i>Hieraetus morphnoides</i>	Little Eagle		Resident
<i>Circus approximans</i>	Swamp Harrier		Vagrant
<i>Circus assimilis</i>	Spotted Harrier		Regular Visitor
<i>Accipiter fasciatus</i>	Brown Goshawk		Resident
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk		Resident
<i>Haliastur sphenurus</i>	Whistling Kite		Resident
<i>Milvus migrans</i>	Black Kite		Resident
<i>Tyto alba</i>	Barn Owl		Resident
<i>Ninox connivens</i>	Barking Owl		Resident
<i>Ninox novaeseelandiae</i>	Southern Boobook		Resident
<i>Merops ornatus</i>	Rainbow Bee-eater		Resident
<i>Todiramphus sanctus</i>	Sacred Kingfisher		Resident
<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher		Resident
<i>Dacelo leachii</i>	Blue-winged Kookaburra		Irregular Visitor
<i>Falco cenchroides</i>	Nankeen Kestrel		Resident
<i>Falco longipennis</i>	Australian Hobby		Resident
<i>Falco berigora</i>	Brown Falcon		Resident
<i>Falco hypoleucos</i>	Grey Falcon	VU	Vagrant
<i>Falco subniger</i>	Black Falcon		Vagrant
<i>Falco peregrinus</i>	Peregrine Falcon	OS	Irregular Visitor
<i>Nymphicus hollandicus</i>	Cockatiel		Resident

SPECIES	COMMON NAME	STATUS	EXPECTED OCCURRENCE
<i>Eolophus roseicapillus</i>	Galah		Resident
<i>Cacatua sanguinea</i>	Little Corella		Resident
<i>Barnardius zonarius</i>	Australian Ringneck		Resident
<i>Pezoporus occidentalis</i>	Night Parrot	EN	Vagrant
<i>Melopsittacus undulatus</i>	Budgerigar		Resident
<i>Malurus lamberti</i>	Variegated Fairy-wren		Resident
<i>Malurus splendens</i>	Splendid Fairy-wren		Resident
<i>Malurus leucopterus</i>	White-winged Fairy-wren		Resident
<i>Sugomel niger</i>	Black Honeyeater		Irregular Visitor
<i>Lichmera indistincta</i>	Brown Honeyeater		Resident
<i>Certhionyx variegatus</i>	Pied Honeyeater		Irregular Visitor
<i>Epthianura tricolor</i>	Crimson Chat		Regular Visitor
<i>Epthianura aurifrons</i>	Orange Chat		Irregular Visitor
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		Resident
<i>Lichenostomus virescens</i>	Singing Honeyeater		Resident
<i>Lichenostomus keartlandi</i>	Grey-headed Honeyeater		Resident
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater		Resident
<i>Manorina flavigula</i>	Yellow-throated Miner		Resident
<b>Pardalotidae (Pardalotes)</b>			
<i>Pardalotus rubricatus</i>	Red-browed Pardalote		Resident
<i>Pardalotus striatus</i>	Striated Pardalote		Resident
<i>Gerygone fusca</i>	Western Gerygone		Resident
<i>Smicrornis brevirostris</i>	Weebill		Resident
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill		Resident
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler		Resident
<i>Daphoenositta chrysoptera</i>	Varied Sittella		Resident
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		Resident
<i>Lalage tricolor</i>	White-winged Triller		Resident
<i>Pachycephala rufiventris</i>	Rufous Whistler		Resident
<i>Colluricincla harmonica</i>	Grey Shrike-thrush		Resident
<i>Oreoica gutturalis</i>	Crested Bellbird		Resident

