

Benger Solar Farm

Desktop Vegetation, Flora and Fauna Assessment &
Reconnaissance Survey



AECOM

Benger Solar Farm Development
Benger Solar Farm – Desktop Vegetation, Flora and Fauna Assessment &
Reconnaissance Survey
Commercial-in-Confidence

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Desktop Vegetation, Flora and Fauna Assessment & Reconnaissance Survey

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Table of Contents

1.0	Introduction	1
1.1	Background	1
1.2	Location	1
1.3	Scope of work	1
2.0	Legislative Framework	1
2.1	Overview	1
2.2	Federal Legislation - EPBC Act	2
2.2.1	Matters of National Environmental Significance	2
2.2.2	Flora and Fauna	2
2.2.3	Vegetation Communities	3
2.3	Western Australian Legislation	3
2.3.1	Flora and Fauna	3
2.3.2	Vegetation Communities	5
2.3.3	<i>Biosecurity and Agriculture Management Act 2007</i>	6
2.3.4	Communities of Local, Regional and National Significance	7
3.0	Existing Environment	8
3.1	Climate	8
3.2	IBRA Region	8
3.3	Soils and Geology	8
3.4	Vegetation	9
4.0	Methods	10
4.1	Desktop Assessment	10
4.2	Field Survey	11
4.2.1	Flora and Vegetation	11
4.2.2	Fauna and Fauna Habitat	11
4.3	Assumptions and limitations	11
5.0	Results and Discussion	12
5.1	Desktop Assessment	12
5.1.1	Threatened and Priority Ecological Communities	12
5.1.2	Conservation Significant Flora	14
5.1.3	Conservation Significant Fauna	15
5.2	Field Survey	18
5.2.1	Flora and Vegetation	18
5.2.2	Fauna	20
6.0	Summary and Recommendations	27
6.1	Summary	27
6.2	Recommendations	27
7.0	Reference	28
Appendix A		
	EPBC - Protected Matters Search Tool Results	A
Appendix B		
	NatureMap Search Results	B
Appendix C		
	Likelihood of threatened species	C

List of Figures

Figure 1	Project Location	1
Figure 2	Climate data for the Brunswick Junction weather station (BoM, 2018)	8
Figure 3	Vegetation Communities and Condition	19
Figure 4	Broadly Defined Fauna Habitats of the Project Area	22

List of Tables

Table 1	Relevant Legislation, Regulations and Guidance	1
Table 2	Categories of Species Listed under Schedule 179 of the EPBC Act	2
Table 3	Categories of TECs that are listed under the EPBC Act	3
Table 4	Conservation codes for WA flora and fauna listed under the <i>Wildlife Conservation Act 1950</i> updated November 2015	4
Table 5	Conservation codes for WA flora and fauna as listed by DPaW and endorsed by the Minister for Environment	5
Table 6	Conservation codes for State listed Ecological Communities	6
Table 7	Categories for Priority Ecological Communities	6
Table 8	Soil Systems within the Project Area (Purdie <i>et al.</i> , 2004)	9
Table 9	Pre-European Vegetation Associations Mapped in the Project Area	9
Table 10	Categories of Likelihood of Occurrence for Flora and Fauna Species	10
Table 11	Summary of PMST results	12
Table 12	Threatened ecological communities identified in the desktop assessment	13
Table 13	Significant flora species that may or are likely to occur in the Project Area	14
Table 14	Conservation Significant Fauna Species that May or are Likely to Occur in the Project Area	16
Table 15	Fauna Species Recorded within the Project Area	20
Table 16	Broadscale Fauna Habitats of the Project Area	23

1.0 Introduction

1.1 Background

SE Campbell Developments (trading as South Energy) is considering potential sites for solar farm development in the southwest of Western Australia. To inform the first stage of the planning and approvals process, AECOM has been engaged by South Energy to undertake a desktop assessment and reconnaissance vegetation, flora and fauna survey of the proposed site at Benger.

1.2 Location

The proposed solar farm site comprises a 187 ha parcel of farmland in Benger located approximately 20 km northeast of Bunbury, in the Shire of Harvey in Western Australia (Figure 1). There is currently no registered street address for the site, which represents Lot 0 on Diagram 685 (Land ID 039815).

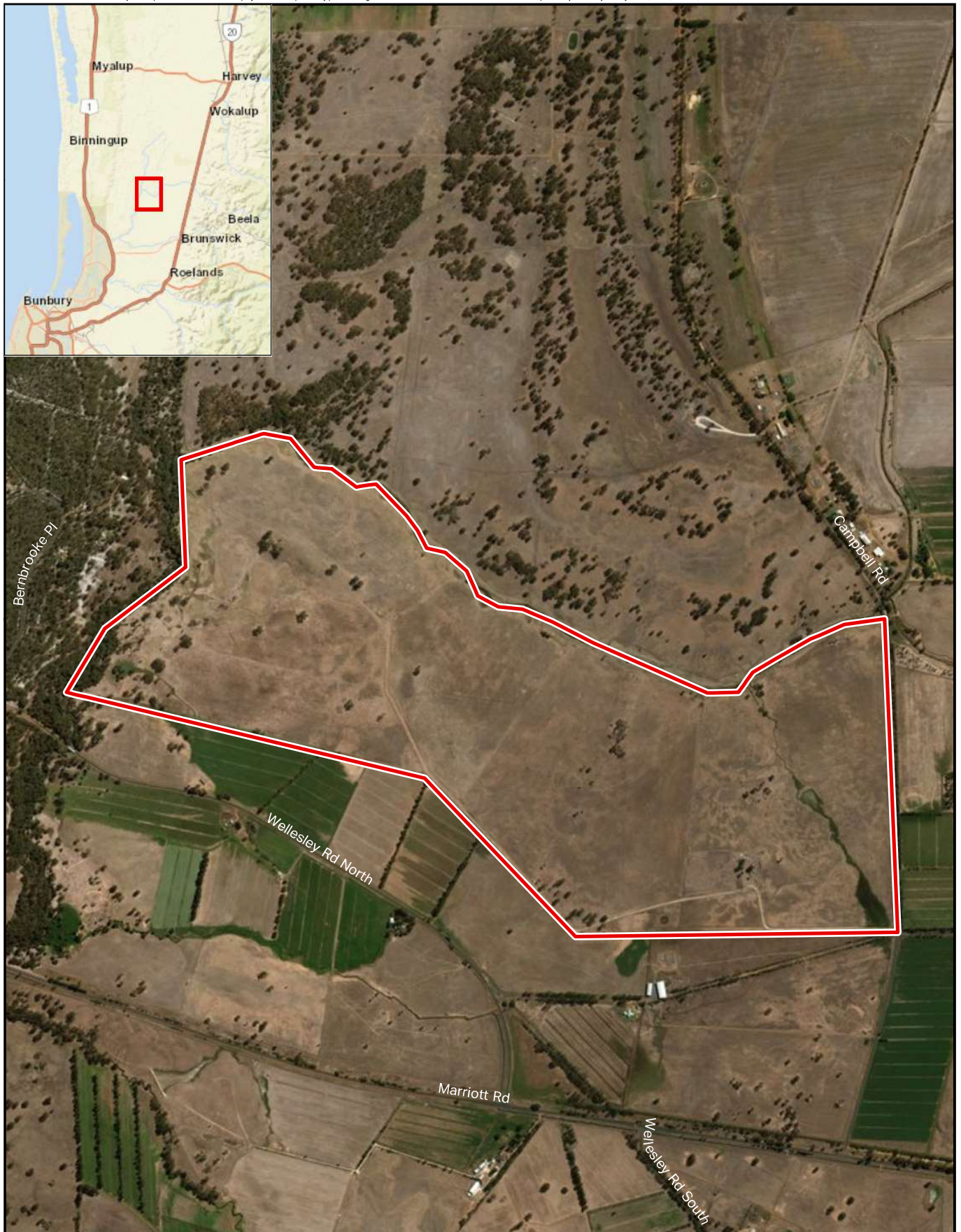
The site is bound by the Wellesley River to the west, and an unnamed tributary to the north. The eastern boundary abuts Campbell Road, and the southern boundary is broadly aligned with Wellesley Road North and Partridge Road, which are located approximately 200 m south.

1.3 Scope of work

The purpose of the flora, vegetation and fauna assessment is to determine the environmental values present within the defined Project Area to inform an assessment of potential impacts relevant to the Project. The scope of works for the assessment was to:

- Undertake a desktop review to identify potential for Threatened or Priority flora, fauna or ecological communities to occur within, or in close proximity to the proposed site
- Undertake a reconnaissance survey of the site to:
 - verify the results of the desktop review
 - note evidence of any conservation significant biota that were not identified by the desktop survey.
 - investigate the presence (or likely presence) of specific Commonwealth and State-listed threatened flora and fauna species and communities
- Recommend further ecological work and/or next steps that will clarify the path for regulatory and planning approval for the proposed solar farm development.

This report represents the findings of the desktop and reconnaissance flora, vegetation and fauna assessment.



<p>PROJECT ID 60590393 CREATED BY KW APPROVED BY C.Bennison LAST MODIFIED 17 JAN 2019</p> <p>AECOM www.aecom.com</p> <p>DATUM GDA 1994, PROJECTION MGA ZONE 50</p> <p>0 125 250 375 500 metres</p> <p>1:15,000 when printed at A4</p>	<p>LEGEND</p> <p> Project Area</p> <p><small>Data sources: Sources: Esri, HERE, Garmin, USGS, Imagery, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (The Netherlands), NCC, © OpenStreetMap contributors, and the GIS User Community</small></p>	<p>Project Location</p> <p>SOUTH ENERGY</p> <p><i>BENGER SOLAR FARM ENVIRONMENTAL CONSTRAINTS ASSESSMENT</i></p> <p>Figure 1</p>
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2.0 Legislative Framework

2.1 Overview

Table 1 summarises the key legislation governing the protection and management of Western Australia's conservation significant flora, fauna and communities.

Table 1 Relevant Legislation, Regulations and Guidance

Legislation	Purpose
Commonwealth of Australia	
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	Provides for the protection of the environment and the conservation of biodiversity.
EPBC Act Referral Guidelines for Three Threatened Black Cockatoo Species, (DSEWPAC, 2012)	These guidelines are intended to assist proponents in determining whether an action needs to be referred to the Australian Government. Definitions of habitat are provided as are criteria used to judge significant impact for these black Cockatoo species.
Western Australia	
<i>Wildlife Conservation Act 1950</i> (WC Act) to be superseded by the <i>Biodiversity Conservation Act 2016</i> in January 2019.	Provides for the conservation and protection of Western Australia's wildlife.
<i>Biodiversity Conservation Act 2016</i> (BC Act)	This Act will replace both the WC Act and the <i>Sandalwood Act 1929</i> . On 3 December 2016, several parts of the new Act were proclaimed by the State Governor in the Government Gazette. Provisions that replace those existing under the WC Act and <i>Sandalwood Act 1929</i> (including threatened species listings and controls over the taking and keeping of native species) and their associated Regulations will come into effect on 1 January 2019.
<i>Environmental Protection Act 1986</i> (EP Act)	Preventing, controlling and abating environmental harm and conserving, preserving, protecting, enhancing and managing the environment.
<i>Biosecurity and Agriculture Management Act 2007</i> (BAM Act)	Provides for the management, control and prevention of certain plants and animals, and for the protection of agriculture and related resources generally.
EPA Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016a)	Provides guidance to ensure adequate flora and vegetation data of an appropriate standard are obtained and used in EIA.
EPA Technical Guidance – Terrestrial Fauna Surveys (EPA, 2016b)	Provides guidance on the standard of survey required to assist in collecting the appropriate data for decision-making associated with the protection of Western Australia's terrestrial fauna.
EPA Technical Guidance – Sampling Methods for Terrestrial Vertebrate Fauna, (EPA, 2016c)	Provides advice on fauna sampling techniques and methodologies for different regions of the State and the analysis, interpretation and reporting requirements for EIA.

2.2 Federal Legislation - EPBC Act

2.2.1 Matters of National Environmental Significance

The EPBC Act is the main piece of Federal legislation protecting biodiversity in Australia. All Matters of National Environmental Significance (MNES) are listed under the EPBC Act. These include:

- listed threatened species and ecological communities
- migratory species protected under international agreements
- Ramsar wetlands of international importance
- the Commonwealth marine environment
- world Heritage properties
- national Heritage places
- Great Barrier Reef Marine Park
- a water resource, in relation to coal seam gas development and large coal mining development
- nuclear actions.

If an action is likely to have a significant impact on a MNES this action must be referred to the Department of the Environment and Energy (DotEE) for a decision on whether assessment and approval is required under the EPBC Act.

2.2.2 Flora and Fauna

Species at risk of extinction are recognised at a Commonwealth level and are categorised in one of six categories as outlined in Table 2.

Table 2 Categories of Species Listed under Schedule 179 of the EPBC Act

Conservation	Code Category
Ex	Extinct Taxa which at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
ExW	Extinct in the Wild Taxa which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or 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.
CE	Critically Endangered Taxa which 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.
E	Endangered Taxa which is not critically endangered and it is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
V	Vulnerable Taxa which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

Conservation	Code Category
CD	<p>Conservation Dependent Taxa which at a particular time if, at that time: 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 the following subparagraphs are satisfied:</p> <ul style="list-style-type: none"> • the species is a species of fish • the species is the focus of a plan of management that provides for 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 the plan of management is in force under a law of the Commonwealth or of a State or Territory cessation of the plan of management would adversely affect the conservation status of the species.

2.2.3 Vegetation Communities

Communities can be classified as Threatened Ecological Communities (TECs) under the EPBC Act. The EPBC Act protects Australia's ecological communities by providing for:

- identification and listing of ecological communities as threatened
- development of conservation advice and recovery plans for listed ecological communities
- recognition of key threatening processes
- reduction of the impact of these processes through threat abatement plans.

Categories of federally listed TECs are described in Table 3.

Table 3 Categories of TECs that are listed under the EPBC Act

Code	Category
CE	Critically Endangered If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
E	Endangered If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
V	Vulnerable If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

2.3 Western Australian Legislation

2.3.1 Flora and Fauna

Threatened flora are plants which have been assessed as being at risk of extinction (DEC 2012). Under the WC Act, the Western Australian Minister for the Environment may declare species of flora to be protected if they are considered to be in danger of extinction, rare or otherwise in need of special protection (WAH 1998).

Plants and animals that are considered Threatened and need to be specially protected because they are under identifiable threat of extinction are listed under the WC Act. These categories are defined in Table 4.

Table 4 Conservation codes for WA flora and fauna listed under the *Wildlife Conservation Act 1950* updated November 2015

Code	Category
CR	Critically Endangered Species Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.
EN	Endangered Species Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora
VU	Vulnerable Species Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.
EX	Presumed Extinct Species Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.
IA	Migratory birds protected under an international agreement 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 the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.
CD	Special conservation
OS	Special protection for reasons other than those already mentioned

Species that have not yet been adequately surveyed to warrant being listed under the WC Act, or are otherwise data deficient, are added to a Priority Lists under Priorities 1, 2 or 3 by the State Minister for Environment. 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. Categories and definitions of Priority Flora and Fauna species are provided in Table 5.

Table 5 Conservation codes for WA flora and fauna as listed by DPaW and endorsed by the Minister for Environment

Code	Category
P1	Priority One – Poorly Known Species Species that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.
P2	Priority Two – Poorly Known Species Species that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.
P3	Priority Three – Poorly Known Species Species that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities 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 localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.
P4	Priority Four – Rare, Near Threatened and other species in need of monitoring <ol style="list-style-type: none"> 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. Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

2.3.2 Vegetation Communities

TECs are naturally occurring biological assemblages that occur in a particular type of habitat and that may be subject to processes that threaten to destroy or significantly modify the assemblage across its range. TECs are listed by both state and commonwealth legislation.

Vegetation communities in Western Australia are described as TECs if they have been endorsed by the Western Australian Minister for Environment following recommendations made by the Threatened Species Scientific Committee. Categories of TECs are defined in Table 6.

The Western Australian Department of Biodiversity, Conservation and Attractions (DBCA) maintains a database of state listed TECs which is available for online searches via their website. Possible TECs that do not meet survey criteria or are not adequately defined are listed as Priority Ecological Communities (PECs) under Priorities 1, 2 and 3. Ecological communities that are adequately known and are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. Conservation dependent communities are classified as Priority 5. PECs are endorsed by the Minister for Environment and are described in Table 7.

DBCA requires that all Priority and Threatened ecological communities are considered during environmental impact assessments and clearing permit applications. There is currently no formal protection afforded to TECs or PECs listed at the state level.

Table 6 Conservation codes for State listed Ecological Communities

Code	Category
PD	Presumed Totally Destroyed
CR	Critically Endangered
EN	Endangered
VU	Vulnerable

Table 7 Categories for Priority Ecological Communities

Code	Category
P1	Priority One: poorly-known ecological communities
P2	Priority Two: poorly-known ecological communities
P3	Priority Three: poorly known ecological communities
P4	Priority Four: 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.

2.3.3 Biosecurity and Agriculture Management Act 2007

Biosecurity is the management of the risk of animal and plant pests and diseases entering, emerging, establishing or spreading in WA to protect the economy, environment and community. Biosecurity is managed under the BAM Act which came into effect 1 May 2013. Exotic animals and plants can become an invasive species if they can establish in new areas where local conditions are favourable for their growth. Each organism listed under the Bam Act comes with certain legal / import requirements:

- Declared Pest, Prohibited - s12. Prohibited organisms are declared pests by virtue of section 22(1), and may only be imported and kept subject to permits.
- Permitted - s11. Permitted organisms may be subject to an import permit if they are potential carriers of high-risk organisms.
- Declared Pest - s22(2). Declared pests may be subject to an import permit if they are potential carriers of high-risk organisms, and may also be subject to control and keeping requirements once within Western Australia.
- Permitted, Requires Permit - r73. Regulation 73 permitted organisms may only be imported subject to an import permit.

