



Dale Development

# Flora, Vegetation, Fauna and Black Cockatoo Survey

Prepared for:

Co-operative Bulk Handling  
Pty

February 2019

● people ● planet ● professional

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## Abbreviations

ABBREVIATION	DEFINITION
360 Environmental	360 Environmental Pty Ltd
BAM Act	<i>Biodiversity and Agriculture Management Act 2007</i> (state)
BoM	Bureau of Meteorology
DPIRD	Department of Agriculture and Food Western Australia
DBCA	Department of Biodiversity, Conservation and Attractions
DEE	Department of the Environment and Energy
EPA	Environmental Protection Authority (state)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
ESA	Environmentally Sensitive Area
ha	Hectare
IBRA	Interim Biogeographic Regionalisation for Australia
km	Kilometres
m	Meters
mm	Millimetres
MNES	Matters of National Environmental Significance
PEC	Priority Ecological Community
PMST	Protected Matters Search Tool
TEC	Threatened Ecological Community
TPFL	Threatened and Priority Flora Database
TP List	Threatened and Priority Flora List
WA Herbarium	Western Australian Herbarium
WAOL	Western Australian Organism List
WC Act	<i>Wildlife Conservation Act 1950</i> (state)
WoNS	Weeds of National Significance

## Executive Summary

Co-operative Bulk Handling Pty commissioned 360 Environmental Pty Ltd to undertake a Detailed Flora and Vegetation Survey, a Level 1 Vertebrate Fauna Survey and Black Cockatoo Habitat Assessment within various lots at their Dale Grain Receival Site, Westdale totalling 8.4 hectares.

The survey was required to support any vegetation clearing and/or environmental permit approval processes that may be required to develop the site.

### Key findings from the Detailed Flora and Vegetation Survey

- No Threatened flora species pursuant to the Environment Protection and Biodiversity Conservation Act 1999 and/or gazetted as Declared Rare Flora pursuant to the Wildlife Conservation Act 1950 were recorded during the survey or are considered to have a 'High' Likelihood of Occurrence within the Survey Area.
- One Department of Biodiversity, Conservation and Attractions listed Priority flora species was recorded, *Hibbertia montana* (P4). The presence of this species is unlikely to form a statutory constraint for the Survey Area and is dealt with by the State on a case by case basis.
- Seven introduced species were recorded during the survey. None are listed as a Declared species for the region.
- Vegetation Type EwCc – *Eucalyptus wandoo* and *Corymbia calophylla* Woodland, was mapped within the Survey Area and is considered to represent the Federally listed Threatened Ecological Community, and State listed Priority Ecological Community (P3), *Eucalypt Woodlands of the Western Australian Wheatbelt*.

### Key Findings from the Level 1 Vertebrate Fauna Survey

- A total of 17 fauna species were recorded within the Survey Area during the Survey, from 18 families. This included:
  - Sixteen bird species from 14 families;
  - Two mammal species from two families; and
  - Two reptile species from two families.
- Three habitat assessments were undertaken during the field survey and one general fauna habitat was identified and mapped, the Wandoo Woodland.
- Twenty-four conservation significant vertebrate fauna species were assessed for their Likelihood of Occurrence based on database searches and the field survey:
  - Two were recorded during the survey in the Pallid Cuckoo and Rainbow Bee-eater;
  - Six are considered to have a High Likelihood of Occurrence within the Survey Area in the Forest Red-tailed Black Cockatoo, Baudin's Black



Cockatoo, Carnaby's Black Cockatoo, Peregrine Falcon, Chuditch and Western Brush Wallaby;

- Three are considered to have a Medium Likelihood of Occurrence within the Survey Area in the Malleefowl, Red-tailed Phascogale and Brush-tailed Phascogale; and
  - Thirteen species are considered to have a Low Likelihood of Occurrence within the Survey Area.
- The fauna assessment was undertaken at a time considered appropriate for the species of conservation significance considered to have a High or Medium Likelihood of Occurrence within the Survey Area.