SPECIES	COMMON NAME	STATUS	EXPECTED OCCURRENCE
<i>Psophodes occidentalis</i>	Chiming Wedgebill		Resident
<i>Cracticus tibicen</i>	Australian Magpie		Resident
<i>Cracticus nigrogularis</i>	Pied Butcherbird		Resident
<i>Cracticus torquatus</i>	Grey Butcherbird		Resident
<i>Artamus personatus</i>	Masked Woodswallow		Regular Visitor
<i>Artamus cinereus</i>	Black-faced Woodswallow		Resident
<i>Artamus leucorhynchus</i>	White-breasted Woodswallow		Regular Visitor
<i>Rhipidura leucophrys</i>	Willie Wagtail		Resident
<i>Rhipidura fuliginosa</i>	Grey Fantail		Resident
<i>Corvus orru</i>	Torresian Crow		Resident
<i>Corvus bennetti</i>	Little Crow		Resident
<i>Grallina cyanoleuca</i>	Magpie-lark		Resident
<i>Petroica goodenovii</i>	Red-capped Robin		Resident
<i>Melanodryas cucullata</i>	Hooded Robin		Resident
<i>Dicaeum hirundinaceum</i>	Mistletoebird		Resident
<i>Emblema pictum</i>	Painted Finch		Irregular visitor
<i>Neochmia ruficauda</i>	Star Finch		Regular visitor
<i>Taeniopygia guttata</i>	Zebra Finch		Resident
<i>Anthus novaeseelandiae</i>	Australasian Pipit		Resident
<i>Mirafrja javanica</i>	Horsfield's Bushlark		Resident
<i>Cincloramphus cruralis</i>	Brown Songlark		Resident
<i>Cincloramphus mathewsi</i>	Rufous Songlark		Resident
<i>Eremiornis carteri</i>	Spinifexbird		Resident
<i>Cheramoeca leucosterna</i>	White-backed Swallow		Resident
<i>Petrochelidon ariel</i>	Fairy Martin		Resident
<i>Petrochelidon nigricans</i>	Tree Martin		Resident
<i>Hirundo neoxena</i>	Welcome Swallow		Resident
<i>Hirundo rustica</i>	Barn Swallow	MI, MA	Regular visitor
<i>Esacus giganteus</i>	Beach Stone-curlew		
<i>Haematopus longirostris</i>	Australian Pied Oystercatcher		
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		

SPECIES	COMMON NAME	STATUS	EXPECTED OCCURRENCE
<i>Arenaria interpres</i>	Ruddy Turnstone		
<i>Calidris alba</i>	Sanderling	MI	
<i>Tringa brevipes</i>	Grey-tailed Tattler	P4	
<i>Anous stolidus</i>	Common Noddy	MI, MA	
<i>Onychoprion anaethetus</i>	Bridled Tern	MI, MA	
<i>Sternula albifrons</i>	Little Tern	MI, MA	
<i>Sternula nereis</i>	Fairy Tern		
<i>Sterna dougallii</i>	Roseate Tern	MI, MA	
<i>Sterna hirundo</i>	Common Tern	MI	
<i>Thalasseus bengalensis</i>	Lesser Crested Tern		
<i>Thalasseus bergii</i>	Crested Tern	MI, MA	
<i>Oceanites oceanicus</i>	Wilson's Storm-Petrel	MI	
<i>Macronectes giganteus</i>	Southern Giant-Petrel	EN, MI, MA	
<i>Ardenna pacifica</i>	Wedge-tailed Shearwater	MI, MA	
<i>Calonectris leucomelas</i>	Streaked Shearwater	MI, MA	
<i>Fregata ariel</i>	Lesser Frigatebird	MI, MA	
<i>Pandion haliaetus</i>	Osprey	MI, MA	
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		
<i>Haliastur indus</i>	Brahminy Kite		
<i>Motacilla flava</i>	Yellow Wagtail	MI, MA	
<i>Motacilla cinerea</i>	Grey Wagtail	MI, MA	
<b>MAMMALS</b>			
<i>Tachyglossus aculeatus acanthion</i>	Short-beaked Echidna		Resident
<i>Dasyercus blythi</i>	Brush-tailed Mulgara	P4	Regular Visitor
<i>Dasykaluta rosamondae</i>	Kaluta		Resident
<i>Dasyurus hallucatus</i>	Northern Quoll	EN	Vagrant
<i>Ningau timealeyi</i>	Pilbara Ningau		Resident
<i>Planigale 'species 1'</i>	Pilbara Planigale		Resident
<i>Sminthopsis macroura stalker</i>	Stripe-faced Dunnart		Resident
<i>Sminthopsis youngsoni</i>	Lesser Hairy-footed Dunnart		Resident
<i>Trichosurus vulpecula hypoleucus</i>	Brushtail Possum		Irregular visitor