Declared pests can be assigned to a C1, C2 or C3 control category under the Biosecurity and Agriculture Management Regulations 2013:

- C1 Exclusion - Organisms which should be excluded from part or all of Western Australia.
- C2 Eradication - Organisms which should be eradicated from part or all of Western Australia.
- C3 Management - Organisms that should have some form of management applied that will alleviate the harmful impact of the organism, reduce the numbers or distribution of the organism or prevent or contain the spread of the organism.
- Unassigned - Declared pests that are recognised as having a harmful impact under certain circumstances, where their subsequent control requirements are determined by a Plan or other legislative arrangements under the BAM Act.

2.3.4 Communities of Local, Regional and National Significance

Significant flora and vegetation units need to take into account a number of other features other than statutory listings in accordance with the Flora and Vegetation Environmental Factor Guideline (EPA, 2016d). These include the following:

- restricted distribution
- degree of historical impact from threatening processes
- a role as a refuge
- providing an important function required to maintain ecological integrity of a significant ecosystem.

3.0 Existing Environment

3.1 Climate

The Project Area has a Mediterranean type climate. Rainfall occurs mostly in the winter months between the months of May and August. The nearest Bureau of Meteorology (BoM) weather station is Brunswick Junction (Station ID 9513) located 3.8 km from Benger. Mean annual rainfall at Brunswick Junction is 996 mm (BoM, 2018). Monthly Rainfall ranges from 12.3 mm in January, to 196.3 mm in June (Figure 2). No historical temperature data are available for Brunswick Junction weather station, the next closest weather station is Wokalup (5.5km from the Project). Historical data from Wokalup show that mean monthly minimum temperatures range from 16.7 °C to 31.0 °C and mean monthly maximum temperatures range from 18.5 °C to 34.7 °C (Figure 2).

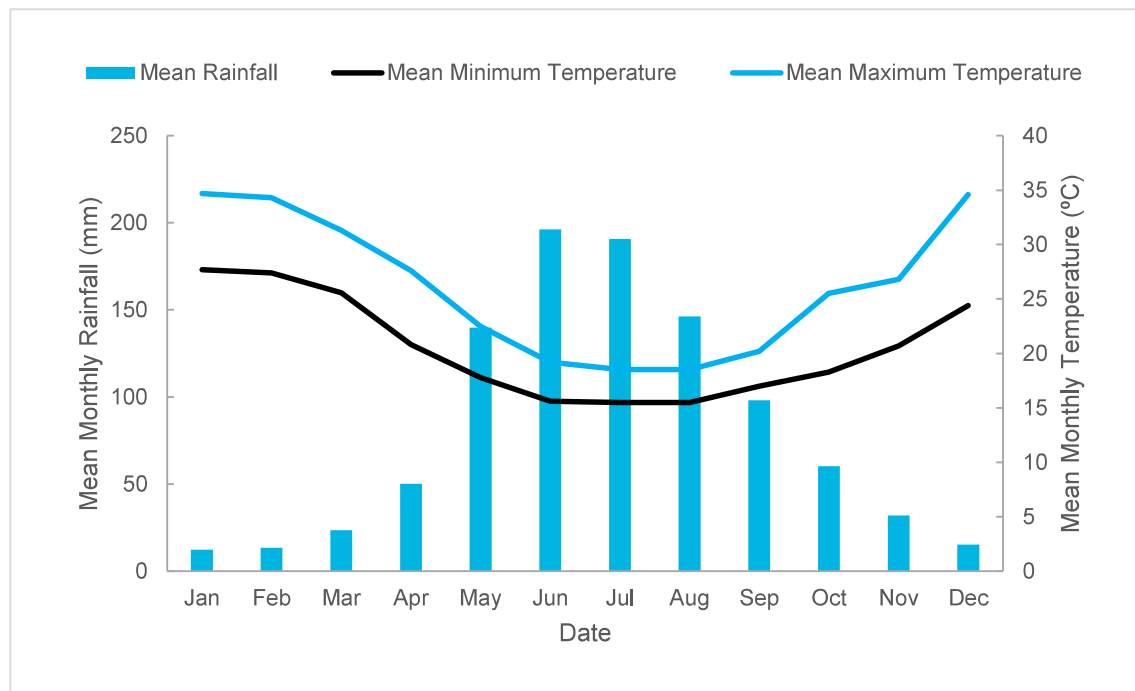


Figure 2 Climate data for the Brunswick Junction weather station (BoM, 2018)

3.2 IBRA Region

The Project Area lies in the Swan Coastal Plain 2 (SWA2) subregion of the Swan Coastal Plain IBRA region. This subregion comprises colluvial and aeolian sands, alluvial rivers flats and coastal limestone (Mitchell *et al.*, 2002). Vegetation in the SWA2 subregion has been described as heath and/or Tuart woodlands on Limestone, Banksia and Jarrah-Banksia woodlands on Quaternary marine dunes and Marri on colluvial and alluvials (Mitchell *et al.*, 2002).

3.3 Soils and Geology

The Project lies in the alluvial plain at foothills of the Darling Scarp. Soil mapping indicates that soils present are predominantly alluvium (Table 8). Six soil systems have been mapped in the Project Area by Purdie *et al.* (2004) (Table 8). The majority of the Project Area lies within the Pinjarra P2 Phase soil system, which is characterised by duplex soils comprising shallow pale sand and loams over clay.

Table 8 Soil Systems within the Project Area (Purdie *et al.*, 2004)

Soil System	Description
Pinjarra P2 Phase	Flat to very gently undulating plain with deep alkaline mottled yellow duplex soils which generally consist of shallow pale sand to sandy loam over clay.
Pinjarra P10 Phase	Gently undulating to flat terraces adjacent to major rivers, but below the general level of the plain, with deep well drained uniform brownish sands or loams subject to periodic flooding.
Pinjarra P8 Phase	Broad poorly drained flats and poorly defined stream channels with moderately deep to deep sands over mottled clays; acidic or less commonly alkaline grey and yellow duplex soils to uniform bleached or pale brown sands over clay.
Pinjarra P7a Phase	Seasonally inundated swamps and depressions with very poorly drained variable acidic mottled yellow and grey duplex soils becoming alkaline with depth.
Pinjarra P1a Phase	Flat to very gently undulating plain with deep acidic mottled yellow duplex (or coeffective duplex) soils. Shallow pale sand to sandy loam over clay; imperfect to poorly drained and generally not susceptible to salinity.
Pinjarra P3 Phase	Flat to very gently undulating plain with deep, imperfect to poorly drained acidic gradational yellow or grey-brown earths and mottled yellow duplex soils, with loam to clay loam surface horizons.

3.4 Vegetation

Beard (2013) mapped three pre-European vegetation associations across the Project Area (Table 9). The majority of the Project Area is characterised by pre-European vegetation association 968.

Aerial photography from the Project Area show the majority of the site has been cleared for agriculture prior to 1996.

Table 9 Pre-European Vegetation Associations Mapped in the Project Area

Vegetation Association	Description
968	Jarrah (<i>Eucalyptus marginata</i>), marri (<i>Corymbia calophylla</i>) and wandoo (<i>E. wandoo</i>) woodland.
1000	Woodland, Low woodland, Low forest or Woodland.
1182	Jarrah (<i>Eucalyptus marginata</i>), marri (<i>Corymbia calophylla</i>) and wandoo (<i>E. wandoo</i>) woodland.

4.0 Methods

4.1 Desktop Assessment

A detailed desktop assessment was undertaken to define the existing environment and identify potential matters of conservation significance to target during the field survey. The desktop assessment was informed by publicly available government databases including:

- Western Australian Herbarium (WAH) records
- DBCA and Western Australian Museum's NatureMap
- EPBC Act Protected Matters Search Tool (PMST).

Buffer distances for database searches varied from one to 10 kilometres and are considered appropriate for detecting conservation significant species in the south west region of Western Australia.

The likelihood of occurrence was determined for all species conservation significant species identified, using categories outlined in Table 10.

Table 10 Categories of Likelihood of Occurrence for Flora and Fauna Species

Likelihood Category	Flora	Fauna	Communities
Likely to occur	Habitat is present in the Project Area and the species has been recorded in close proximity to the Project Area	Project Area is within the known distribution of the species, habitat is present in the Project Area and the species has been recorded in close proximity to the Project Area	Known occurrences of the community in close proximity to the Project Area. Vegetation within the known occurrence appears to be congruent with vegetation in the Project Area based on aerial imagery. Geographic location is similar to the Project Area
May occur	Habitat may be present and/or the species has been recorded in close proximity to the Project Area	Project Area is within the known distribution of the species, marginal habitat may be present and/or the species has been recorded in close proximity to the Project Area	Known occurrence of the community in the local area, and/or vegetation within known occurrence appears to be congruent with vegetation in the Project Area based on aerial imagery. Geographic location is similar to the Project Area
Unlikely to occur	No suitable habitat is present and the species has not been recorded in close proximity to the Project Area	Project Area is outside the known distribution for the species, or no suitable habitat is present and the species has not been recorded in close proximity to the Project Area	Known occurrence of the community in close proximity to the Project Area however geographic location does not occur in Project Area

4.2 Field Survey

4.2.1 Flora and Vegetation

A reconnaissance flora and vegetation survey was undertaken by botanist Floora de Wit on 20 December 2018. The Project Area was traversed on foot and broad floristic data collected from areas representing native vegetation. Significant weeds and landforms were also recorded that may have implications for planning, approvals and environmental management.

4.2.2 Fauna and Fauna Habitat

A reconnaissance fauna survey was undertaken by Ecologist Jared Leigh on 20 December 2018. The survey involved a broad-scale assessment of fauna habitats present, an assessment of the potential for the conservation significant fauna species identified during the desktop assessment to utilise these habitats, and an inventory of fauna species observed was also compiled.

4.3 Assumptions and limitations

The findings of this report are subject to the following assumptions and limitations:

1. Fauna habitat mapping conducted was at a broad-scale.
2. Black Cockatoo potential breeding trees were not counted.
3. Mapping was conducted using hand-held computer (Samsung tablet) units and aerial photo interpretation. The accuracy of the mapping is subject to the accuracy of the unit and access to satellite information (generally < 6 metres). As such, these points should not be relied on for detailed design purposes.
4. No comprehensive flora species list was developed as part of the reconnaissance survey. Only broad-scale attributes were recorded to inform planning and identify potential environmentally significant values.

5.0 Results and Discussion

5.1 Desktop Assessment

The PMST identified a number of MNES that may occur, or for which suitable habitat may occur within the Project Area.

Results of the PMST search as requested on 26 November 2018 are summarised in Table 11.

The summarised results of the PMST and NatureMap searches of species sites with the potential to occur within the Project Area are summarised in Sections 5.1.1 to 5.1.3. Refer to **Appendix A** and **Appendix B** for the full PMST and NatureMap searches, respectively.

Table 11 Summary of PMST results

MNES	Number of occurrences
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Significance (Ramsar Sites)	One wetland of international significance Peel-yalgorup system (within 10 km)
Listed threatened species and ecological communities	Three threatened ecological communities Banksia Woodlands of the Swan Coastal Plain ecological community Clay Pans of the Swan Coastal Plain Subtropical and temperate Coastal Saltmarsh 50 listed threatened species made up of 18 listed fauna species 38 listed flora species
Migratory Species	35 migratory species
Commonwealth Marine Areas	None

5.1.1 Threatened and Priority Ecological Communities

Three TECs listed under the EPBC Act were identified in the desktop study. These include the Banksia Woodlands of the Swan Coastal Plan ecological community, Clay Pans of the Swan Coastal Plain and Subtropical and temperate Coastal Saltmarsh. These TECs are also listed as PECs by the DBCA (see Table 12).

A review of habitat and spatial data identified one TEC that is '*known to occur*' and two TEC's '*may occur*'. The Banksia Woodlands of the Swan Coastal Plain (EPBC Endangered, DBCA P3) is known to occur from remnant native vegetation adjacent to the Project Area.

The mapping of the Banksia Woodland TEC is based on the Commonwealth's 'likely to occur' areas and represents the mapped broad-scale vegetation units most likely to contain the described ecological community. Therefore, the mapping represents the indicative present distribution of the Banksia Woodlands ecological community. Ground-truthing is required to verify if a particular site meets the required diagnostic characteristics and minimum condition thresholds and size to be the described TEC.

Table 12 Threatened ecological communities identified in the desktop assessment

Community Name	EPBC	DBCAs	Description	Likelihood of Occurrence
Banksia Woodlands of the Swan Coastal Plain ecological community	E	P3	Canopy is most commonly dominated or co-dominated by <i>Banksia attenuata</i> and/or <i>B. menziesii</i> . Other Banksia species that can dominate in the community are <i>B. prionotes</i> or <i>B. ilicifolia</i> . It typically occurs on well drained, low nutrient soils on sandplain landforms (DBCAs 2017).	Known to occur
Clay Pans of the Swan Coastal Plain	CE	P1	The Clay Pans of the Swan Coastal Plain ecological community occurs where clay soils form an impermeable layer close to the landscape surface, and wetlands form that rely solely on rainfall to fill and then dry to impervious pans in summer. The ecological community generally occurs as a shrubland (less commonly as a low, open woodland) over a ground layer of geophytes, herbs and sedges which are characteristic of the wetter parts of the sites. There are no dominant species which characterise the entire ecological community. The ecological community, however, shows similar landform and vegetation structural features across its range	Unlikely to occur
Subtropical and Temperate Coastal Saltmarsh	V	P3	The Coastal Saltmarsh ecological community consists mainly of salt-tolerant vegetation (halophytes) including: grasses, herbs, sedges, rushes and shrubs. Succulent herbs, shrubs and grasses generally dominate and vegetation is generally of less than 0.5 m height (with the exception of some reeds and sedges). Many species of non-vascular plants are also found in saltmarsh, including epiphytic algae, diatoms and cyanobacterial mats.	Unlikely to occur
Southern <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands (FCT25)		P3	Occurs on deeper soils of the Swan Coastal Plain south of Woodmans Point.	Likely to occur
Low lying <i>Banksia attenuata</i> woodlands or shrublands (FCT21c)	E	P3	Occurs between Gingin and Bunbury, restricted to Bassendean systems where it occupies low lying wetter sites and is dominated by <i>Melaleuca preissiana</i> , <i>Banksia attenuata</i> , <i>B. menziesii</i> , <i>Regelia ciliata</i> , <i>Eucalyptus marginata</i> or <i>Corymbia calophylla</i> either singly or in combination.	Unlikely to occur
Shrublands and woodlands on Muchea Limestone	E	E	Occurs on heavy soils of the eastern side of the SCP and includes wetlands and well-drained habitats. It is defined on the basis of rare limestone-influenced substrates.	Unlikely to occur

5.1.2 Conservation Significant Flora

A total of 28 Threatened and Priority flora species were identified from the database search as potentially occurring within the Project Area. These include, 15 species are listed as Priority Flora. The remaining 13 species are listed under the WC Act, of which 11 are also listed as Threatened under the EPBC Act.

A review of habitat and spatial data identified that 21 of the species are considered 'likely to occur' or 'may occur' within the Project Area. This includes 9 Priority Flora and 12 EPBC Act and WC Act listed species. The likelihood of occurrence of flora species was determined by assessing the likely presence of suitable habitat in the Project Area and reviewing the recent records of the species in the area. Details of species considered likely to occur within the Project Area are below in Table 13.