#### **Key Findings from the Black Cockatoo Habitat Assessment**

- A total of 4.67 ha of Black Cockatoo foraging and roosting habitat was identified within the Survey Area.
- A total of 169 native trees met the criteria for breeding habitat. Sixty-four of these trees contained hollows, of which 18 had an estimated opening diameter of >120 mm.
- No evidence of Black Cockatoo foraging, breeding or roosting was identified within the Survey Area.



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# 1 Introduction

## 1.1 The Project

Co-operative Bulk Handling Pty (CBH) commissioned 360 Environmental Pty Ltd (360 Environmental) to undertake a Detailed Flora and Vegetation Survey, a Level 1 Vertebrate Fauna Survey and Black Cockatoo Habitat Assessment within various lots at their Dale Grain Receival Site, Westdale (herein known as the Survey Area), totalling 8.4 hectares (ha) (Figure 1).

The survey was required to support any vegetation clearing and/or environmental permit approval processes that may be required to develop the site.

## 1.2 Objectives and Scope

The overall objective was to survey the flora, vegetation, terrestrial fauna and Black Cockatoo habitat of the Survey Area with the key findings used to inform the environmental assessment approvals process.

The Scope of works includes:

- Desktop Assessment including database and publicly available searches; and
- Combined biological survey including:
  - Detailed Flora and Vegetation Survey;
  - Level 1 Vertebrate Fauna Survey; and
  - Black Cockatoo Habitat Assessment.





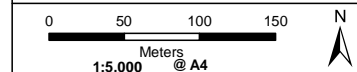


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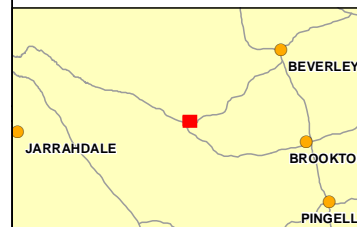
- Survey Area
- Local Road

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## LOCALITY MAP



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**Co-operative Bulk Handling**  
**Westdale Rd, Dale**

**Flora and Fauna Survey**

**Figure 1**  
**Location of the Survey Area**



## 2 Background

### 2.1 Legislation

Western Australian flora and fauna is protected formally and informally by legislative and non-legislative measures, which are as follows:

Legislative measures:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- WA *Wildlife Conservation Act 1950* (WC Act);
- WA *Biodiversity Conservation Act 2016* (BC Act);
- WA *Environmental Protection Act 1986* (EP Act); and
- WA *Biosecurity and Agriculture Management Act 2007* (BAM Act).

Non-legislative measures:

- WA Department of Biodiversity Conservation and Attractions (DBCA) Priority lists for fauna, flora and ecological communities;
- Weeds of National Significance (WoNS); and
- Recognition of locally significant populations by DBCA.

A short description of each is provided in Appendix A. Other definitions, including species conservation categories and Conservation categories are presented in Appendix B, conservation categories for Ecological Communities are provided in Appendix C, and Environmental Weeds and Declared Plant Categories are provided in Appendix D.

### 2.2 Biophysical Environment

#### 2.2.1 Climate

The closest long-term Bureau of Meteorology (BoM) weather station with a complete dataset is the Beverley weather station (station 10515), located approximately 35 km northeast of the Survey Area.

The long-term mean minimum temperature for Beverley ranges from 5.1°C (July and August) to 16.7°C (February) (1945 to 2018) and the long-term mean maximum temperature ranges from 16.9°C (July) to 34.3°C (January) (1968 to 2018) (Bureau of Meteorology, 2018) (Figure 2).

Beverley recorded 395.3 mm of rainfall in the 12 months prior to the survey (September 2017 to August 2018), which is 23.2 mm below the long-term average of 418.5 mm (1886 to 2018) (Bureau of Meteorology, 2018). In the three months prior to the survey (August

2018 to October 2018), 114.1 mm of rainfall was recorded, 4.2 mm below the long-term average of 118.3 mm for the same time period (1886 to 2018) (Bureau of Meteorology, 2018) (Figure 2).