SPECIES	COMMON NAME	STATUS	EXPECTED OCCURRENCE
<i>Osphranter robustus erubescens</i>	Euro, Biggada		Resident
<i>Osphranter rufus</i>	Red Kangaroo, Marlu		Resident
<i>Leggadina lakedownensis</i>	Short-tailed Mouse	P4	Resident
<i>Mus musculus</i>	House Mouse	Int	Resident
<i>Notomys alexis alexis</i>	Spinifex Hopping-mouse		Resident
<i>Pseudomys delicatulus</i>	Delicate Mouse		Resident
<i>Pseudomys desertor</i>	Desert Mouse		Resident
<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse		Resident
<i>Rattus rattus</i>	Black Rat	Int	Resident
<i>Zyomys argurus</i>	Common Rock-rat		Vagrant
<i>Oryctolagus cuniculus</i>	Rabbit	Int	Resident
<i>Pteropus alecto gouldii</i>	Black Flying-fox		Resident
<i>Pteropus scapulatus</i>	Little Red Flying-fox		Resident
<i>Rhinioncteris aurantia (Pilbara)</i>	Pilbara Leaf-nosed Bat	VU	Vagrant
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tailed Bat		Resident
<i>Taphozous georgianus</i>	Common Sheath-tailed Bat		Resident
<i>Austronomus australis</i>	White-striped Free-tailed Bat		Resident
<i>Chaerephon jobensis colonicus</i>	Greater Northern Free-tailed Bat		Resident
<i>Ozimops cobourgianus</i>	Northern Coastal Free-tailed Bat		Resident
<i>Ozimops lumsdenae</i>	Northern Free-tailed Bat		Resident

# **Appendix E**

## **Floristic Quadrat and Relevé Data Sheets**

### Flora Site Sheet

Project Name	A22.052		
Site	Q01		
Location	MGA 50	mE 304097.364	mN 7606524.425
Described By	Andrew Fry		
Date	14/09/2022		
Type	Quadrat		
Landform	Mid Slope		
Slope	Gentle		
Rock Type	None		
Soil Type	Sand		
Soil Colour	Yellow-Brown		



#### Vegetation

Condition	Degraded	Disturbance	Clearing, heavy weed invasion, old waste dump.
Fire Age	>10		

*Acacia bivenosa*, *Acacia coriacea* subsp. *coriacea* and *Acacia trachycarpa* tall open shrubland over \**Cenchrus ciliaris*, *Triodia epactia* and *Trichodesma zelyanicum* tall tussock grassland/hummock grassland/forbland

#### SPECIES LIST

Taxon	Cover (%)	Notes
<i>Abutilon</i> sp. <i>Dioicum</i> (A.A. Mitchell PRP 1618)	2	
<i>Acacia bivenosa</i>	6	
<i>Acacia coriacea</i> subsp. <i>coriacea</i>	4	
<i>Acacia sclerosperma</i>	<1	
<i>Acacia stellaticeps</i>	<1	
<i>Acacia trachycarpa</i>	2	
<i>Adriana tomentosa</i> var. <i>tomentosa</i>	<1	
<i>Aerva javanica</i>	2	*
<i>Cenchrus setiger</i>	2	*
<i>Cenchrus ciliaris</i>	30	*
<i>Crotalaria cunninghamii</i>	<1	
<i>Euphorbia myrtoides</i>	<1	
<i>Indigofera colutea</i>	<1	
<i>Indigofera monophylla</i>	<1	

Flora Site Sheet

<i>Quoya loxocarpa</i>	<1
<i>Rhagodia preissii</i> subsp. <i>obovata</i>	<1
<i>Salsola australis</i>	<1
<i>Tephrosia gardneri</i>	<1
<i>Tephrosia rosea</i> var. <i>clementii</i>	<1
<i>Threlkeldia diffusa</i>	<1
<i>Tribulus occidentalis</i>	<1
<i>Trichodesma zelyanicum</i>	2
<i>Triodia epactia</i>	10

### Flora Site Sheet

<b>Project Name</b>	A22.052		
<b>Site</b>	Q02		
<b>Location</b>	MGA 50	mE 304399.928	mN 7606521.494
<b>Described By</b>	Andrew Fry		
<b>Date</b>	14/09/2022		
<b>Type</b>	Quadrat		
<b>Landform</b>	Mid Slope		
<b>Slope</b>	Gentle		
<b>Rock Type</b>	None		
<b>Soil Type</b>	Sandy loam		
<b>Soil Colour</b>	Yellow-Brown		



#### Vegetation

<b>Condition</b>	Degraded	<b>Disturbance</b>	Heavy weed invasion.
<b>Fire Age</b>	>10		

*Acacia coriacea* subsp. *coriacea* tall open shrubland over \**Cenchrus ciliaris*, *Triodia epactia* and *Trichodesma zelyanicum* mid tussock grassland/hummock grassland/forbland

#### SPECIES LIST

Taxon	Cover (%)	Notes
<i>Abutilon</i> sp. <i>Dioicum</i> (A.A. Mitchell PRP 1618)	<1	
<i>Acacia coriacea</i> subsp. <i>coriacea</i>	15	
<i>Adriana tomentosa</i> var. <i>tomentosa</i>	<1	
<i>Aerva javanica</i>	2	*
<i>Boerhavia coccinea</i>	<1	
<i>Cassytha aurea</i> var. <i>aurea</i>	<1	
<i>Cenchrus ciliaris</i>	30	*
<i>Chrysocephalum apiculatum</i>	<1	
<i>Corynotheca pungens</i>	<1	
<i>Crotalaria cunninghamii</i>	<1	
<i>Eulalia aurea</i>	<1	
<i>Euphorbia myrtilloides</i>	<1	
<i>Pluchea dunlopii</i>	<1	
<i>Quoya loxocarpa</i>	<1	