Table 13 Significant flora species that may or are likely to occur in the Project Area

Taxon	WC / DBCA	EPBC Act	Habitat	Likelihood
<i>Acacia flagelliformis</i>	P4		Sandy soils. Winter-wet areas.	Likely to occur
<i>Acacia semitrullata</i>	P4		White/grey sand, sometimes over laterite, clay. Sandplains, swampy areas.	Likely to occur
<i>Andersonia gracilis</i>	VU	EN	White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.	May occur
<i>Austrostipa bronwenae</i>	EN		Calcareous, winter-wet grey-brown sandy-loam or dark brown loam over clay.	Likely to occur
<i>Boronia juncea subsp. juncea</i>	P1		Sand. Low scrub.	Unlikely to occur
<i>Caladenia huegelii</i>	CR	EN	Grey or brown sand, clay loam.	May occur
<i>Caladenia procera</i>	CR	CR	Alluvial loamy flats, jarrah/marri/peppermint woodland, dense heath, sedges.	Likely to occur
<i>Caladenia speciosa</i>	P4		White, grey or black sand.	Unlikely to occur
<i>Carex tereticaulis</i>	P3		Black peaty sand.	Unlikely to occur
<i>Chamaescilla gibsonii</i>	P3		Winter-wet flats, shallow water-filled claypans.	Likely to occur
<i>Cyathochaeta teretifolia</i>	P3		Grey sand, sandy clay. Swamps, creek edges.	Likely to occur
<i>Dillwynia dillwynioides</i>	P3		Sandy soils. Winter-wet depressions.	Likely to occur
<i>Diuris drummondii</i>	VU	VU	Low-lying depressions, swamps.	May occur
<i>Diuris micrantha</i>	VU	VU	Winter-wet swamps, in shallow water.	May occur
<i>Diuris purdiei</i>	EN	EN	Grey-black sand, moist. Winter-wet swamps.	May occur
<i>Drakaea elastica</i>	CR	EN	White or grey sand. Low-lying situations adjoining winter-wet swamps.	May occur
<i>Drakaea micrantha</i>	EN	VU	White-grey sand.	May occur
<i>Eleocharis keigheryi</i>	VU	VU	Clay, sandy loam. Emergent in freshwater: creeks, claypans.	May occur
<i>Eucalyptus rudis subsp. Cratyantha</i>	P4		Loam. Flats, hillsides.	May occur

Taxon	WC / DBCA	EPBC Act	Habitat	Likelihood
<i>Lasiopetalum membranaceum</i>	P3		Sand over limestone.	Unlikely to occur
<i>Pterostylis frenchii</i>	P2		Calcareous sand with limestone, laterite. Flatlands and gentle slopes.	Unlikely to occur
<i>Puccinellia vassica</i>	P1		Saline soils. On the outer margins of coastal saltmarshes.	Unlikely to occur
<i>Pultenaea skinneri</i>	P4		Sandy or clayey soils. Winter-wet depressions.	Likely to occur
<i>Synaphea</i> sp. Fairbridge Farm (D. Papenfus 696)	CR	CR	Sandy with lateritic pebbles. Near winter-wet flats, in low woodland with weedy grasses.	Unlikely to occur
<i>Synaphea</i> sp. Serpentine (G.R. Brand 103)	CR		Grey-brown sandy loams or clay in seasonally wet areas.	May occur
<i>Synaphea stenoloba</i>	CR	EN	Sandy or sandy clay soils. Winter-wet flats, granite.	May occur
<i>Tripterococcus</i> sp. <i>Brachylobus</i> (A.S. George 14234)	P4		Winter-wet areas in shrubland or heath.	Likely to occur
<i>Verticordia attenuata</i>	P3		White or grey sand. Winter-wet depressions.	Likely to occur

5.1.3 Conservation Significant Fauna

The desktop fauna assessment identified 26 conservation significant fauna species that could potentially occur within the Project Area. The likelihood of occurrence of fauna species was determined by assessing the likely presence of suitable habitat in the Project Area and reviewing the distribution of the species. This assessment determined that:

- two species are 'likely to occur'
- 12 species 'may occur'
- 12 species are 'unlikely to occur'.

The 14 species considered as 'likely to occur' or 'may occur' in the Project Area include three mammal, eight bird, two fish and one invertebrate species. Refer to Table 14 for further information on these 14 species, and Appendix A for further information on all 26 species. The conservation significant categories as defined by DBCA, the WC Act and the EPBC Act are defined in Section 2.0.

Table 14 Conservation Significant Fauna Species that May or are Likely to Occur in the Project Area

Scientific Name	Common Name	Cons. Status		Ecology
		State	Comm.	
<i>Apus pacificus</i>	Fork-tailed Swift	IA	Migratory	The Fork-tailed Swift is a medium-sized Swift, with a slim body with long scythe-shaped wings that taper to finely pointed tips. It is characterised by a long and deeply forked tail. It is almost exclusively aerial, and a non-breeding visitor to Australia (DotEE, 2018). They mostly occur over inland plains over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh but sometimes above foothills or in coastal areas (DotEE, 2018).
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	E	The Australasian Bittern is a large thick-necked bird, growing to a length of 66 to 76 cm (Marchant & Higgins, 1990). In Western Australia the species was formerly widespread in the south-west however is now thought to only occur on the western coastal plain, southern coastal region and inland on some wetlands in the Jarrah forests (DotEE, 2018). The Australasian Bittern's preferred habitat is comprised of wetlands with tall dense vegetation, where it forages in still shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water (Marchant & Higgins, 1990).
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	IA	Migratory	The Sharp-tailed Sandpiper is a small to medium sized wader with a length of 17 to 22 cm and weighing 65g. They are widespread in Western Australia from the Pilbara region to the south-west. They prefer muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DotEE, 2018).
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black-Cockatoo	VU	V	Forest Red-tailed Black Cockatoo is 55-60 cm in length, and are mostly glossy black with a pair of black central tail feathers, a crest, robust bill and bright red, orange or yellow barring in the tail (Higgins, 1999). Requires tree hollows to nest and breed, occurs in forests of Karri (<i>Eucalyptus diversicolor</i>), Jarrah (<i>Eucalyptus marginata</i>) and Marri (<i>Corymbia calophylla</i>), with flocks moving out onto the Swan Coastal Plain in search of food from exotic trees such as White Cedar (Johnstone et al., 2010). Foraging habitat for the species consists of Jarrah and Marri woodlands and forest throughout its range.
<i>Calyptorhynchus baudinii</i>	Baudin's Cockatoo	EN	E	Baudin's Cockatoo is a large cockatoo that measures 50–57 cm in length, with a wingspan of approximately 110 cm. Mostly dull black in colour, with pale whitish margins on the feathers (Higgins, 1999). Habitat critical to the survival of this species includes forests of Karri (<i>Eucalyptus diversicolor</i>), Jarrah (<i>Eucalyptus marginata</i>) and Marri (<i>Corymbia calophylla</i>). Breeding has been recorded to the south-west of the area bounded by Leschenault, Collie and Albany (DSEWPac, 2012), with the most northerly record at Lowden (Johnstone & Storr, 1998).
<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	EN	E	Carnaby's Cockatoo is a white-tailed black cockatoo endemic to the south-west of Western Australia. It is a postnuptial nomad and typically moves west soon after breeding. The species nests in hollows in eucalypts, particularly Salmon Gum (<i>Eucalyptus salmonophloia</i>) and Wandoo (<i>E. Wandoo</i>), but nests have been found in other eucalypts including York Gum (<i>Eucalyptus loxophleba</i>), Flooded Gum (<i>Eucalyptus rudis</i>), Tuart (<i>Eucalyptus gomphocephala</i>) and Marri (<i>Corymbia calophylla</i>) (Johnstone et al., 2010). Diet consists of an array of Proteaceous and <i>Eucalyptus</i> species.

Scientific Name	Common Name	Cons. Status		Ecology
		State	Comm.	
<i>Dasyurus geoffroyi</i>	Chuditch	VU	V	At maturity the Chuditch is the size of a small domestic cat with white spotted brown pelage, large rounded ears, pointed muzzle, large dark eyes and non-hopping gait. Following European settlement the range of this species contracted dramatically, from much of the continent to a small area in the south west. It currently only occurs in areas dominated by sclerophyll forest or drier woodland, heath and mallee shrubland (Van Dyck & Strahan, 2008). The Chuditch requires adequate numbers of suitable den and refuge sites (horizontal hollow logs or earth burrows) and sufficient prey biomass (large invertebrates, reptiles and small mammals) to survive.
<i>Galaxiella nigrostriata</i>	Black-striped Dwarf Galaxias	EN	E	The Black-stripe Minnow, <i>Galaxiella nigrostriata</i> , is a small (maximum 48 mm TL), scaleless freshwater fish. It is characterised by two black longitudinal bands separated with a yellow/orange to red stripe. It is found in acidic ephemeral bodies of water in peat flats located in the south west corner of Western Australia. The major populations occur from Augusta to Albany with two disjunct populations discovered in the same peat flats near Bunbury and one north of Perth near Gingin (Morgan <i>et al.</i> , 1998). Generally prefer sandy soils, as it will burrow into the moist soil when ephemeral pools dry out.
<i>Geotria australis</i>	Pouched Lamprey	P3	-	The Pouched Lamprey are eel-like fishes with cartilaginous skeletons and lack true jaws. Adults spawn in the headwaters of freshwater rivers and streams, and when the larvae or ammocoetes hatch, they drift downstream and burrow into soft muddy sediments. After metamorphosis, young adults migrate downstream to estuaries and coastal waters, where they feed parasitically by rasping flesh from other fishes with their toothy tongues. They eventually cease feeding and migrate back to freshwater to breed.
<i>Isoodon fusciventer</i>	Quenda	P4	-	The Quenda or Southern Brown Bandicoot exists only in a fragmented distribution to its former range in southern south western and eastern Australia. It is found in forest, woodland, heath and shrub communities in these regions. Preferred habitat usually consists of a combination of sandy soils and dense heathy vegetation (Van Dyck & Strahan, 2008).
<i>Ixobrychus dubius</i>	Australian Little Bittern	P4	-	A small, secretive bittern, standing at between 25 cm to 35 cm, the Little Bittern forages among dense low swamp vegetation and on floating water plants. This species occurs in the south-west of Western Australia however it is very uncommon (Pizzey & Knight, 2007).
<i>Plegadis falcinellus</i>	Glossy Ibis	IA	Migratory	The Glossy Ibis is slightly smaller than other ibises, reaching 49-55 cm. It occupies well vegetated wetlands, wet pastures, floodwaters, brackish wetlands and mudflats. This species is a non-breeding visitor to south-west Western Australia (Pizzey & Knight, 2007).
<i>Pseudocheirus occidentalis</i>	Western Ringtail Possum	CR	V	This species is restricted to the south-west corner of Western Australia. Closer to the coast it is associated with Peppermint (<i>Agonis flexuosa</i>) forest and woodland and Tuart (<i>Eucalyptus gomphocephala</i>) with a peppermint mid-story. Further from the coast the species is found in Jarrah (<i>Eucalyptus marginata</i>), Wandoo (<i>Eucalyptus wandoo</i>) and Marri (<i>Corymbia calophylla</i>) forest (Van Dyck & Strahan, 2008).
<i>Westralunio carteri</i>	Carter's Freshwater Mussel	VU	V	This bivalve species is the only mussel species known to inhabit freshwater systems of south-west Western Australia (Klunzinger <i>et al.</i> , 2012). Occurs in greatest abundance in slower flowing waters with stable sediments that are soft enough for burrowing amongst woody debris and exposed tree roots.

5.2 Field Survey

5.2.1 Flora and Vegetation

No Threatened or Priority ecological communities were recorded during the field survey. The Banksia Woodlands TEC was verified as not being present within the Project Area. The occurrence of this TEC is restricted to the west side of the creek where aerial imagery shows Banksia Woodlands to occur.

The native vegetation within the Project Area is restricted to the southwest corner, represented as 'Riparian Vegetation' on Figure 4 and shown in Plate 1. Riparian vegetation extends for 1.76 ha. The vegetation comprises *Melaleuca raphiophylla* and *Eucalyptus rudis* over weedy grasses and herbs. The understorey is devoid of native species caused by weed displacement and increasing competition for resources. The remnant native vegetation is considered in 'Good' condition, with the remaining Project Area considered 'Completely Degraded' (185.28 ha) in accordance with the Keighery *et al.* (1994) vegetation condition scale.

Despite the poor condition of the remnant vegetation, it is still considered locally and regionally significant as it represents riparian vegetation. Riparian vegetation is essential for regulating and maintaining important functions and attributes of the freshwater system.

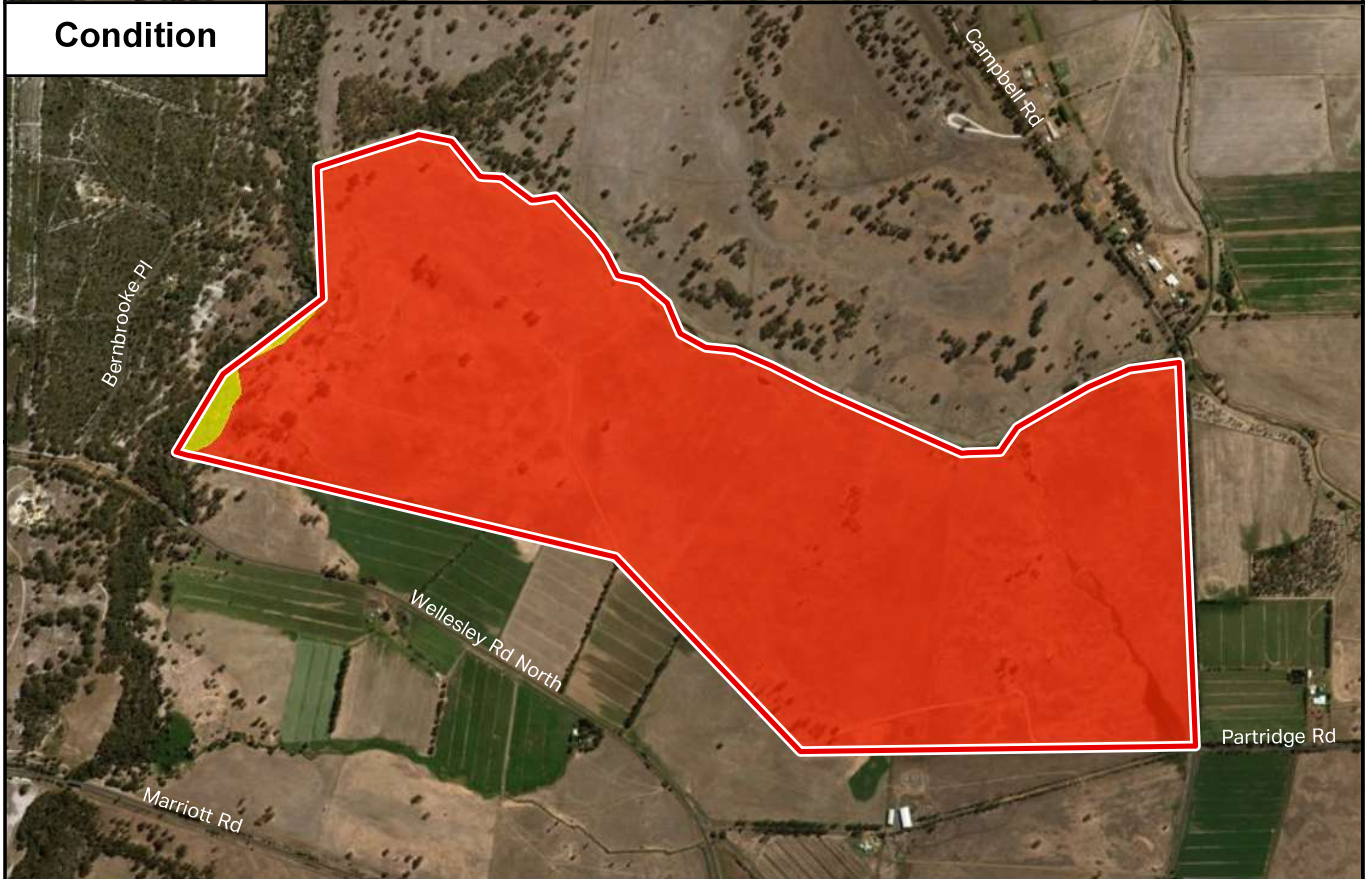
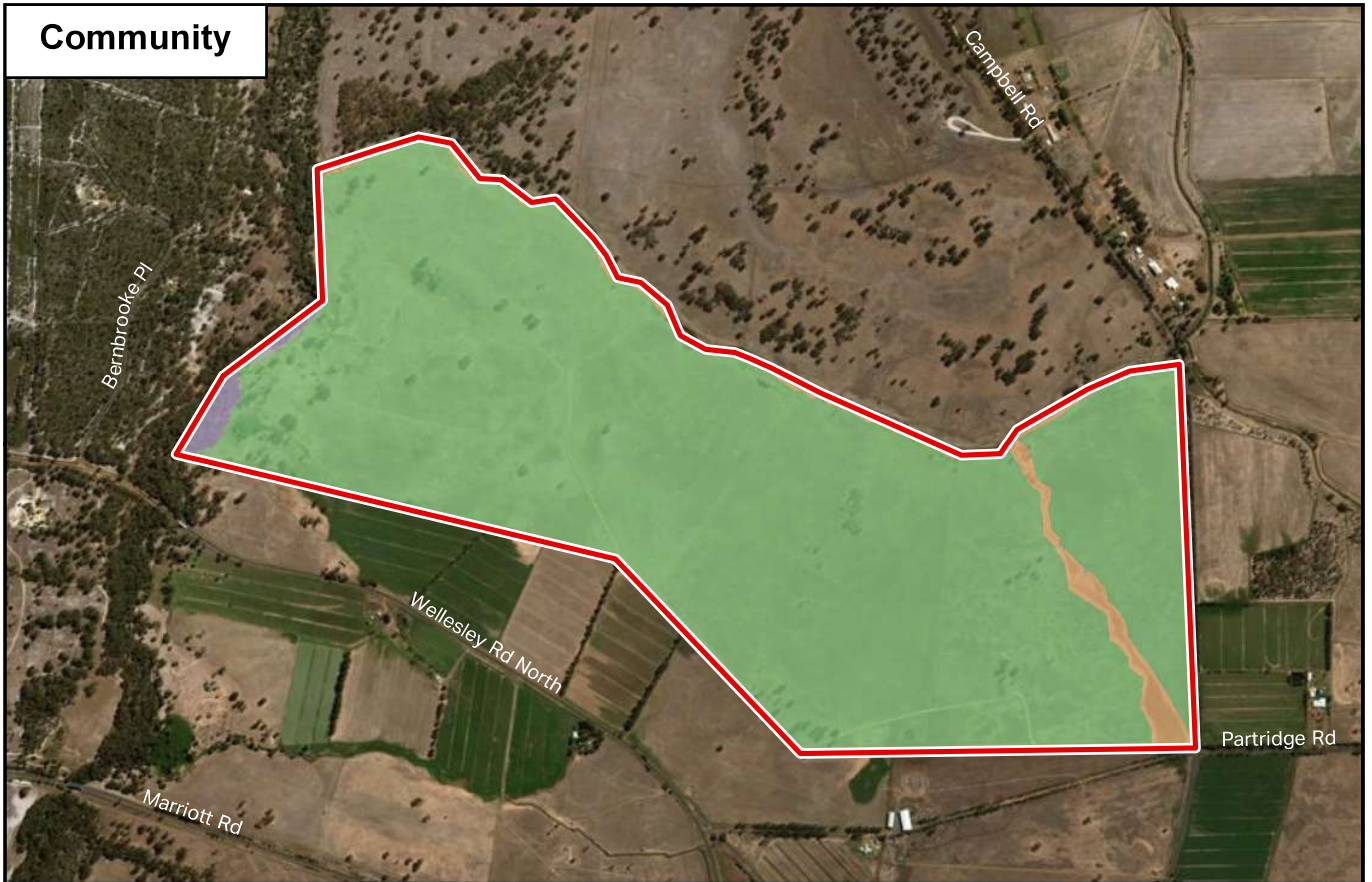
The remainder of the Project Area comprises 'Wetland' and 'Paddock'. The Wetland areas are recognised as entirely or partially inundated during winter and spring months. It includes a man-made drain that was inundated at the time of the survey, and waterlogged areas that had some scattered rushes (*Juncus sp.*).