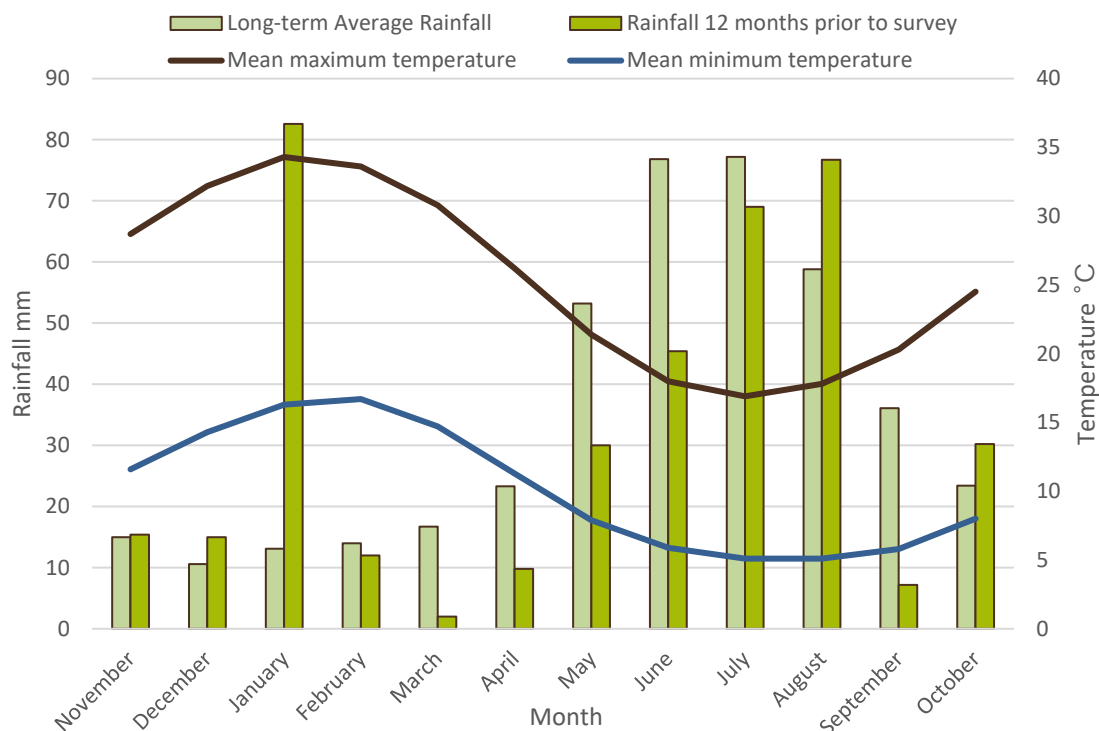


Figure 2: Long-term monthly rainfall and monthly rainfall in the 12 months prior to the survey, average maximum and minimum temperatures for Beverley (10515) (Bureau of Meteorology, 2018).

### 2.2.2 Interim Biogeographic Regionalisation of Australia

The Interim Biogeographic Regionalisation of Australia (IBRA) divides Australia into 89 bioregions based on major biological, geographical and geological attributes. These bioregions are subdivided into 419 subregions as part of a refinement of the IBRA framework (Department of the Environment and Energy, 2016). The Survey Area occurs within the Northern Jarrah Forest (JAF01) subregion of the Jarrah Forest bioregion (Figure 3), approximately 11 km west of the Katanning (AVW02) subregion of the Avon Wheatbelt bioregion.