Flora Site Sheet

<i>Rhagodia preissii</i> subsp. <i>obovata</i>	<1
<i>Salsola australis</i>	2
<i>Sida echinocarpa</i>	<1
<i>Solanum lasiophyllum</i>	<1
<i>Spinifex longifolius</i>	<1
<i>Threlkeldia diffusa</i>	1
<i>Tribulus occidentalis</i>	<1
<i>Trichodesma zelyanicum</i>	3
<i>Triodia epactia</i>	10

## Flora Site Sheet

<b>Project Name</b>	A22.052		
<b>Site</b>	Q03		
<b>Location</b>	MGA 50	mE 304333.162	mN 7606657.679
<b>Described By</b>	Andrew Fry		
<b>Date</b>	14/09/2022		
<b>Type</b>	Quadrat		
<b>Landform</b>	Mid Slope		
<b>Slope</b>	Gentle		
<b>Rock Type</b>	None		
<b>Soil Type</b>	Sand		
<b>Soil Colour</b>	Yellow-Brown		



### Vegetation

<b>Condition</b>	Degraded	<b>Disturbance</b>	Weed and clearing.
<b>Fire Age</b>	>10		

*Acacia coriacea* subsp. *coriacea* tall open shrubland over \**Cenchrus ciliaris*, *Salsola australis* and *Tephrosia gardneri* mid open tussock grassland/open chenopod shrubland/low open shrubland

### SPECIES LIST

Taxon	Cover (%)	Notes
<i>Acacia coriacea</i> subsp. <i>coriacea</i>	25	
<i>Adriana tomentosa</i> var. <i>tomentosa</i>	<1	
<i>Aerva javanica</i>	1	*
<i>Cassutha aurea</i> var. <i>aurea</i>	<1	
<i>Cenchrus ciliaris</i>	25	*
<i>Chrysocephalum apiculatum</i>	<1	
<i>Corynotheca pungens</i>	<1	
<i>Crotalaria cunninghamii</i>	1	
<i>Euphorbia myrtilloides</i>	<1	
<i>Ptilotus axillaris</i>	<1	
<i>Rhagodia preissii</i> subsp. <i>obovata</i>	1	
<i>Salsola australis</i>	2	
<i>Spinifex longifolius</i>	<1	
<i>Tephrosia gardneri</i>	1	
<i>Threlkeldia diffusa</i>	1	

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Flora Site Sheet

<i>Tribulus occidentalis</i>	<1
<i>Trichodesma zelyanicum</i>	<1

### Flora Site Sheet

Project Name	A22.052		
Site	Q04		
Location	MGA 50	mE 304290.708	mN 7606749.649
Described By	Andrew Fry		
Date	14/09/2022		
Type	Quadrat		
Landform	Lower Slope		
Slope	Flat		
Rock Type	None		
Soil Type	Sand		
Soil Colour	Yellow-Brown		



#### Vegetation

Condition	Degraded	Disturbance	Weeds and clearing.
Fire Age	>10		

*Acacia coriacea* subsp. *coriacea* and *Crotalaria cunninghamii* mid open shrubland over *Spinifex longifolius*, \**Cenchrus ciliaris* and *Salsola australis* mid hummock grassland/tussock grassland/chenopod shrubland.

#### SPECIES LIST

Taxon	Cover (%)	Notes
<i>Acacia coriacea</i> subsp. <i>coriacea</i>	10	
<i>Cenchrus ciliaris</i>	20	*
<i>Crotalaria cunninghamii</i>	3	
<i>Eriachne aristidea</i>	<1	
<i>Eulalia aurea</i>	<1	
<i>Euphorbia myrtilloides</i>	<1	
<i>Ipomoea pes-caprae</i>	<1	
<i>Ptilotus axillaris</i>	<1	
<i>Rhagodia preissii</i> subsp. <i>obovata</i>	<1	
<i>Salsola australis</i>	2	
<i>Scaevola crassifolia</i>	1	
<i>Spinifex longifolius</i>	25	
<i>Tephrosia gardneri</i>	<1	
<i>Threlkeldia diffusa</i>	<1	
<i>Tribulus occidentalis</i>	<1	
<i>Trichodesma zelyanicum</i>	<1	