The 'Paddock' consisted of remnant native trees over weeds.

One plant listed as a Declared Pest under the BAM Act was recorded. The river banks and riparian vegetation community was infested with *Zantedeschia aethiopica* Arum Lily which is classified under s22(2) and considered Exempt under the BAM Act. This listing does not include any management requirements.



Plate 1 Riparian Vegetation



<p>PROJECT ID 60590393 CREATED BY KW APPROVED BY C.Bennison LAST MODIFIED 01 FEB 2019</p> <p>AECOM www.aecom.com</p> <p>DATUM GDA 1994, PROJECTION MGA ZONE 50</p> <p>0 140 280 420 560 metres</p> <p>1:17,500 when printed at A4</p>	<p>LEGEND</p> <p> Project Area</p> <p>Community</p> <ul style="list-style-type: none"> Paddock Riparian Vegetation Wetland <p>Condition</p> <ul style="list-style-type: none"> Good Completely Degraded <p><small>Data sources: Sources: Esri, HERE, Garmin, USGS, Imagery, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NOAA, © OpenStreetMap contributors, and the GIS User Community</small></p>	<p>Vegetation Communities and Condition</p> <p>SOUTH ENERGY</p> <p>BENGER SOLAR FARM ENVIRONMENTAL CONSTRAINTS ASSESSMENT</p> <p style="text-align: right;">Figure 3</p>
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5.2.2 Fauna

5.2.2.1 Fauna Inventory

Twenty vertebrate fauna species were recorded during the field survey. This comprised 16 bird and four mammal species (refer to Table 15). Of the 20 fauna species observed, three species were of conservation significance. These comprised Carnaby's Cockatoo (*Calyptorhynchus latirostris*) listed as Endangered under the EPBC Act and WC Act, and the Tree Martin (*Petrochelidon nigricans*) and Magpie Lark (*Grallina cyanoleuca*) which are both listed as Marine under the EPBC Act. Species listed as Marine under the EPBC Act are only considered of conservation significance when recorded within Commonwealth Land. These two species will not be discussed further as the Project Area does not contain Commonwealth land. Refer to Section 4.2.2 for further information on Carnaby's Cockatoo.

Table 15 Fauna Species Recorded within the Project Area

Species	Common Name	Status	Observation
Birds			
<i>Anthochaera carunculata</i>	Red Wattlebird	Native	Observed within native vegetation towards western end of Project Area
<i>Barnardius zonarius semitorquatus</i>	Australian Ring-neck Parrot	Native	Observed within mature trees in paddock
<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	Native	Small flock of 3 or 4 birds heard in mature eucalypts adjacent western end of Project Area
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Native	Observed within native vegetation in paddock towards western end of Project Area
<i>Corvus coronoides</i>	Australian Raven	Native	Seen and heard flying north through the Project Area
<i>Cracticus torquatus</i>	Grey Butcherbird	Native	Observed on stag within vegetation in western end of Project Area
<i>Dacelo novaeguineae</i>	Australian Kookaburra	Naturalised	Heard in distance
<i>Egretta novaehollandiae</i>	White-faced Heron	Native	Two individuals observed on creek running past northern boundary of Project Area
<i>Falco cenchroides</i>	Australian Kestrel	Native	Observed flying above south eastern edge of Project Area
<i>Grallina cyanoleuca</i>	Magpie Lark	Native	Individual observed flying over paddock towards western end of Project Area
<i>Pardalotus striatus</i>	Striated Pardalote	Native	Heard along riverine habitat to the west of the Project Area
<i>Petrochelidon nigricans</i>	Tree Martin	Native	Large flock observed flying across wetland area to south-eastern edge of Project Area
<i>Purpureicephalus spurius</i>	Red-capped Parrot	Native	Probable foraging evidence observed beneath Marri trees in paddock (Plate 2)
<i>Rhipidura leucophrys</i>	Willie Wagtail	Native	Observed within native vegetation in paddock towards western end of Project Area
<i>Threskiornis molucca</i>	Australian White Ibis	Native	Large flock (>20) of Australian White Ibis and Straw-necked Ibis observed circling above Project Area
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	Native	Large flock (>20) of Australian White Ibis and Straw-necked Ibis observed circling above Project Area
Mammals			
<i>Bos taurus</i>	European Cattle	Introduced	Observed in paddocks
<i>Macropus fuliginosus</i>	Western Grey Kangaroo	Native	Four individuals observed hopping across paddock
<i>Sus scrofa</i>	Feral Pig	Introduced	A large individual and several areas of diggings observed in vegetation towards western end of Project Area
<i>Vulpes vulpes</i>	Red Fox	Introduced	Observed running through paddock towards western end of Project Area.



Plate 2 Probable Red-capped Parrot Foraging Evidence

Three introduced fauna species were recorded during the field survey. The species and their legal status under the BAM Act are listed below:

- Feral Pig (*Sus scrofa*) - Declared Pest – s22(2) (C3 Prohibited)
- European Cattle (*Bos taurus*) – Permitted s11
- Red Fox (*Vulpes vulpes*) - Declared Pest - s22(2) (C3 Exempt).

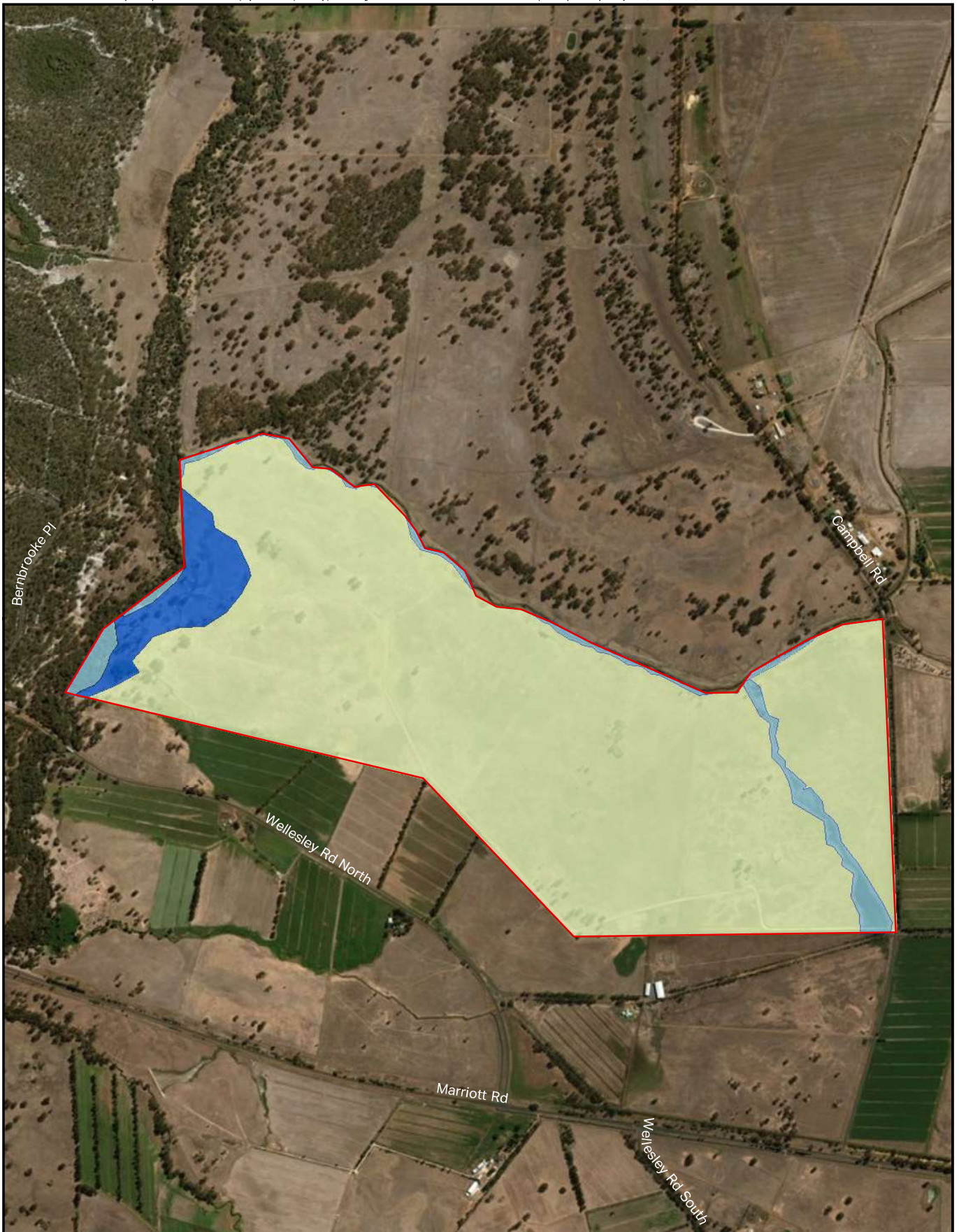
The Feral Pig and Red Fox are listed as Declared Pests under the BAM Act. Refer to Section 2.0 for explanations of BAM Act categories.

5.2.2.2 Fauna Habitats

Three broadly defined fauna habitats were mapped within the Project Area (refer to Figure 4). These comprise:


- Paddocks with Scattered Trees – 170.66 ha
- River, Drainage Lines and Riparian Vegetation – 7.41 ha
- Floodplain – 8.97 ha.


The Paddock with Scattered Trees fauna habitat occupies the largest area within the Project Area, and apart from the large mature eucalypts, is the poorest quality fauna habitat. Table 16 describes these three fauna habitats and discusses the conservation significant fauna species that may potentially utilise these habitats, or aspects of these habitats.



<p>PROJECT ID 60590393 CREATED BY KW APPROVED BY C.Bennison LAST MODIFIED 17 JAN 2019</p> <p>AECOM www.aecom.com</p> <p>DATUM GDA 1994, PROJECTION MGA ZONE 50</p> <p>0 125 250 375 500 metres</p> <p>1:15,000 when printed at A4</p>	<p>LEGEND</p> <ul style="list-style-type: none"> Project Area Fauna Habitat Floodplain Paddock with Scattered Trees River, Drainage Lines and Riparian Vegetation <p><small>Data sources: Sources: Esri, HERE, Garmin, USGS, Imagery, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NOAA, © OpenStreetMap contributors, and the GIS User Community</small></p>	<p>Fauna Habitat</p> <hr/> <p>SOUTH ENERGY</p> <p><i>BENGER SOLAR FARM ENVIRONMENTAL CONSTRAINTS ASSESSMENT</i></p> <p style="text-align: right;">Figure 4</p>
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Table 16 Broadscale Fauna Habitats of the Project Area

Fauna Habitat	Description	Conservation Significant Species Potentially Utilising Habitat	Photo
Paddock with Scattered Trees	<p>This habitat is predominantly cleared paddocks with scattered individual or clumps of large mature eucalypts (and other vegetation). It also contains the occasional soak / dam. The large eucalypts contain hollows and may provide significant fauna habitat. These trees would be classified as black cockatoo breeding and potential breeding trees (refer to Plate 3), and it is recommended that they are avoided where possible.</p> <p>Additional fauna surveys (Level 1 and targeted) are likely to be required if impacts to vegetation in the paddock are possible.</p>	<ul style="list-style-type: none"> • Carnaby's Cockatoo (<i>Calyptorhynchus latirostris</i>), Baudin's Cockatoo (<i>Calyptorhynchus baudinii</i>) and the Forest Red-tailed Black-Cockatoo (<i>Calyptorhynchus banksii naso</i>) may utilise the mature eucalypts within the paddock as foraging, roosting and / or breeding habitat • Mammals including the Western Ringtail Possum (<i>Pseudocheirus occidentalis</i>) may utilise the mature eucalypts within the paddocks • Waterbird species including the Glossy Ibis (<i>Plegadis falcinellus</i>) may utilise the grassy paddock habitat when wet • Fork-tailed Swift (<i>Apus pacificus</i>) may fly over this habitat. 	

Fauna Habitat	Description	Conservation Significant Species Potentially Utilising Habitat	Photo
<p>River, Drainage Lines and Riparian Vegetation</p>	<p>This fauna habitat contains the river and riverine habitat to the west of the Project Area, the creeks and riparian vegetation along the northern boundary and north-south towards the eastern side of the Project Area.</p> <p>The riverine habitat contains mature flooded gums and paperbarks, with a generally degraded understorey through weeds and feral animals (e.g. Feral Pigs). The river had a moderate flow, with exposed sediments and woody debris.</p> <p>The creeks and riparian vegetation are also degraded from access by European Cattle.</p> <p>Additional fauna surveys (Level 1 and targeted) are likely to be required if impacts to vegetation in this habitat are possible.</p>	<ul style="list-style-type: none"> • Carnaby's Cockatoo (<i>Calyptorhynchus latirostris</i>), Baudin's Cockatoo (<i>Calyptorhynchus baudinii</i>) and the Forest Red-tailed Black-Cockatoo (<i>Calyptorhynchus banksii naso</i>) may utilise the mature eucalypts and other native vegetation within the riverine habitat as foraging, roosting and / or breeding habitat • Waterbird species including Australasian Bittern (<i>Botaurus poiciloptilus</i>), Sharp-tailed Sandpiper (<i>Calidris acuminata</i>), Glossy Ibis (<i>Plegadis falcinellus</i>) may utilise aspects of this habitat • Mammals including the Chuditch (<i>Dasyurus geoffroii</i>), Quenda (<i>Isodon fusciventer</i>), Western Ringtail Possum (<i>Pseudocheirus occidentalis</i>) may utilise the riverine habitat • Carter's Freshwater Mussel (<i>Westralunio carteri</i>) and the Pouched Lamprey (<i>Geotria australis</i>) may utilise the rivers and creeks of this habitat • Fork-tailed Swift (<i>Apus pacificus</i>) may fly over this habitat. 	


Fauna Habitat	Description	Conservation Significant Species Potentially Utilising Habitat	Photo
Floodplain	<p>This habitat comprises a floodplain with scattered vegetation. It also contains the occasional degraded soak. It is likely to be waterlogged during the wetter months of the year.</p> <p>Additional fauna surveys (Level 1 and targeted) are likely to be required if impacts to vegetation in this habitat are possible.</p>	<ul style="list-style-type: none"> • Carnaby's Cockatoo (<i>Calyptorhynchus latirostris</i>), Baudin's Cockatoo (<i>Calyptorhynchus baudinii</i>) and the Forest Red-tailed Black-Cockatoo (<i>Calyptorhynchus banksii naso</i>) may utilise the mature eucalypts and other scattered native vegetation within this habitat as foraging, roosting and / or breeding habitat • Waterbird species including the Glossy Ibis (<i>Plegadis falcinellus</i>) may utilise this habitat when flooded • Fork-tailed Swift (<i>Apus pacificus</i>) may fly over this habitat. 	



Plate 3 Potential Black Cockatoo Breeding Trees in Paddock

6.0 Summary and Recommendations

6.1 Summary

AECOM was engaged by South Energy to undertake an ecological assessment of a proposed solar farm site on a 187 ha parcel of land in Benger. The Project Area is located approximately 140 km south of Perth, in the Shire of Harvey. This assessment identified:

- Three vegetation types were mapped, of which only the 'Riparian Vegetation' (1.67 ha) represents native vegetation.
- Twenty-six conservation significant fauna species that could potentially occur within the Project Area based on the desktop assessment. With two species that are 'likely to occur', 12 species that 'may occur' and 12 species that are 'unlikely to occur'. The 14 species considered as 'likely to occur' or 'may occur' in the Project Area include three mammal, eight bird, two fish and one invertebrate species
- Twenty vertebrate fauna species were recorded during the field survey. This comprised 16 bird and four mammal species. Of the 20 fauna species observed, three species were of conservation significance. These comprised Carnaby's Cockatoo (*Calyptorhynchus latirostris*) listed as Endangered under the EPBC Act and WC Act, and the Tree Martin (*Petrochelidon nigricans*) and Magpie Lark (*Grallina cyanoleuca*), which are both listed as Marine under the EPBC Act.
- Three introduced fauna species were recorded during the field survey. These included the Feral Pig (*Sus scrofa*), European Cattle (*Bos taurus*) and Red Fox (*Vulpes vulpes*). The Feral Pig and Red Fox are both listed as Declared Pests under the BAM Act.
- Three broadly defined fauna habitats were mapped within the Project Area. These comprise Paddocks with Scattered Trees; River, Drainage Lines and Riparian Vegetation; and Floodplain. The Paddock with Scattered Trees fauna habitat occupies the largest area within the Project Area, and apart from the large mature eucalypts, is the poorest quality fauna habitat.
- Aspects of all three fauna habitats may be utilised by conservation significant fauna species, particularly the large mature eucalypts which may potentially be utilised by Carnaby's Cockatoo (*Calyptorhynchus latirostris*), Baudin's Cockatoo (*Calyptorhynchus baudinii*), Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*), Western Ringtail Possum (*Pseudocheirus occidentalis*), with the river, drainage line and riparian vegetation potentially utilised by species including Australasian Bittern (*Botaurus poiciloptilus*), Sharp-tailed Sandpiper (*Calidris acuminata*), Glossy Ibis (*Plegadis falcinellus*), Chuditch (*Dasyurus geoffroyi*), Quenda (Isodon fusciventer), Carter's Freshwater Mussel (*Westralunio carteri*) and the Pouched Lamprey (*Geotria australis*).