The Northern Jarrah Forest subregion incorporates the area east of the Darling Scarp, overlying Archaean granite and metamorphic rocks of an average elevation of 300 m, capped by an extensive lateritic duricrust, dissected by later drainage and broken by occasional granite hills (Williams and Mitchell, 2001). In the east the laterite becomes deeply dissected until it compresses isolated remnants. The vegetation comprises Jarrah - Marri forest in the west with Bullich and Blackbutt in the valleys grading to Wandoo and Marri woodlands in the east with Powder bark on breakaways (Williams and Mitchell, 2001). There are extensive but localised sand sheets with *Banksia* low woodlands. Heath



is found on granite rocks and as a common understorey of forests and woodlands in the north and east (Williams and Mitchell, 2001).

The Katanning subregion is an erosional surface of gently undulating rises to low hills with abrupt breakaways. Continuous stream channels that in most years and colluvial processes are active. The soil of the subregion formed in colluvium or in-situ weathered rock. The vegetation includes woodland of Wandoo, York Gum and Salmon Gum with Jam and Casuarina (Beecham, 2001).

### 2.2.3 Soil-Land Systems and Surface Geology

Soil-landscape system mapping of Western Australia describes broad soil and landscape characteristics from regional to local scales, and has been captured at scales ranging from 1:20,000 to 1:250,000 (Department of Agriculture and Food WA, 2012). The Survey Area occurs within the Clackline 1 Subsystem (253Cc\_1) which is characterised by largely intact lateritic surface, often bounded by breakaways, pisolitic gravelly, yellowish brown soils that vary in texture from loamy sands to clays, with pockets of pale sands and areas of outcropping laterite (Figure 4).

The 1: 2,500,000 surface geology mapping indicates the majority of the Survey Area falls within the upper cretaceous carbonate rocks, greater Carnarvon basin 14290 surface geology unit, which is characterised by undifferentiated felsic intrusive rocks, including monzogranite, granodiorite, granite, tonalite, quartz monzonite, syenogranite, diorite, monzodiorite, pegmatite, and local abundant mafic and ultramafic inclusions (Department of Mines and Petroleum, 1999).

### 2.2.4 Hydrology

A review of the Department of Water and Environmental Regulation (DWER) GIS data sets indicates that no surface hydrology features occur within the Survey Area. The nearest surface hydrology features are the Flint Gully major tributary, which passes 700 m to the north of the Survey Area, and the Dale River, which passes 2.1 km to the south of the Survey Area (Figure 5).

## 2.3 Biological Environment

### 2.3.1 Broad Vegetation Types

Mapping of pre-European Broad vegetation within Western Australia was completed on a broad scale (1:1,000,000) by (Beard, J. S. 1976). These Vegetation Types were later re-assessed by Shepherd et. al. (2002) with some larger vegetation units divided into smaller units. Together, this pre-European database contains a total of 819 Vegetation Types within Western Australia.

One Broad Vegetation Type is mapped across the Survey Area (Figure 6), Bannister 4, which is characterised by southwest woodland dominated by Jarrah (*Eucalyptus*

*marginata*), Marri (*Corymbia calophylla*) and Wandoo (*E. wandoo*). The current representation of Bannister 4 at a local, regional and state level is shown in Table 1.

Mapping by Heddle *et al.* (1980) used landform-soil units determined by Churchward and McArthur (1978). The delineation of vegetation complexes is based on the concept of a series of plant communities forming regularly repeating complexes associated with a particular soil unit. The extent of this mapping does not cover the Survey Area, however it can be extrapolated that two Heddle *et al.* (1980) vegetation complexes are likely to occur within the Survey Area. These are described below and displayed in Figure 7:

- **Michibin Complex:** Open woodland of Wandoo (*E. wandoo*) with York Gum (*E. loxophleba*). *Acacia acuminata* and Rock Sheoak (*Allocasuarina huegeliana*) dominating the understorey.
- **Yalanbee Complex in Low Rainfall:** Woodlands of *Eucalyptus wandoo*-*Eucalyptus accedens*, less consistently open forest of *Eucalyptus marginata* subsp. *thalassica*-*Corymbia calophylla* on lateritic uplands and breakaway landscapes in arid and perarid zones.