6.2 Recommendations

In order to minimise impacts of the ecological values of the site, and to ensure the timely progression of approvals for the proposed solar farm, we provide the following recommendations:

- Avoid or minimise impacts to the native vegetation including the isolated trees in paddock and riparian vegetation.
- Potential impacts to native vegetation are likely to require a Level 1 fauna survey and targeted fauna surveys. The specific targeted fauna surveys required would be dependent on the habitat impacted (e.g. potential impacts to large mature eucalypts will require a targeted black cockatoo survey, and potentially a targeted Western Ringtail Possum (*Pseudocheirus occidentalis*) survey.
- Impacts for the EPBC referral relate to the large trees and these would have to be mapped one by one to determine whether they have hollows for Black Cockatoo species. If more than one of the 'habitat' trees is cleared it can trigger EPBC referral.
- The wetland areas do provide habitat for some species but disturbance of the floodplain is unlikely to trigger referral.

7.0 Reference

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Appendix A

EPBC - Protected
Matters Search Tool
Results



EPBC Act Protected Matters Report

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

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

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 26/11/18 11:12:04

[Summary](#)

[Details](#)

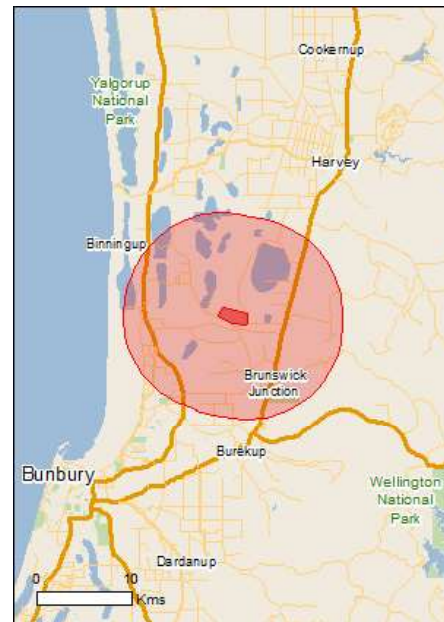
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	50
Listed Migratory Species:	35

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	37
Whales and Other Cetaceans:	4
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	6
Regional Forest Agreements:	1
Invasive Species:	29
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [\[Resource Information \]](#)

Name	Proximity
Peel-yalgorup system	Within 10km of Ramsar

Listed Threatened Ecological Communities [\[Resource Information \]](#)

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

Name	Status	Type of Presence
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

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

Name	Status	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Species or species habitat known to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Fish		
Galaxiella nigrostriata Blackstriped Dwarf Galaxias, Black-stripe Minnow [88677]	Endangered	Species or species habitat known to occur within area
Nannatherina balstoni Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat may occur within

Name	Status	Type of Presence area
Dasyurus geoffroi Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat may occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat known to occur within area
Setonix brachyurus Quokka [229]	Vulnerable	Species or species habitat likely to occur within area
Other		
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area
Plants		
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat likely to occur within area
Austrostipa bronwenae [87808]	Endangered	Species or species habitat known to occur within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat known to occur within area
Caladenia procera Carbunup King Spider Orchid [68679]	Critically Endangered	Species or species habitat known to occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat known to occur within area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat likely to occur within area
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat known to occur within area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat likely to occur within area
Synaphea sp. Fairbridge Farm (D. Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat likely to occur within area
Synaphea sp. Serpentine (G.R. Brand 103) [86879]	Critically Endangered	Species or species habitat may occur within area
Synaphea stenoloba Dwellingup Synaphea [66311]	Endangered	Species or species

Name	Status	Type of Presence habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Sharks		
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat likely to occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Species or species habitat likely to occur within area
Migratory Marine Species		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat likely to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species

Name	Threatened	Type of Presence
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	habitat likely to occur within area Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

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

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.

Name
Commonwealth Land -

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

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species

Name	Threatened	Type of Presence
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	habitat likely to occur within area Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Species or species habitat likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Species or species habitat likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Mammals

Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat may occur within area
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Reptiles

Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Whales and other Cetaceans

[[Resource Information](#)]

Name	Status	Type of Presence
Mammals		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Name	State
Benger Swamp	WA
Byrd Swamp	WA
Leschenault Peninsula	WA
NTWA Bushland covenant (0004)	WA
NTWA Bushland covenant (0095)	WA
Unnamed WA40564	WA

Regional Forest Agreements [\[Resource Information \]](#)

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	Western Australia

Invasive Species [\[Resource Information \]](#)

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

Name	Status	Type of Presence
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Birds

Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
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Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
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Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
--	--	--

Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
--	--	--

Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
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Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
--	--	--

Mammals

Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
--	--	--

Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
--	--	--

Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
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Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
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Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
--	--	--

Rattus rattus Black Rat, Ship Rat [84]		Species or species
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Name	Status	Type of Presence
Sus scrofa Pig [6]		habitat likely to occur within area Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus declinatus Bridal Veil, Bridal Veil Creeper, Pale Berry Asparagus Fern, Asparagus Fern, South African Creeper [66908]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area

Nationally Important Wetlands

[Resource Information]

Name

State

[Benger Swamp](#)

WA

Caveat

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

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

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

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

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

Where very little information is available for 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 reliable distribution mapping methods are used to update these distributions as time permits.

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-33.210886 115.813801,-33.210886 115.813715,-33.209449 115.800412,-33.204566 115.786679,-33.197599 115.790112,-33.20198 115.81363,-33.210886 115.813801

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.

Appendix B

NatureMap Search Results

NatureMap Species Report

Created By Guest user on 26/11/2018

Current Names Only Yes
 Core Datasets Only Yes
 Method 'By Circle'
 Centre 115° 48' 04" E, 33° 12' 13" S
 Buffer 10km
 Group By Conservation Status

Conservation Status	Species	Records
Non-conservation taxon	600	4496
Other specially protected fauna	2	6
Priority 1	2	9
Priority 2	1	1
Priority 3	7	18
Priority 4	11	56
Protected under international agreement	11	52
Rare or likely to become extinct	18	179
TOTAL	652	4817

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Rare or likely to become extinct				
1.	38480 <i>Austrostipa bronwenae</i>		T	
2.	24345 <i>Botaurus poiciloptilus</i> (Australasian Bittern)		T	
3.	1596 <i>Caladenia huegelii</i> (Grand Spider Orchid)		T	
4.	18038 <i>Caladenia procera</i>		T	
5.	24731 <i>Calyptorhynchus banksii</i> subsp. <i>naso</i> (Forest Red-tailed Black Cockatoo)		T	
6.	24733 <i>Calyptorhynchus baudinii</i> (Baudin's Cockatoo, White-tailed Long-billed Black Cockatoo)		T	
7.	24734 <i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)		T	
8.	48400 <i>Calyptorhynchus</i> sp. (white-tailed black cockatoo)		T	
9.	24092 <i>Dasyurus geoffroyi</i> (Chuditch, Western Quoll)		T	
10.	10796 <i>Diuris drummondii</i> (Tall Donkey Orchid)		T	
11.	12938 <i>Diuris micrantha</i>		T	
12.	1639 <i>Drakaea elastica</i> (Glossy-leaved Hammer Orchid)		T	
13.	13635 <i>Drakaea micrantha</i>		T	
14.	34027 <i>Galaxiella nigrostriata</i> (Black-stripe Minnow, black-striped dwarf galaxias)		T	
15.	24146 <i>Myrmecobius fasciatus</i> (Numbat, Walpurti)		T	
16.	24798 <i>Numenius madagascariensis</i> (Eastern Curlew)		T	
17.	24166 <i>Pseudocheirus occidentalis</i> (Western Ringtail Possum, ngwayir)		T	
18.	34113 <i>Westralunio carteri</i> (Carter's Freshwater Mussel)		T	
Protected under international agreement				
19.	41323 <i>Actitis hypoleucos</i> (Common Sandpiper)		IA	
20.	24779 <i>Calidris acuminata</i> (Sharp-tailed Sandpiper)		IA	
21.	24481 <i>Glareola maldivarum</i> (Oriental Pratincole)		IA	
22.	48587 <i>Hydroprogne caspia</i> (Caspian Tern)		IA	
23.	48591 <i>Pandion cristatus</i> (Osprey, Eastern Osprey)		IA	
24.	24843 <i>Plegadis falcinellus</i> (Glossy Ibis)		IA	
25.	24382 <i>Pluvialis fulva</i> (Pacific Golden Plover)		IA	
26.	24383 <i>Pluvialis squatarola</i> (Grey Plover)		IA	
27.	48597 <i>Thalasseus bergii</i> (Crested Tern)		IA	
28.	24806 <i>Tringa glareola</i> (Wood Sandpiper)		IA	
29.	24808 <i>Tringa nebularia</i> (Common Greenshank, greenshank)		IA	
Other specially protected fauna				
30.	25624 <i>Falco peregrinus</i> (Peregrine Falcon)		S	
31.	48070 <i>Phascogale tapoatafa</i> subsp. <i>wambenger</i> (South-western Brush-tailed Phascogale, Wambenger)		S	
Priority 1				
32.	16633 <i>Boronia juncea</i> subsp. <i>juncea</i>		P1	

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
33.	31673 <i>Puccinellia vassica</i>		P1	
Priority 2				
34.	31731 <i>Pterostylis frenchii</i>		P2	
Priority 3				
35.	759 <i>Carex tereticaulis</i>		P3	
36.	19338 <i>Chamaescilla gibsonii</i>		P3	
37.	16245 <i>Cyathochaeta teretifolia</i>		P3	
38.	3863 <i>Dillwynia dillwynioides</i>		P3	
39.	5038 <i>Lasiopetalum membranaceum</i>		P3	
40.	25147 <i>Lerista lineata</i> (Perth Slider, Lined Skink)		P3	
41.	12392 <i>Verticordia attenuata</i>		P3	
Priority 4				
42.	3339 <i>Acacia flagelliformis</i>		P4	
43.	3537 <i>Acacia semitrullata</i>		P4	
44.	13862 <i>Caladenia speciosa</i>		P4	
45.	13512 <i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>		P4	
46.	24189 <i>Falsistrellus mackenziei</i> (Western False Pipistrelle, Western Falsistrelle)		P4	
47.	24215 <i>Hydromys chrysogaster</i> (Water-rat, Rakali)		P4	
48.	48588 <i>Isoodon fusciventer</i> (Quenda, southwestern brown bandicoot)		P4	
49.	47975 <i>Ixobrychus dubius</i> (Australian Little Bittern)		P4	
50.	24328 <i>Oxyura australis</i> (Blue-billed Duck)		P4	
51.	4183 <i>Pultenaea skinneri</i> (Skinner's Pea)		P4	
52.	44444 <i>Tripterococcus</i> sp. <i>Brachylobus</i> (A.S. George 14234)		P4	
Non-conservation taxon				
53.	3374 <i>Acacia huegelii</i>			
54.	3410 <i>Acacia lateriticola</i>			
55.	3502 <i>Acacia pulchella</i> (Prickly Moses)			
56.	15481 <i>Acacia pulchella</i> var. <i>glaberrima</i>			
57.	15483 <i>Acacia pulchella</i> var. <i>pulchella</i>			
58.	30032 <i>Acacia saligna</i> subsp. <i>saligna</i>			
59.	30036 <i>Acacia saligna</i> subsp. <i>stolonifera</i>			
60.	3557 <i>Acacia stenoptera</i> (Narrow Winged Wattle)			
61.	3602 <i>Acacia willdenowiana</i> (Grass Wattle)			
62.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
63.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
64.	24262 <i>Acanthiza inornata</i> (Western Thornbill)			
65.	24560 <i>Acanthorhynchus superciliosus</i> (Western Spinebill)			
66.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
67.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
68.	42368 <i>Acritoscincus trilineatus</i> (Western Three-lined Skink)			
69.	25755 <i>Acrocephalus australis</i> (Australian Reed Warbler)			
70.	1790 <i>Adenanthos meisneri</i>			
71.	1791 <i>Adenanthos obovatus</i> (Basket Flower)			
72.	25544 <i>Aegotheles cristatus</i> (Australian Owlet-nightjar)			
73.	<i>Aganippe raphiduca</i>			
74.	5316 <i>Agonis flexuosa</i> (Peppermint, Wonil)			
75.	17202 <i>Agonis flexuosa</i> var. <i>flexuosa</i>			
76.	184 <i>Aira caryophyllea</i> (Silvery Hairgrass)	Y		
77.	2652 <i>Alternanthera nodiflora</i> (Common Joyweed)			
78.	13380 <i>Amphibromus nervosus</i>			
79.	<i>Aname mainae</i>			
80.	<i>Aname tepperi</i>			
81.	24310 <i>Anas castanea</i> (Chestnut Teal)			
82.	24312 <i>Anas gracilis</i> (Grey Teal)			
83.	24315 <i>Anas rhynchotis</i> (Australasian Shoveler)			
84.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
85.	6300 <i>Andersonia aristata</i> (Rice Flower)			
86.	47414 <i>Anhinga novaehollandiae</i> (Australasian Darter)			
87.	1409 <i>Anigozanthos humilis</i> (Catspaw)			
88.	1411 <i>Anigozanthos manglesii</i> (Mangles Kangaroo Paw, Kurulbrang)			
89.	17455 <i>Anredera cordifolia</i>	Y		
90.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
91.	12724 <i>Anthotium junciforme</i>			
92.	25670 <i>Anthus australis</i> (Australian Pipit)			
93.	3688 <i>Aotus gracillima</i>			
94.	1118 <i>Aphelia drummondii</i>			
95.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
96.	<i>Araneus senicaudatus</i> subsp. <i>simplex</i>			Y