**Table 1: Broad Vegetation Types within the State, Regional and Local Representation (Government of Western Australia, 2018)**

VEGETATION TYPE	PRE-EUROPEAN EXTENT (HA)	CURRENT EXTENT (HA)	REMAINING (%)	CURRENT EXTENT MANAGED IN DBCA LANDS (%)
<b>Vegetation Type representation in WA</b>				
Bannister 4	211,727.90	79,731.75	37.66	39.38
<b>Vegetation Type representation in the Jarrah Forrest Bioregion</b>				
Bannister 4	208,697.38	78,928.86	37.82	39.76
<b>Vegetation Type representation in the Shire of Beverley</b>				
Bannister 4	26,426.08	8,814.25	33.35	56.19

### 2.3.2 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are declared to prevent degradation of important environmental values such as Threatened flora, Threatened Ecological Communities or significant wetlands. Exemptions contained in the *Environmental Protection (Clearing of Native vegetation) Regulations 2004* for low impact land clearing do not apply in ESAs and a clearing permit is required.

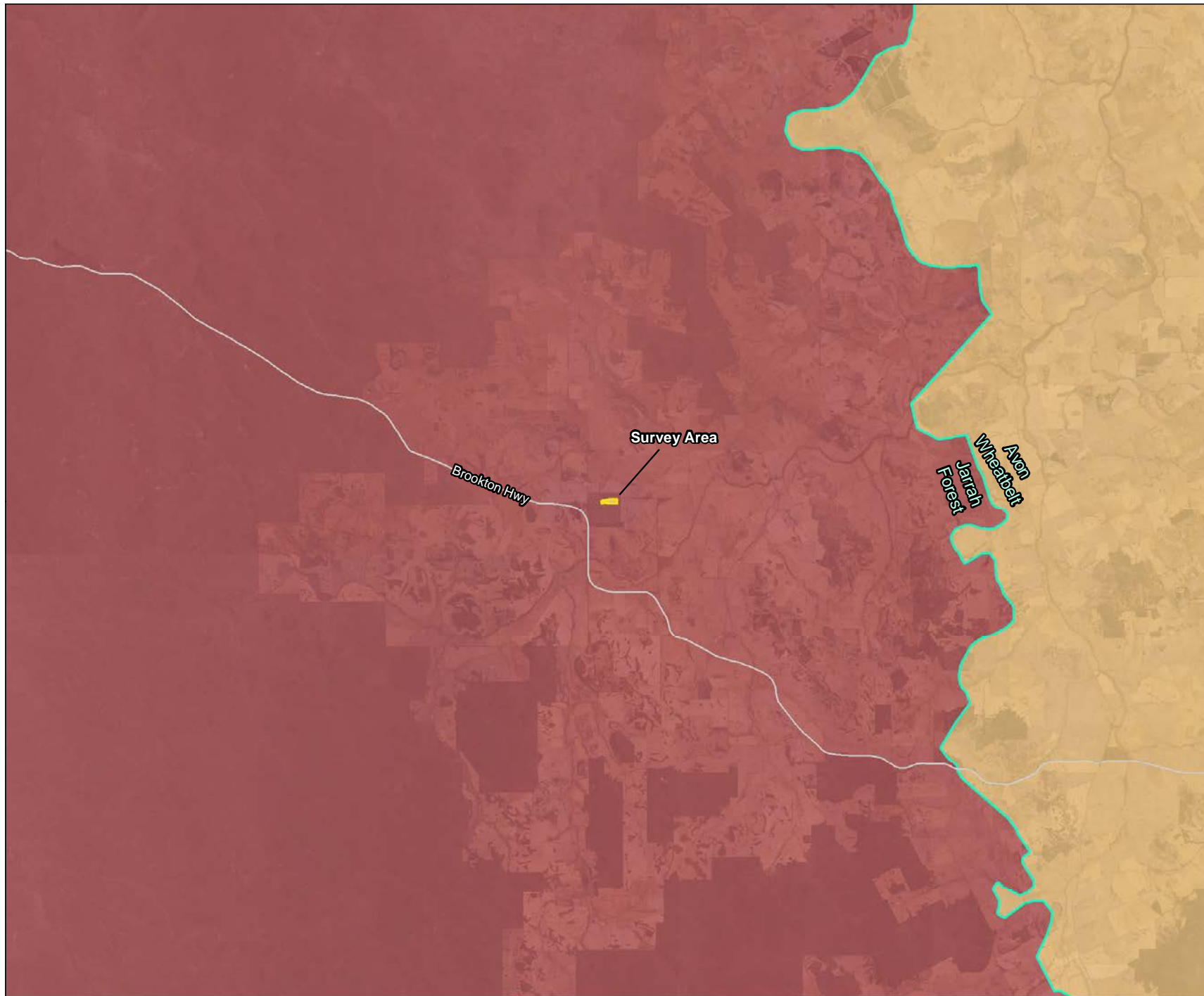
There are no mapped ESAs occurring within the Survey Area. The nearest ESAs are listed below and displayed in Figure 8 (Department of Water and Environmental Regulation, 2018):

- Several rare flora specimens, with the nearest occurring 9.6 km northwest and 15.5 km south of the Survey Area;
- Areas of environmental heritage including Mundaring State Forest occurring 9.9 km northwest of the Survey Area, Boyagin Nature Reserve occurring 25.7 km southeast of the Survey Area and Helena National Park occurring 27.2 km northwest of the Survey Area; and
- A TEC occurring 2.8 km northeast of the Survey Area.

### 2.3.3 Conservation Areas

There are no conservation areas within the Survey Area and the nearest conservation areas are (Department of Biodiversity Conservation and Attractions, 2017) (Figure 8):

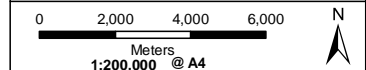
- Wandoo National Park, approximately 4.5 km north;
- Boyagarring Conservation Park, approximately 6.5 km southwest;
- Mundaring State Forest, approximately 7.6 km northwest;
- Youraling State Forest, approximately 8.4 km east;
- Strange Road Nature Reserve, approximately 8.6 km south;
- Wills Nature Reserve, approximately 12.0 km southeast;
- Brookton Highway Nature Reserve, approximately 12.1 km southeast
- Bartram Nature Reserve, approximately 12.2 southeast;
- Lupton Conservation Park, approximately 13.7 south;
- Napping Nature Reserve, approximately 17.0 km southeast;
- Jarrahdale State Forest, approximately 23.4 km west;
- Helena National Park, approximately 24.6 km northwest;
- Boyagin Nature Reserve, approximately 26.6 km southeast; and
- Monadnocks Conservation Park, approximately 28.9 km east of the Survey Area.



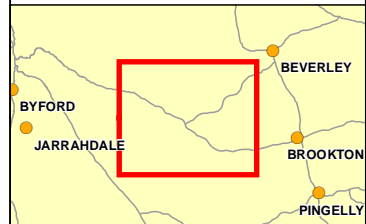
- Legend**
- Survey Area
  - State Road
  - IBRA Regions
  - IBRA Subregions**
  - Katanning
  - Northern Jarrah Forest

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**Co-Operative Bulk Handling  
Westdale Rd, Dale**

**Flora and Fauna Survey**

**Figure 3 IBRA**





## Legend

- Survey Area
- State Road
- Local Road

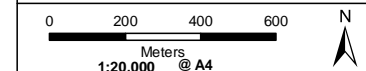
## Soil and Land Systems

253Cc: Moderately dissected areas with gravelly slopes and ridges and minor rock outcrop on the eastern side of the Darling Plateau over weathered granite and granitic gneiss. Loamy gravels, shallow\*

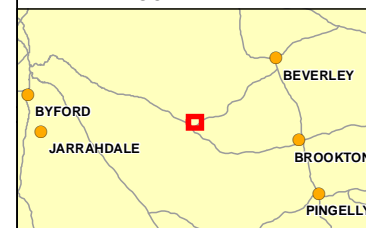
253Da: Sediments of the ancestral Avon river, from Beverley through West Dale to the Helena valley, that now occupies both valley and low rolling uplands.