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
97.	41324 <i>Ardea modesta</i> (great egret, white egret)			
98.	24340 <i>Ardea novaehollandiae</i> (White-faced Heron)			
99.	24341 <i>Ardea pacifica</i> (White-necked Heron)			
100.	<i>Argiope protensa</i>			
101.	<i>Argiope trifasciata</i>			
102.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
103.	24353 <i>Artamus cyanopterus</i> (Dusky Woodswallow)			
104.	20283 <i>Astartea scoparia</i> (Common Astartea)			
105.	42801 <i>Astartea zephyra</i>			
106.	7851 <i>Asteridea pulverulenta</i> (Common Bristle Daisy)			
107.	6323 <i>Astroloma ciliatum</i> (Candle Cranberry)			
108.	6334 <i>Astroloma pallidum</i> (Kick Bush)			
109.	2462 <i>Atriplex hypoleuca</i>			
110.	17233 <i>Austrostipa campylachne</i>			
111.	17237 <i>Austrostipa elegantissima</i>			
112.	17240 <i>Austrostipa flavescens</i>			
113.	20013 <i>Axonopus fissifolius</i>	Y		
114.	24318 <i>Aythya australis</i> (Hardhead)			
115.	42902 <i>Azolla rubra</i>			
116.	18279 <i>Babiana angustifolia</i>	Y		
117.	1800 <i>Banksia attenuata</i> (Slender Banksia, Piara)			
118.	1819 <i>Banksia grandis</i> (Bull Banksia, Pulgarla)			
119.	1822 <i>Banksia ilicifolia</i> (Holly-leaved Banksia)			
120.	<i>Barnardius zonarius</i>			
121.	3165 <i>Billardiera varifolia</i>			
122.	24319 <i>Biziura lobata</i> (Musk Duck)			
123.	749 <i>Bolboschoenus caldwellii</i> (Marsh Club-rush)			
124.	4420 <i>Boronia fastigiata</i> (Bushy Boronia)			
125.	4438 <i>Boronia ramosa</i>			
126.	14397 <i>Bossiaea aquifolium</i> subsp. <i>laidlawiana</i>			
127.	3710 <i>Bossiaea eriocarpa</i> (Common Brown Pea)			
128.	18497 <i>Bossiaea</i> sp. Waroona (B.J. Keighery & N. Gibson 229)			
129.	6341 <i>Brachyloma preissii</i> (Globe Heath)			
130.	11187 <i>Brassica barrelieri</i> subsp. <i>oxyrrhina</i> (Smooth-stem Turnip)	Y		
131.	32327 <i>Breutelia affinis</i>			
132.	244 <i>Briza maxima</i> (Blowfly Grass)	Y		
133.	245 <i>Briza minor</i> (Shivery Grass)	Y		
134.	248 <i>Bromus catharticus</i> (Prairie Grass)	Y		
135.	249 <i>Bromus diandrus</i> (Great Brome)	Y		
136.	12770 <i>Burchardia congesta</i>			
137.	25716 <i>Cacatua sanguinea</i> (Little Corella)			
138.	25598 <i>Cacomantis flabelliformis</i> (Fan-tailed Cuckoo)			
139.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
140.	1276 <i>Caesia micrantha</i> (Pale Grass Lily)			
141.	1592 <i>Caladenia flava</i> (Cowslip Orchid)			
142.	15348 <i>Caladenia flava</i> subsp. <i>flava</i>			
143.	15352 <i>Caladenia georgei</i>			
144.	1599 <i>Caladenia latifolia</i> (Pink Fairy Orchid)			
145.	15371 <i>Caladenia nana</i> subsp. <i>nana</i>			
146.	17760 <i>Caladenia nobilis</i>			
147.	2845 <i>Calandrinia brevipedata</i> (Short-stalked Purslane)			
148.	19309 <i>Calectasia narragara</i>			
149.	34942 <i>Callitriche brutia</i> subsp. <i>brutia</i>	Y		
150.	25717 <i>Calyptorhynchus banksii</i> (Red-tailed Black-Cockatoo)			
151.	5460 <i>Calytrix fraseri</i> (Pink Summer Calytrix)			
152.	1162 <i>Cartonema philydroides</i>			
153.	2957 <i>Cassytha racemosa</i> (Dodder Laurel)			
154.	11799 <i>Cassytha racemosa</i> forma <i>racemosa</i>			
155.	1121 <i>Centrolepis aristata</i> (Pointed Centrolepis)			
156.	1129 <i>Centrolepis glabra</i> (Smooth Centrolepis)			
157.	13489 <i>Cerastium pumilum</i>	Y		
158.	<i>Ceratopogonidae</i> sp.			
159.	24086 <i>Cercartetus concinnus</i> (Western Pygmy-possum, Mundarda)			
160.	24186 <i>Chalinolobus gouldii</i> (Gould's Wattle Bat)			
161.	1280 <i>Chamaescilla corymbosa</i> (Blue Squill)			
162.	24377 <i>Charadrius ruficapillus</i> (Red-capped Plover)			
163.	43380 <i>Chelodina collicii</i> (South-western Snake-necked Turtle)			
164.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
165.	<i>Chironominae</i> sp.			
166.	3761 <i>Chorizema rhombeum</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
167.	24980 <i>Christinus marmoratus</i> (Marbled Gecko)			
168.	<i>Chroicocephalus novaehollandiae</i>			
169.	25601 <i>Chrysococcyx lucidus</i> (Shining Bronze Cuckoo)			
170.	27662 <i>Chrysothrix candelaris</i>			
171.	24288 <i>Circus approximans</i> (Swamp Harrier)			
172.	27691 <i>Cladonia ramulosa</i>			
173.	24774 <i>Cladorhynchus leucocephalus</i> (Banded Stilt)			
174.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
175.	4559 <i>Comesperma polygaloides</i> (Small Milkwort)			
176.	4564 <i>Comesperma virgatum</i> (Milkwort)			
177.	6348 <i>Conostephium pendulum</i> (Pearl Flower)			
178.	6349 <i>Conostephium preissii</i>			
179.	1418 <i>Conostylis aculeata</i> (Prickly Conostylis)			
180.	11826 <i>Conostylis aculeata</i> subsp. <i>aculeata</i>			
181.	1436 <i>Conostylis juncea</i>			
182.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
183.	<i>Corixidae</i> sp.			
184.	48259 <i>Cortaderia selloana</i> subsp. <i>selloana</i>	Y		
185.	25592 <i>Corvus coronoides</i> (Australian Raven)			
186.	24417 <i>Corvus coronoides</i> subsp. <i>perplexus</i> (Australian Raven)			
187.	17104 <i>Corymbia calophylla</i> (Marri)			
188.	1285 <i>Corynotheca micrantha</i> (Sand Lily)			
189.	7945 <i>Cotula coronopifolia</i> (Waterbuttons)	Y		
190.	7947 <i>Cotula turbinata</i> (Funnel Weed)	Y		
191.	24671 <i>Coturnix pectoralis</i> (Stubble Quail)			
192.	25701 <i>Coturnix ypsilophora</i> (Brown Quail)			
193.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
194.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
195.	3137 <i>Crassula colorata</i> (Dense Stonecrop)			
196.	15706 <i>Crassula natans</i> var. <i>minus</i>	Y		
197.	25398 <i>Crinia georgiana</i> (Quacking Frog)			
198.	25399 <i>Crinia glauerti</i> (Clicking Frog)			
199.	25400 <i>Crinia insignifera</i> (Squelching Froglet)			
200.	17964 <i>Crinum moorei</i>	Y		
201.	13484 <i>Cryptandra arbutiflora</i> var. <i>tubulosa</i>			
202.	4802 <i>Cryptandra mutila</i>			
203.	30893 <i>Cryptoblepharus buchananii</i>			
204.	25047 <i>Ctenotus impar</i>			
205.	25049 <i>Ctenotus labillardieri</i>			
206.	6663 <i>Cuscuta epithymum</i> (Lesser Dodder, Greater Dodder)	Y		
207.	24322 <i>Cygnus atratus</i> (Black Swan)			
208.	783 <i>Cyperus congestus</i> (Dense Flat-sedge)	Y		
209.	792 <i>Cyperus eragrostis</i> (Umbrella Sedge)	Y		
210.	806 <i>Cyperus polystachyos</i> (Bunchy Sedge)			
211.	30901 <i>Dacelo novaeguineae</i> (Laughing Kookaburra)	Y		
212.	7454 <i>Dampiera linearis</i> (Common Dampiera)			
213.	7484 <i>Dampiera trigona</i> (Angled-stem Dampiera)			
214.	25673 <i>Daphoenositta chrysoptera</i> (Varied Sittella)			
215.	5508 <i>Darwinia citriodora</i> (Lemon-scented Darwinia)			
216.	1218 <i>Dasypogon bromeliifolius</i> (Pineapple Bush)			
217.	6218 <i>Daucus glochidiatus</i> (Australian Carrot)			
218.	3807 <i>Daviesia divaricata</i> (Mamo)			
219.	306 <i>Dichelachne crinita</i> (Longhair Plumegrass)			
220.	19649 <i>Disa bracteata</i>	Y		
221.	11049 <i>Diuris corymbosa</i>			
222.	48254 <i>Diuris cruenta</i>			
223.	48253 <i>Diuris porphyrochila</i>			
224.	11156 <i>Drakaea livida</i>			
225.	24470 <i>Dromaius novaehollandiae</i> (Emu)			
226.	48724 <i>Drosera collina</i>			
227.	3095 <i>Drosera erythrorhiza</i> (Red Ink Sundew)			
228.	3102 <i>Drosera huegelii</i> (Bold Sundew)			
229.	14298 <i>Drosera macrantha</i> subsp. <i>macrantha</i>			
230.	3108 <i>Drosera marchantii</i>			
231.	13209 <i>Drosera marchantii</i> subsp. <i>marchantii</i>			
232.	3112 <i>Drosera myriantha</i> (Star Rainbow)			
233.	3118 <i>Drosera pallida</i> (Pale Rainbow)			
234.	3131 <i>Drosera stolonifera</i> (Leafy Sundew)			
235.	<i>Dytiscidae</i> sp.			
236.	11105 <i>Echinochloa crus-galli</i>	Y		

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237.	332 <i>Echinochloa frumentacea</i> (Siberian Millet)	Y		
238.	338 <i>Echinochloa teimtophila</i> (Swamp Barnyard Grass)	Y		
239.	25100 <i>Egernia napoleonis</i>			
240.	<i>Egretta garzetta</i>			
241.	<i>Egretta novaehollandiae</i>			
242.	347 <i>Ehrharta calycina</i> (Perennial Veldt Grass)	Y		
243.	<i>Elanus axillaris</i>			
244.	25250 <i>Elapognathus coronatus</i> (Crowned Snake)			
245.	47937 <i>Elsayornis melanops</i> (Black-fronted Dotterel)			
246.	1643 <i>Elythranthera brunonis</i> (Purple Enamel Orchid)			
247.	1644 <i>Elythranthera emarginata</i> (Pink Enamel Orchid)			
248.	<i>Eolophus roseicapillus</i>			
249.	6133 <i>Epilobium hirtigerum</i> (Hairy Willow Herb)			
250.	24567 <i>Epthianura albifrons</i> (White-fronted Chat)			
251.	1646 <i>Eriochilus dilatatus</i> (White Bunny Orchid)			
252.	15412 <i>Eriochilus dilatatus</i> subsp. <i>multiflorus</i>			
253.	4332 <i>Erodium botrys</i> (Long Storksbill)	Y		
254.	24379 <i>Erythronyctes cinctus</i> (Red-kneed Dotterel)			
255.	5615 <i>Eucalyptus decipiens</i> (Limestone Marlock, Moit)			
256.	5643 <i>Eucalyptus falcata</i> (Silver Mallet, Dulyumuk)			
257.	5708 <i>Eucalyptus marginata</i> (Jarrah, Djara)			
258.	13547 <i>Eucalyptus marginata</i> subsp. <i>marginata</i> (Jarrah)			
259.	3872 <i>Euchlopsis linearis</i> (Swamp Pea)			
260.	835 <i>Evandra pauciflora</i>			
261.	25621 <i>Falco berigora</i> (Brown Falcon)			
262.	25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
263.	25623 <i>Falco longipennis</i> (Australian Hobby)			
264.	24041 <i>Felis catus</i> (Cat)	Y		
265.	32365 <i>Fissidens leptocladus</i>			
266.	32367 <i>Fissidens megalotis</i>			
267.	32469 <i>Fissidens taylorii</i> var. <i>taylorii</i>			
268.	27748 <i>Flavoparmelia rutidota</i>			
269.	18392 <i>Freesia alba</i> x <i>leichtlinii</i>	Y		
270.	25727 <i>Fulica atra</i> (Eurasian Coot)			
271.	24761 <i>Fulica atra</i> subsp. <i>australis</i> (Eurasian Coot)			
272.	31532 <i>Fumaria muralis</i> subsp. <i>muralis</i>	Y		
273.	32370 <i>Funaria hygrometrica</i>			
274.	25729 <i>Gallinula tenebrosa</i> (Dusky Moorhen)			
275.	24763 <i>Gallinula tenebrosa</i> subsp. <i>tenebrosa</i> (Dusky Moorhen)			
276.	25730 <i>Gallirallus philippensis</i> (Buff-banded Rail)			
277.	20505 <i>Gastrolobium celsianum</i>			
278.	20512 <i>Gastrolobium praemorsum</i>			
279.	3924 <i>Gastrolobium spinosum</i> (Prickly Poison)			
280.	32379 <i>Gemmabryum inaequale</i>			
281.	32380 <i>Gemmabryum pachythecum</i>			
282.	25404 <i>Geocrinia leai</i> (Ticking Frog)			
283.	4337 <i>Geranium dissectum</i> (Cutleaf Cranesbill)	Y		
284.	4340 <i>Geranium retrorsum</i>			
285.	4341 <i>Geranium solanderi</i> (Native Geranium)			
286.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
287.	46134 <i>Glebionis segetum</i>	Y		
288.	3948 <i>Gompholobium capitatum</i>			
289.	10909 <i>Gompholobium confertum</i>			
290.	3954 <i>Gompholobium polymorphum</i>			
291.	11083 <i>Gompholobium scabrum</i>			
292.	3956 <i>Gompholobium shuttleworthii</i>			
293.	3957 <i>Gompholobium tomentosum</i> (Hairy Yellow Pea)			
294.	6160 <i>Gonocarpus paniculatus</i>			
295.	6161 <i>Gonocarpus pithyoides</i>			
296.	8614 <i>Goodenia claytoniacea</i>			
297.	29362 <i>Goodenia coerulea</i>			
298.	12520 <i>Goodenia fasciculata</i>			
299.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
300.	37500 <i>Grammatotheca bergiana</i> var. <i>bergiana</i>	Y		
301.	<i>Gymnopilus purpuratus</i>			
302.	24487 <i>Haematopus longirostris</i> (Pied Oystercatcher)			
303.	1472 <i>Haemodorum simplex</i>			
304.	1474 <i>Haemodorum sparsiflorum</i>			
305.	1475 <i>Haemodorum spicatum</i> (Mardja)			
306.	2128 <i>Hakea amplexicaulis</i> (Prickly Hakea)			

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307.	2197 <i>Hakea prostrata</i> (Harsh Hakea)			
308.	24293 <i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)			
309.	24295 <i>Haliastur sphenurus</i> (Whistling Kite)			
310.	24296 <i>Hamirostra isura</i> (Square-tailed Kite)			
311.	3961 <i>Hardenbergia comptoniana</i> (Native Wisteria)			
312.	25410 <i>Heleioporus eyrei</i> (Moaning Frog)			
313.	3016 <i>Heliophila pusilla</i>	Y		
314.	6839 <i>Hemiandra pungens</i> (Snakebush)			
315.	<i>Hemicordulidae</i> sp.			
316.	25119 <i>Hemiergis quadrilineata</i>			
317.	<i>Henicops dentatus</i>			
318.	5117 <i>Hibbertia cuneiformis</i> (Cutleaf Hibbertia)			
319.	5135 <i>Hibbertia hypericoides</i> (Yellow Buttercups)			
320.	45534 <i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>			
321.	5162 <i>Hibbertia racemosa</i> (Stalked Guinea Flower)			
322.	5173 <i>Hibbertia subvaginata</i>			
323.	5176 <i>Hibbertia vaginata</i>			
324.	47965 <i>Hieraaetus morphnoides</i> (Little Eagle)			
325.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
326.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
327.	<i>Hogna crispipes</i>			
328.	6222 <i>Homalosciadium homalocarpum</i>			
329.	3966 <i>Hovea pungens</i> (Devil's Pins, Puyenak)			
330.	3968 <i>Hovea trisperma</i> (Common Hovea)			
331.	12859 <i>Hovea trisperma</i> var. <i>trisperma</i>			
332.	12741 <i>Hyalosperma cotula</i>			
333.	12717 <i>Hyalosperma pusillum</i>			
334.	16759 <i>Hyalosperma simplex</i> subsp. <i>simplex</i>			
335.	5216 <i>Hybanthus calycinus</i> (Wild Violet)			
336.	<i>Hydrophilidae</i> sp.			
337.	5180 <i>Hypericum gramineum</i> (Small St John's Wort)			
338.	8086 <i>Hypochaeris glabra</i> (Smooth Catsear)	Y		
339.	9352 <i>Hypochaeris radicata</i> (Flat Weed, Cats-ear)	Y		
340.	1070 <i>Hypolaena exsulca</i>			
341.	16836 <i>Hypolaena viridis</i>			
342.	1531 <i>Iris germanica</i> (Flag Iris)	Y		
343.	917 <i>Isolepis marginata</i> (Coarse Club-rush)			
344.	7396 <i>Isotoma hypocrateriformis</i> (Woodbridge Poison)			
345.	3992 <i>Isotropis cuneifolia</i> (Granny Bonnets)			
346.	4012 <i>Jacksonia furcellata</i> (Grey Stinkwood)			
347.	4017 <i>Jacksonia horrida</i>			
348.	1295 <i>Johnsonia acaulis</i>			
349.	1176 <i>Juncus aridicola</i>			
350.	1184 <i>Juncus holoschoenus</i> (Jointleaf Rush)			
351.	11922 <i>Juncus kraussii</i> subsp. <i>australiensis</i>			
352.	1191 <i>Juncus polyanthemus</i>	Y		
353.	1195 <i>Juncus subsecundus</i> (Finger Rush)			
354.	<i>Kangarosa properipes</i>			
355.	4037 <i>Kennedia coccinea</i> (Coral Vine)			
356.	4044 <i>Kennedia prostrata</i> (Scarlet Runner)			
357.	20019 <i>Lachnagrostis filiformis</i>			
358.	8095 <i>Lactuca saligna</i> (Wild Lettuce, Willow-leaf Lettuce)	Y		
359.	<i>Laetesia mollita</i>			
360.	18585 <i>Lagenophora huegelii</i>			
361.	<i>Lampona cylindrata</i>			
362.	24511 <i>Larus novaehollandiae</i> subsp. <i>novaehollandiae</i> (Silver Gull)			
363.	1051 <i>Lemna disperma</i> (Duckweed)			
364.	38805 <i>Lentinellus pulvinulus</i>			
365.	925 <i>Lepidosperma angustatum</i>			
366.	936 <i>Lepidosperma leptostachyum</i>			
367.	937 <i>Lepidosperma longitudinale</i> (Pithy Sword-sedge)			
368.	<i>Lepidosperma</i> sp.			
369.	945 <i>Lepidosperma squamatum</i>			
370.	1653 <i>Leporella fimbriata</i> (Hare Orchid)			
371.	1077 <i>Leptocarpus canus</i> (Hoary Twine-rush)			
372.	1078 <i>Leptocarpus coangustatus</i>			
373.	46375 <i>Leptocarpus decipiens</i>			
374.	46382 <i>Leptocarpus roycei</i>			
375.	2342 <i>Leptomeria cunninghamii</i>			
376.	2350 <i>Leptomeria pauciflora</i> (Sparse-flowered Currant Bush)			