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**Figure 4  
 Soil and Land Systems**





## Legend

Survey Area

State Road

Local Road

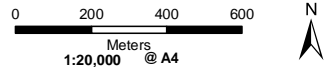
## Hydrography

Watercourse - minor

Drain - major

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**Figure 5 Hydrology**





### Legend

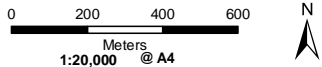
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- Local Road

### Pre-European Vegetation

- BANNISTER\_4
- DRYANDRA\_4

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**Co-operative Bulk Handling**  
**Westdale Rd, Dale**

**Flora and Fauna Survey**

**Figure 6a**  
**Beard Pre-European Vegetation**



## Legend

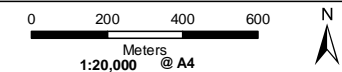
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- State Road
- Local Road

## Vegetation Complexes

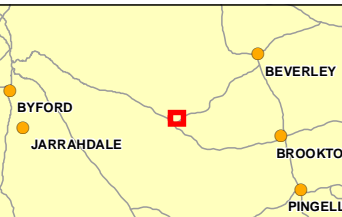
- Michibin Complex
- Williams- Avon- Brockman- Mumballup Complex
- Yalanbee Complex In Low Rainfall

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## LOCALITY MAP



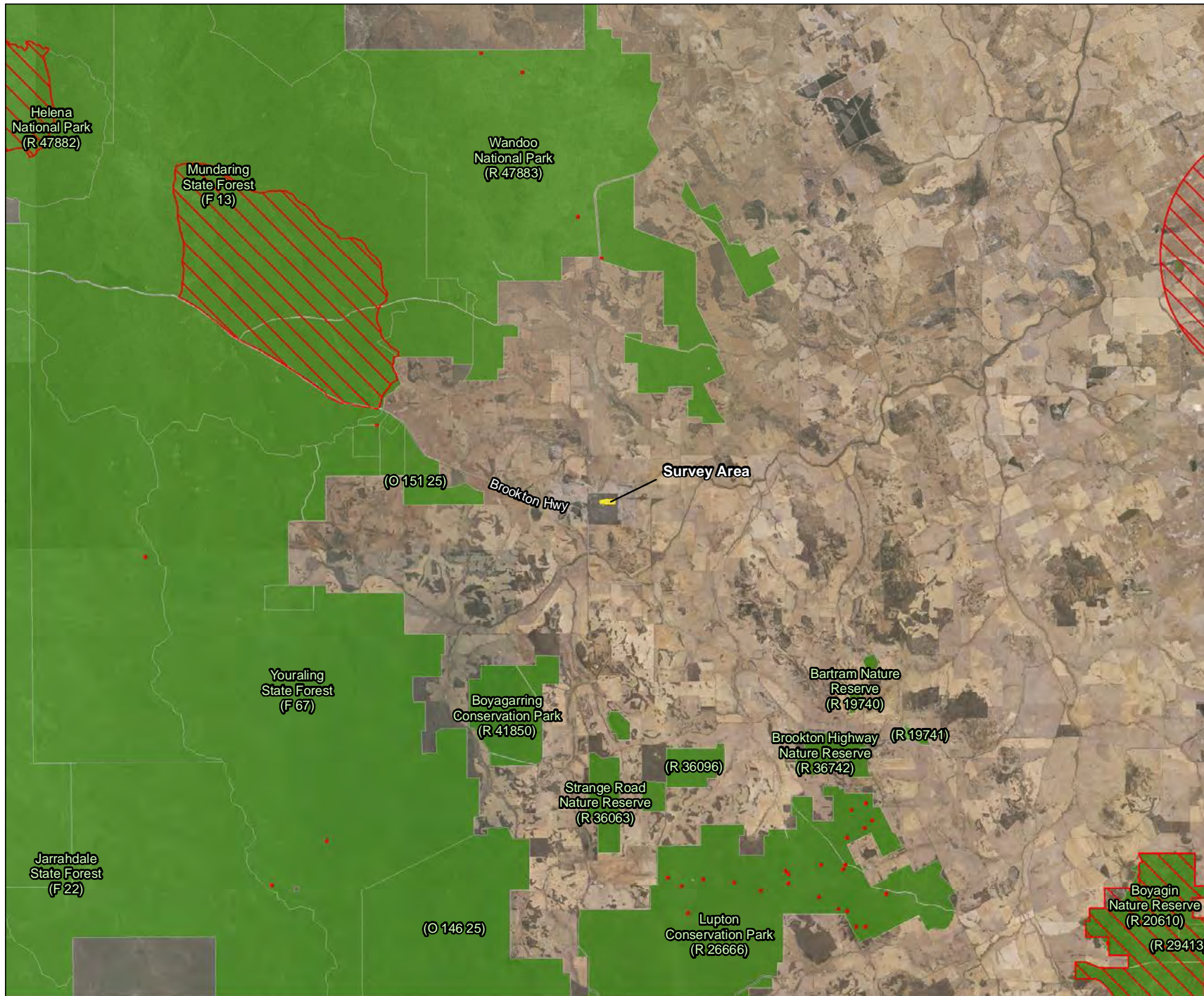
PROJECT ID 3004			DATE 8/01/2019
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CREATED SL	CHECKED AH	APPROVED SW	REVISION 0