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377.	1085 <i>Lepyrodia glauca</i>			
378.	25133 <i>Lerista elegans</i>			
379.	6374 <i>Leucopogon conostephioides</i>			
380.	6375 <i>Leucopogon cordatus</i>			
381.	6436 <i>Leucopogon propinquus</i>			
382.	6445 <i>Leucopogon squarrosus</i>			
383.	6454 <i>Leucopogon verticillatus</i> (Tassel Flower)			
384.	7677 <i>Levenhookia stipitata</i> (Common Stylewort)			
385.	25005 <i>Lialis burtonis</i>			
386.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
387.	25415 <i>Limnodynastes dorsalis</i> (Western Banjo Frog)			
388.	7073 <i>Limosella australis</i> (Common Mudwort)			
389.	4363 <i>Linum trigynum</i> (French Flax)	Y		
390.	25378 <i>Litoria adelaidensis</i> (Slender Tree Frog)			
391.	25388 <i>Litoria moorei</i> (Motorbike Frog)			
392.	7408 <i>Lobelia tenuior</i> (Slender Lobelia)			
393.	11073 <i>Lolium x hybridum</i>	Y		
394.	1223 <i>Lomandra caespitosa</i> (Tufted Mat Rush)			
395.	1228 <i>Lomandra hermaphrodita</i>			
396.	1232 <i>Lomandra micrantha</i> (Small-flower Mat-rush)			
397.	1234 <i>Lomandra nigricans</i>			
398.	1236 <i>Lomandra odora</i> (Tiered Matrush)			
399.	1240 <i>Lomandra purpurea</i> (Purple Mat Rush)			
400.	1243 <i>Lomandra sericea</i> (Silky Mat Rush)			
401.	1246 <i>Lomandra suaveolens</i>			
402.	4059 <i>Lotus angustissimus</i> (Narrowleaf Trefoil)	Y		
403.	1092 <i>Loxocarya cinerea</i>			
404.	4064 <i>Lupinus albus</i> (White Lupin)	Y		Y
405.	1097 <i>Lyginia barbata</i>			
406.	34736 <i>Lysinema pentapetalum</i>			
407.	24132 <i>Macropus fuliginosus</i> (Western Grey Kangaroo)			
408.	85 <i>Macrozamia riedlei</i> (Zamia, Djiridji)			
409.	24326 <i>Malacorhynchus membranaceus</i> (Pink-eared Duck)			
410.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
411.	<i>Marsilea</i> sp.			
412.	4073 <i>Medicago intertexta</i> (Calvary Medic)	Y		
413.	25758 <i>Megalurus gramineus</i> (Little Grassbird)			
414.	5946 <i>Melaleuca pauciflora</i>			
415.	5952 <i>Melaleuca preissiana</i> (Moonah)			
416.	5959 <i>Melaleuca raphiophylla</i> (Swamp Paperbark)			
417.	18598 <i>Melaleuca systema</i>			
418.	5980 <i>Melaleuca thymoides</i>			
419.	13280 <i>Melaleuca viminea</i> subsp. <i>viminea</i>			
420.	25184 <i>Menetia greyii</i>			
421.	6883 <i>Mentha pulegium</i> (Pennyroyal)	Y		
422.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)			
423.	<i>Microcarbo melanoleucos</i>			
424.	485 <i>Microlaena stipoides</i> (Weeping Grass)			
425.	15419 <i>Microtis media</i> subsp. <i>media</i>			
426.	8106 <i>Millotia tenuifolia</i> (Soft Millotia)			
427.	14344 <i>Millotia tenuifolia</i> var. <i>tenuifolia</i> (Soft Millotia)			
428.	<i>Missulena granulosa</i>			
429.	<i>Missulena occatoria</i>			
430.	<i>Mituliodon tarantulinus</i>			
431.	4666 <i>Monotaxis occidentalis</i>			
432.	25191 <i>Morethia lineocellata</i>			
433.	24223 <i>Mus musculus</i> (House Mouse)	Y		
434.	25610 <i>Myiagra inquieta</i> (Restless Flycatcher)			
435.	6192 <i>Myriophyllum drummondii</i>			
436.	6201 <i>Myriophyllum verrucosum</i> (Red Water Milfoil)			
437.	11019 <i>Narcissus papyraceus</i>	Y		
438.	25248 <i>Neelaps bimaculatus</i> (Black-naped Snake)			
439.	24738 <i>Neophema elegans</i> (Elegant Parrot)			
440.	<i>Nicodamus mainae</i>			
441.	25252 <i>Notechis scutatus</i> (Tiger Snake)			
442.	<i>Notonectidae</i> sp.			
443.	<i>Nunciella aspera</i>			
444.	2401 <i>Nuytsia floribunda</i> (Christmas Tree, Mudja)			
445.	25564 <i>Nycticorax caledonicus</i> (Rufous Night Heron)			
446.	24194 <i>Nyctophilus geoffroyi</i> (Lesser Long-eared Bat)			

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447.	24195 <i>Nyctophilus gouldi</i> (Gould's Long-eared Bat)			
448.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
449.	35416 <i>Oenothera lindheimeri</i>	Y		
450.	8133 <i>Olearia elaeophila</i>			
451.	8143 <i>Olearia paucidentata</i> (Autumn Scrub Daisy)			
452.	<i>Oligochaeta</i> sp.			
453.	<i>Oniscidae</i> sp.			
454.	7348 <i>Opercularia hispidula</i> (Hispid Stinkweed)			
455.	46316 <i>Orianthera serpyllifolia</i> subsp. <i>angustifolia</i>			
456.	7122 <i>Orobanche minor</i> (Lesser Broomrape)	Y		
457.	<i>Orthoclaadiinae</i> sp.			
458.	24085 <i>Oryctolagus cuniculus</i> (Rabbit)	Y		
459.	168 <i>Ottelia ovalifolia</i> (Swamp Lily)			
460.	4355 <i>Oxalis perennans</i>			
461.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
462.	<i>Palaemonidae</i> sp.			
463.	23500 <i>Paracaleana hortiorum</i>			
464.	1667 <i>Paracaleana nigrita</i> (Flying Duck Orchid)			
465.	25253 <i>Parasuta gouldii</i>			
466.	25681 <i>Pardalotus punctatus</i> (Spotted Pardalote)			
467.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
468.	7089 <i>Parentucellia latifolia</i> (Common Bartsia)	Y		
469.	7090 <i>Parentucellia viscosa</i> (Sticky Bartsia)	Y		
470.	1762 <i>Parietaria debilis</i> (Pellitory)			
471.	527 <i>Paspalum dilatatum</i>	Y		
472.	528 <i>Paspalum distichum</i> (Water Couch)	Y		
473.	1550 <i>Patersonia occidentalis</i> (Purple Flag, Koma)			
474.	4346 <i>Pelargonium littorale</i>			
475.	24648 <i>Pelecanus conspicillatus</i> (Australian Pelican)			
476.	6006 <i>Pericalymma ellipticum</i> (Swamp Teatree)			
477.	13911 <i>Persicaria decipiens</i>			
478.	11020 <i>Persicaria hydropiper</i>			
479.	2273 <i>Persoonia saccata</i> (Snottygobble)			
480.	<i>Perthiidae</i> sp.			
481.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
482.	48066 <i>Petroica boodang</i> (Scarlet Robin)			
483.	2299 <i>Petrophile linearis</i> (Pixie Mops)			
484.	19825 <i>Petrorhagia dubia</i>	Y		
485.	25697 <i>Phalacrocorax carbo</i> (Great Cormorant)			
486.	25698 <i>Phalacrocorax melanoleucos</i> (Little Pied Cormorant)			
487.	24667 <i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)			
488.	25699 <i>Phalacrocorax varius</i> (Pied Cormorant)			
489.	548 <i>Phalaris aquatica</i> (Phalaris)	Y		
490.	551 <i>Phalaris minor</i> (Lesser Canary Grass)	Y		
491.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
492.	25587 <i>Phaps elegans</i> (Brush Bronzewing)			
493.	32411 <i>Philonotis tenuis</i>			
494.	18529 <i>Philothea spicata</i> (Pepper and Salt)			
495.	1478 <i>Phlebocarya ciliata</i>			
496.	<i>Phryganoporus candidus</i>			
497.	24596 <i>Phylidonyris novaehollandiae</i> (New Holland Honeyeater)			
498.	4675 <i>Phyllanthus calycinus</i> (False Boronia)			
499.	<i>Phytophthora cinnamomi</i>			
500.	8160 <i>Picris squarrosa</i>			
501.	5252 <i>Pimelea lanata</i>			
502.	5255 <i>Pimelea longiflora</i>			
503.	42260 <i>Pithocarpa ramosa</i>			
504.	24841 <i>Platalea flavipes</i> (Yellow-billed Spoonbill)			
505.	25720 <i>Platycercus icterotis</i> (Western Rosella)			
506.	24747 <i>Platycercus spurius</i> (Red-capped Parrot)			
507.	25721 <i>Platycercus zonarius</i> (Australian Ringneck, Ring-necked Parrot)			
508.	6249 <i>Platysace compressa</i> (Tapeworm Plant)			
509.	25703 <i>Podargus strigoides</i> (Tawny Frogmouth)			
510.	8179 <i>Podolepis nutans</i> (Nodding Podolepis)			
511.	25510 <i>Pogona minor</i> (Dwarf Bearded Dragon)			
512.	24907 <i>Pogona minor</i> subsp. <i>minor</i> (Dwarf Bearded Dragon)			
513.	24681 <i>Poliocephalus poliocephalus</i> (Hoary-headed Grebe)			
514.	2419 <i>Polygonum aviculare</i> (Wireweed)	Y		
515.	582 <i>Polygonum monspeliensis</i> (Annual Beardgrass)	Y		
516.	25722 <i>Polytelis anthopeplus</i> (Regent Parrot)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
517.	18323 <i>Populus alba</i>	Y		
518.	4691 <i>Poranthera microphylla</i> (Small Poranthera)			
519.	25731 <i>Porphyrio porphyrio</i> (Purple Swampphen)			
520.	24767 <i>Porphyrio porphyrio</i> subsp. <i>bellus</i> (Purple Swampphen)			
521.	2884 <i>Portulaca oleracea</i> (Purslane, Wakati)			
522.	24769 <i>Porzana fluminea</i> (Australian Spotted Crane)			
523.	25732 <i>Porzana pusilla</i> (Baillon's Crane)			
524.	24771 <i>Porzana tabuensis</i> (Spotless Crane)			
525.	25511 <i>Pseudonaja affinis</i> (Dugite)			
526.	25259 <i>Pseudonaja affinis</i> subsp. <i>affinis</i> (Dugite)			
527.	25433 <i>Pseudophryne guentheri</i> (Crawling Toadlet)			
528.	41651 <i>Pteridium esculentum</i> subsp. <i>esculentum</i>			
529.	<i>Pterostylis</i> aff. <i>nana</i>			
530.	10875 <i>Pterostylis concava</i>			
531.	1693 <i>Pterostylis recurva</i> (Jug Orchid)			
532.	12217 <i>Pterostylis sanguinea</i>			
533.	1698 <i>Pterostylis vittata</i> (Banded Greenhood)			
534.	<i>Purpurecephalus spurius</i>			
535.	8195 <i>Quinetia urvillei</i>			
536.	2933 <i>Ranunculus muricatus</i> (Sharp Buttercup)	Y		
537.	11927 <i>Ranunculus sessiliflorus</i> var. <i>sessiliflorus</i>			
538.	24245 <i>Rattus rattus</i> (Black Rat)	Y		
539.	<i>Raveniella peckorum</i>			
540.	24776 <i>Recurvirostra novaehollandiae</i> (Red-necked Avocet)			
541.	48096 <i>Rhipidura albiscapa</i> (Grey Fantail)			
542.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
543.	4705 <i>Ricinus communis</i> (Castor Oil Plant)	Y		
544.	3066 <i>Rorippa nasturtium-aquaticum</i> (Watercress)	Y		
545.	3187 <i>Rosa rubiginosa</i> (Sweet Briar)	Y		
546.	20496 <i>Rubus laudatus</i>	Y		
547.	2430 <i>Rumex brownii</i> (Swamp Dock)	Y		
548.	2440 <i>Rumex pulcher</i> (Fiddle Dock)	Y		
549.	116 <i>Ruppia polycarpa</i>			
550.	40426 <i>Rytidosperma occidentale</i>			
551.	40430 <i>Rytidosperma pilosum</i>			
552.	40427 <i>Rytidosperma setaceum</i>			
553.	20063 <i>Salix babylonica</i>	Y		
554.	7602 <i>Scaevola calliptera</i>			
555.	13175 <i>Scaevola striata</i> var. <i>striata</i>			
556.	984 <i>Schoenus curvifolius</i>			
557.	1020 <i>Schoenus sublateralis</i>			
558.	<i>Scirtidae</i> sp.			
559.	<i>Scolopendra laeta</i>			
560.	20663 <i>Senecio multicaulis</i> subsp. <i>multicaulis</i>			
561.	25534 <i>Sericornis frontalis</i> (White-browed Scrubwren)			
562.	2909 <i>Silene gallica</i> (French Catchfly)	Y		
563.	14583 <i>Siloxerus multiflorus</i>			
564.	25266 <i>Simoselaps bertholdi</i> (Jan's Banded Snake)			
565.	<i>Simuliidae</i> sp.			
566.	30948 <i>Smicromis brevirostris</i> (Weebill)			
567.	<i>Sminthopsis murina</i>			
568.	7020 <i>Solanum linnaeanum</i> (Apple of Sodom)	Y		
569.	8231 <i>Sonchus oleraceus</i> (Common Sowthistle)	Y		
570.	616 <i>Sorghum bicolor</i> (Grain Sorghum)	Y		
571.	1312 <i>Sowerbaea laxiflora</i> (Purple Tassels)			
572.	45885 <i>Sporisorium sorghi</i>			
573.	635 <i>Sporobolus virginicus</i> (Marine Couch)			
574.	<i>Steatoda capensis</i>			
575.	<i>Steatoda grossa</i>			
576.	2918 <i>Stellaria media</i> (Chickweed)	Y		
577.	48594 <i>Sternula nereis</i> (Fairy Tern)			
578.	24329 <i>Stictonetta naevosa</i> (Freckled Duck)			
579.	2316 <i>Stirlingia latifolia</i> (Blueboy)			
580.	25597 <i>Strepera versicolor</i> (Grey Currawong)			
581.	25590 <i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)	Y		
582.	7684 <i>Stylidium amoenum</i> (Lovely Triggerplant)			
583.	7693 <i>Stylidium brunonianum</i> (Pink Fountain Triggerplant)			
584.	7699 <i>Stylidium carnosum</i> (Fleshy-leaved Triggerplant)			
585.	7702 <i>Stylidium ciliatum</i> (Golden Triggerplant)			
586.	7745 <i>Stylidium junceum</i> (Reed Triggerplant)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
587.	7774 <i>Styidium piliferum</i> (Common Butterfly Triggerplant)			
588.	7785 <i>Styidium repens</i> (Matted Triggerplant)			
589.	7798 <i>Styidium schoenoides</i> (Cow Kicks)			
590.	7799 <i>Styidium spathulatum</i> (Creamy Triggerplant)			
591.	23511 <i>Styidium thesioides</i> (Delicate Triggerplant)			
592.	2639 <i>Suaeda australis</i> (Seablite)			
593.	24259 <i>Sus scrofa</i> (Pig)	Y		
594.	25902 <i>Symphotrichum squamatum</i> (Bushy Starwort)	Y		
595.	16863 <i>Synaphea petiolaris</i> subsp. <i>triloba</i>			
596.	2329 <i>Synaphea spinulosa</i>			
597.	15532 <i>Synaphea spinulosa</i> subsp. <i>spinulosa</i>			
598.	25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
599.	24682 <i>Tachybaptus novaehollandiae</i> subsp. <i>novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
600.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
601.	<i>Tasmanicosa leuckartii</i>			
602.	<i>Tetralycosa oraria</i>			
603.	1036 <i>Tetradlea octandra</i>			
604.	4535 <i>Tetradlea hirsuta</i> (Black Eyed Susan)			
605.	48341 <i>Tetradlea hirsuta</i> subsp. <i>viminea</i>			
606.	10856 <i>Thelymitra benthamiana</i> (Leopard Orchid)			
607.	24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)			
608.	1319 <i>Thysanotus arenarius</i>			
609.	1338 <i>Thysanotus manglesianus</i> (Fringed Lily)			
610.	1339 <i>Thysanotus multiflorus</i> (Many-flowered Fringe Lily)			
611.	1343 <i>Thysanotus patersonii</i>			
612.	25519 <i>Tiliqua rugosa</i>			
613.	25207 <i>Tiliqua rugosa</i> subsp. <i>rugosa</i>			
614.	25549 <i>Todiramphus sanctus</i> (Sacred Kingfisher)			
615.	1368 <i>Trachyandra divaricata</i>	Y		
616.	6280 <i>Trachymene pilosa</i> (Native Parsnip)			
617.	1485 <i>Tribonanthes violacea</i>			
618.	48141 <i>Tribonyx ventralis</i> (Black-tailed Native-hen)			
619.	8251 <i>Trichocline spathulata</i> (Native Gerbera)			
620.	24158 <i>Trichosurus vulpecula</i> subsp. <i>vulpecula</i> (Common Brushtail Possum)			
621.	1361 <i>Tricoryne elatior</i> (Yellow Autumn Lily)			
622.	1362 <i>Tricoryne humilis</i>			
623.	4292 <i>Trifolium campestre</i> (Hop Clover)	Y		
624.	4293 <i>Trifolium cernuum</i> (Drooping Flower Clover)	Y		
625.	4302 <i>Trifolium ligusticum</i> (Ligurian Clover)	Y		
626.	4304 <i>Trifolium ornithopodioides</i> (Birdsfoot Fenugreek)	Y		
627.	4313 <i>Trifolium subterraneum</i> (Subterranean Clover)	Y		
628.	38401 <i>Tritonia gladiolaris</i> (Lined Tritonia)	Y		
629.	4360 <i>Tropaeolum majus</i> (Garden Nasturtium)	Y		
630.	48147 <i>Turnix varius</i> (Painted Button-quail)			
631.	99 <i>Typha orientalis</i> (Bulrush, Cumbungi)			
632.	8254 <i>Urospermum picroides</i> (False Hawkbit)	Y		
633.	8255 <i>Ursinia anthemoides</i> (Ursinia)	Y		
634.	28087 <i>Usnea inermis</i>			
635.	24386 <i>Vanellus tricolor</i> (Banded Lapwing)			
636.	25218 <i>Varanus gouldii</i> (Bungarra or Sand Monitor)			
637.	25225 <i>Varanus rosenbergi</i> (Heath Monitor)			
638.	<i>Velliidae</i> sp.			
639.	8257 <i>Vellereophyton dealbatum</i> (White Cudweed)	Y		
640.	20121 <i>Verbena rigida</i> var. <i>rigida</i>	Y		
641.	6101 <i>Verticordia nitens</i> (Morrison Featherflower, Kodjeningara)			
642.	6107 <i>Verticordia pennigera</i>			
643.	24206 <i>Vespadelus regulus</i> (Southern Forest Bat)			
644.	24040 <i>Vulpes vulpes</i> (Red Fox)	Y		
645.	7384 <i>Wahlenbergia capensis</i> (Cape Bluebell)	Y		
646.	8282 <i>Waitzia suaveolens</i> (Fragrant Waitzia)			
647.	1566 <i>Watsonia marginata</i>	Y		
648.	1251 <i>Xanthorrhoea brunonis</i>			
649.	1256 <i>Xanthorrhoea preissii</i> (Grass tree, Palga)			
650.	6289 <i>Xanthosia huegelii</i>			
651.	2331 <i>Xylomelum occidentale</i> (Woody Pear, Djandin)			
652.	25765 <i>Zosterops lateralis</i> (Grey-breasted White-eye, Silvereye)			

Conservation Codes
T - Rare or likely to become extinct

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
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X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

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

Appendix C

Likelihood of threatened
species

Appendix C Likelihood of Threatened Species

Desktop Fauna Assessment

Scientific Name	Common Name	Cons. Status		Ecology	Likelihood
		State	Comm		
<i>Apus pacificus</i>	Fork-tailed Swift	IA	Migratory	The Fork-tailed Swift is widespread in coastal and subcoastal areas between Augusta and Carnarvon and sparsely scattered inland and along the coast from Augusta to Carnarvon and south-west Pilbara to the north and east Kimberley region. The Fork-tailed Swift is a medium-sized Swift, with a slim body with long scythe-shaped wings that taper to finely pointed tips. It is characterised by a long and deeply forked tail. It is almost exclusively aerial, and a non-breeding visitor to Australia (DotEE, 2018). They mostly occur over inland plains over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh but sometimes above foothills or in coastal areas (DotEE, 2018).	May fly over
<i>Bettongia penicillata ogilbyi</i>	Woylie	CR	E	The Woylie is a small marsupial with grey to greyish brown fur on the back and flanks, and pale greyish on the undersides. The tail is dark and has a distinctive black brush at the end (de Tores & Start 2008). The Woylie previously occurred over large areas of western, central and eastern Australia, however naturally occurring extant populations are now restricted to three small reserves in the Western Australian wheatbelt (Van Dyck & Strahan, 2008). They inhabit woodlands and adjacent heaths with a dense understorey of shrubs, particularly <i>Gastrolobium spp.</i> (poison pea).	Unlikely to occur
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	E	The Australasian Bittern is a large thick-necked bird, growing to a length of 66 to 76 cm. Upper parts are brown and black and mottled to aid in camouflage. It grows to a length of 66–76 cm and has a wingspan of 1050–1180 cm. The Australasian Bittern has a straw yellow bill and the legs and feet are pale green to olive (Marchant & Higgins, 1990; Pizzey & Knight, 1997). In Western Australia the species was formerly widespread in the south-west however is now thought to only occur on the western coastal plain, southern coastal region and inland to some wetlands in the Jarrah forests (DotEE, 2018). The Australasian Bittern's preferred habitat is comprised of wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water (Marchant & Higgins, 1990).	May occur
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	IA	Migratory	The Sharp-tailed Sandpiper is a small to medium sized wader with a length of 17 to 22 cm and weighing 65g. They are widespread in Western Australia from the Pilbara region to the south-west. They prefer muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DotEE, 2018).	May occur
<i>Calidris canutus</i>	Red Knot, Knot	EN & IA	E & Migratory	The Red Knot is 23-25cm in length, weighing 120 g. It is robust, short-necked, rather dumpy but long bodied wader with a short straight bill, long wings extending beyond the tail and short legs. It is common in the north-west of Western Australia (Barnford et al., 2008). The species mainly inhabits intertidal mudflats, sand flats, in estuaries, bays and lagoons. They are occasionally seen on inland salt lakes and wetlands but hardly every use freshwater swamps.	Unlikely to occur

Scientific Name	Common Name	Cons. Status		Ecology	Likelihood
		State	Comm		
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR & IA	CE & Migratory	The Curlew Sandpiper is a small, slim weighing 57 g. In Australia, Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. In Western Australia, they are widespread around coastal and sub coastal plains from Cape Arid to the south-west Kimberley. Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas and less often recorded inland around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand.	Unlikely to occur
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black-Cockatoo	VU	V	Forest Red-tailed Black Cockatoo is 55-60 cm in length, and are mostly glossy black with a pair of black central tail feathers, a crest, robust bill and bright red, orange or yellow barring in the tail (Higgins, 1999). Males are distinguished by broad red tail panels that are only visible when taking off or alighting (Higgins, 1999). Requires tree hollows to nest and breed, occurs in forests of Karri (<i>Eucalyptus diversicolor</i>), Jarrah (<i>Eucalyptus marginata</i>) and Marri (<i>Corymbia calophylla</i>), with flocks moving out onto the Swan Coastal Plain in search of food from exotic trees such as White Cedar (Johnstone <i>et al.</i> , 2010). Foraging habitat for the species consists of Jarrah and Marri woodlands and forest throughout its range. Has become more common in the Metropolitan area in the past few years.	Likely to occur
<i>Calyptorhynchus baudinii</i>	Baudin's Cockatoo	EN	E	Baudin's Cockatoo is a large cockatoo that measures 50–57 cm in length, with a wingspan of approximately 110 cm. Mostly dull black in colour, with pale whitish margins on the feathers (Higgins, 1999). Habitat critical to the survival of this species includes forests of Karri (<i>Eucalyptus diversicolor</i>), Jarrah (<i>Eucalyptus marginata</i>) and Marri (<i>Corymbia calophylla</i>), in areas of 600 mm average rainfall per year. Individuals typically move north through the Perth region from March to May and south through the Perth region from August to October. This species ranges north to Giddegannup and Hoddy Well and west to the Eastern Strip of the Swan Coastal Plain including West Midland in the north, heading south through Armadale, Byford and south and towards the coast until Lake Clifton where it continues to hug the coastline to east of Albany (Johnstone <i>et al.</i> , 2010). Breeding has been recorded to the south-west of the area bounded by Leschenault, Collie and Albany (DSEWPac, 2012), with the most northerly record at Lowden, near Donnybrook (Johnstone & Storr, 1998). Breeding has also been recorded at Serpentine (hills area), and east to Kjonup and near Albany (Johnstone & Kirkby, 2008).	May occur
<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	EN	E	Carnaby's Cockatoo is a white-tailed black cockatoo endemic to the south-west of Western Australia. It is a postnuptial nomad and typically moves west soon after breeding. Breeding occurs mainly from early July to mid-December. There has been an apparent shift in its breeding range further west and south since the middle of last century (Johnstone <i>et al.</i> , 2010). The species nests in hollows in eucalypts, particularly Salmon Gum (<i>Eucalyptus salmonophloia</i>) and Wandoo (<i>E. Wandoo</i>), but nests have been found in other eucalypts including York Gum (<i>Eucalyptus loxophleba</i>), Flooded Gum (<i>Eucalyptus rudis</i>), Tuart (<i>Eucalyptus gomphocephala</i>) and Marri (<i>Corymbia calophylla</i>) (Johnstone <i>et al.</i> , 2010). Breeding success is largely dependent on suitable feeding habitat adjacent to the nest site to provide the necessary food for the survival of the chick (Johnstone <i>et al.</i> , 2010). Diet consists of an array of Proteaceous and Eucalyptus species. Foraging habitat, including Banksia woodlands, is considered to be habitat critical to the survival of the species (Johnstone <i>et al.</i> , 2010).	Likely to occur

Scientific Name	Common Name	Cons. Status		Ecology	Likelihood
		State	Comm		
<i>Dasyurus geoffroyi</i>	Chuditch,	VU	V	At maturity the Chuditch is the size of a small domestic cat with white spotted brown pelage,, large rounded ears, pointed muzzle, large dark eyes and non-hopping gait. Following European settlement the range of this species contracted dramatically, from much of the continent to a small area in the south west. It currently only occurs in areas dominated by sclerophyll forest or drier woodland, heath and mallee shrubland (Van Dyck & Strahan, 2008). The Chuditch requires adequate numbers of suitable den and refuge sites (horizontal hollow logs or earth burrows) and sufficient prey biomass (large invertebrates, reptiles and small mammals) to survive.	May occur
<i>Galaxiella nigrostriata</i>	Black-striped Dwarf	EN	E	The Black-stripe Minnow, <i>Galaxiella nigrostriata</i> , is a small (maximum 48 mm TL), scaleless freshwater fish. It is characterised by two black longitudinal bands separated with a yellow/orange to red stripe. It is found in acidic ephemeral bodies of water in peat flats located in the south west corner of Western Australia. The major populations occur from Augusta to Albany with two disjunct populations discovered in the same peat flats near Bunbury and one north of Perth near Gingin (Morgan <i>et al.</i> , 1998). Generally prefer sandy soils, as it will burrow into the moist soil when ephemeral pools dry out.	May occur
<i>Geotria australis</i>	Pouched Lamprey	P3	-	The Pouched Lamprey are eel-like fishes with cartilaginous skeletons and lack true jaws. Adults spawn in the headwaters of freshwater rivers and streams, and when the larvae or ammocoetes hatch, they drift downstream and burrow into soft muddy sediments. After metamorphosis, young adults migrate downstream to estuaries and coastal waters, where they feed parasitically by rasping flesh from other fishes with their toothy tongues. They eventually cease feeding and migrate back to freshwater to breed.	May occur
<i>Isoodon fusciventer</i>	Quenda	P4	-	The Quenda or Southern Brown Bandicoot exists only in a fragmented distribution to its former range in southern south western and eastern Australia. It is found in forest, woodland, heath and shrub communities in these regions. Preferred habitat usually consists of a combination of sandy soils and dense healthy vegetation (Van Dyck & Strahan, 2008).	May occur
<i>Ixobrychus dubius</i>	Australian Little Bittern	P4	-	A small, secretive bittern, standing at between 25 cm to 35 cm, the Little Bittern forages among dense low swamp vegetation and on floating water plants. This species occurs in the south-west of Western Australia however it is very uncommon (Pizzey & Knight, 2007).	May occur
<i>Leipoa ocellata</i>	Malleefowl	VU	V	The Malleefowl is a large, ground-dwelling bird with strong feet and a short bill. It is found principally in the semi-arid to arid zone in shrublands and low woodlands dominated by mallee and associated habitats such as such as Broombush (<i>Melaleuca uncinata</i>) and Scrub Pine (<i>Callitris verrucosa</i>). In WA Malleefowl distribution was associated with landscapes that had lower rainfall, greater amounts of mallee and shrubland that occur as large remnants, and lighter soil surface textures (Benshemesh, 2007). At a finer scale, malleefowl occurrence was associated with mallee/shrubland and thicket vegetation with woodland representing poor habitat for the species (Patsons, 2008).	Unlikely to occur
<i>Lerista lineata</i>	Perth Slider, Lined Skink	P3	-	The Perth Lined Lerista is an underground dwelling skink, sheltering in leaf litter and upper layers of loose soil. It is typically found at the bases of shrubs, spoil heaps and stick ant nests (Bush <i>et al.</i> , 2010). The species inhabits sandy soils supporting Eucalypt/Banksia woodland, coastal heath and low shrubland (Bush <i>et al.</i> , 2010; Wilson and Swan, 2010).	Unlikely to occur

Scientific Name	Common Name	Cons. Status		Ecology	Likelihood
		State	Comm		
<i>Nannatherina balstoni</i>	Balston's Pygmy Perch	VU	V	Balston's Pygmy Perch is a small freshwater fish that grows to a maximum length of around 90 mm (commonly 60 mm). The total length of this species at one year of age (when sexually mature) averages 60 mm for males and 63 mm for females (Morgan <i>et al.</i> , 1995). This species is brownish dorsally and silver below, usually with a prominent brown mid-lateral stripe and a series of vertical brown bars on sides giving a cross-hatched pattern (Allen <i>et al.</i> , 2002). It occurs in wetlands in south-western Western Australia. It prefers shallow, acidic waters with patches of sedge growth.	Unlikely to occur
<i>Numenius madagascariensis</i>	Far Eastern Curlew	CR & IA	CR & Migratory	The eastern curlew is Australia's largest shorebird and a long-haul flyer. It is easily recognisable, with its long, down-curved bill (DotEE, 2018). The wingspan is 110 cm and the birds weigh approximately 900 g. The head and neck are dark brown and streaked with darker brown. Within Australia, this bird has a primarily coastal distribution. It is found in all states and has a continuous distribution from Barrow Island through the Kimberley region and into the Northern Territory with more scattered records along the coastlines south (DotEE, 2018). In southern Western Australia, eastern curlews are recorded from Eyre, and there are scattered records from Stokes Inlet to Peel Inlet. The species is a scarce visitor to Houtman Abrolhos and the adjacent mainland, and is also recorded around Shark Bay. It is also recorded on Norfolk Island and Lord Howe Island (Marchant & Higgins, 1993).	Unlikely to occur
<i>Oxyura australis</i>	Blue-billed Duck	P4	-	The Blue-billed Duck is a compact diving duck with males having a large scooped bright, light blue bill. The tail is dark with stiff pointed feather tips and is usually held flat on the surface of the water except when in display (Birdlife Australia, 2018). The Blue-billed Duck is endemic to south eastern and south western Australia. It prefers deep water in large permanent wetlands and swamps with aquatic vegetation. This species of duck is fully aquatic and rarely comes onto land (NSW Government, 2015)	Unlikely to occur
<i>Pandion haliaetus</i>	Osprey	IA	Migratory	The Eastern Osprey is a medium-sized raptor with dark-brown to blackish-brown above and white below with a white head and neck; a dark-brown to blackish-brown crest; a black stripe across the eye and ear; a band of reddish-brown, brown or dark-brown streaking across the breast. The breeding range of the Osprey includes the northern coast of Australia from Albany in WA to Lake Macquarie in NSW (DotEE, 2018). The Osprey occurs in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. Found mostly in coastal areas but can travel inland along major rivers. Areas of open fresh, brackish or saline water for foraging is essential for their habitat, visiting various wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps and broad rivers, reservoirs and large lakes. They can also occur over atypical habitats such as heath, woodland or forest when travelling between foraging sites.	Unlikely to occur
<i>Plegadis falcinellus</i>	Glossy Ibis	IA	Migratory	The Glossy Ibis is slightly smaller than other ibises, reaching 49-55 cm. It occupies well vegetated wetlands, wet pastures, floodwaters, brackish wetlands and mudflats. This species is a non-breeding visitor to south-west Western Australia (Pizzey & Knight, 2007).	May occur
<i>Pseudocheirus occidentalis</i>	Western Ringtail Possum, Ngwayir	CR	V	This species is restricted to the south-west corner of Western Australia. Closer to the coast it is closely associated with Peppermint (<i>Agonis flexuosa</i>) forest and woodland and Tuart (<i>Eucalyptus gomphocephala</i>) with a peppermint mid-story. Further from the coast the species is found in Jarrah (<i>Eucalyptus marginata</i>), Wandoo (<i>Eucalyptus wandoo</i>) and Marri (<i>Corymbia calophylla</i>) forest (Van Dyck & Strahan, 2008).	May occur

Scientific Name	Common Name	Cons. Status		Ecology	Likelihood
		State	Comm		
<i>Rostratula australis</i>	Australian Painted-snipe	EN	E	The Australian Painted Snipe is a stocky wading bird around 220–250 mm in length with a long pinkish bill.). This species is a very rare summer visitor to the south-west of Western Australia. Breeding habitat in Western Australia is not quite known however a nest located near Moora was located in a tussock beside a swamp (Johnstone & Storr, 1998). The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans (DotEE, 2018).	Unlikely to occur
<i>Sefonix brachyurus</i>	Quokka	VU	V	The Quokka is distributed from Jarrah forest south-east of Perth, extending south through southern Jarrah, Mairri and Karri forests onward to the south coast. It is now thought to be absent from the Swan Coastal Plain. Habitat use varies and includes thickets of Acacia, Melaleuca and is sometimes found in conjunction with tea-tree (Van Dyck & Strahan, 2008).	Unlikely to occur
<i>Tringa glareola</i>	Wood Sandpiper	IA	Migratory	The Wood Sandpiper is a small wader who is a summer migrant to Australia where it is more common in the north although a casual visitor to southern parts. It occupies wetland margins, saltmarshes and sewage ponds (Pizzey & Knight, 2007).	Unlikely to occur
<i>Westralunio carteri</i>	Carter's Freshwater Mussel	VU	V	This bivalve species is the only mussel species known to inhabit freshwater systems of south-west Western Australia (Klunzinger <i>et al.</i> , 2012). Occurs in greatest abundance in slower flowing waters with stable sediments that are soft enough for burrowing amongst woody debris and exposed tree roots.	May occur

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Appendix C

Concept Layout

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