**Co-operative Bulk Handling  
Westdale Rd, Dale**

**Flora and Fauna Survey**

**Figure 7  
Hedde Vegetation Complexes**



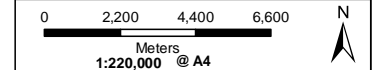


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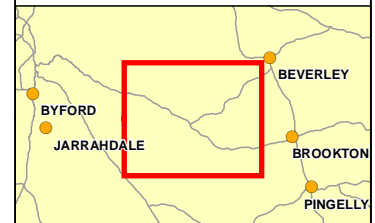
- Survey Area
- State Road
- Environmentally Sensitive Areas
- DBCA Managed Land

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**Co-operative Bulk Handling**  
 Westdale Rd, Dale

**Flora and Fauna Survey**

**Figure 8**  
**Conservation Areas**

## 3 Methods

### 3.1 Requirements for Flora and Fauna Surveys

This survey has been carried out as per the EPA requirements for environmental surveying and reporting of flora and fauna surveys in Western Australia where relevant, and as documented in:

#### Western Australia

- Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (Environmental Protection Authority, 2016a);
- Technical Guidance – Sampling Methods for Terrestrial Vertebrate Fauna (Environmental Protection Authority, 2016b); and
- Technical Guidance – Terrestrial Fauna Surveys (Environmental Protection Authority, 2016c).

#### Federal

- EPBC Act referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo (endangered) *Calyptorhynchus latirostris* Baudin's cockatoo (vulnerable) *Calyptorhynchus baudinii* Forest red-tailed black cockatoo (vulnerable) *Calyptorhynchus banksii naso* (Department of Sustainability Environment Water Population and Communities, 2012);
- Survey Guidelines for Australia's threatened mammals (Department of Sustainability Environment Water Population and Communities, 2011); and
- Survey guidelines for Australia's threatened birds Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Department of the Environment Water Heritage and the Arts, 2010); and
- Matters of National Environmental Significance Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999 (Department of the Environment, 2013).

### 3.2 Desktop Assessment

#### 3.2.1 Database Searches

Database searches were undertaken to identify potential conservation significant flora and fauna taxa and Ecological Communities within or surrounding the Survey Area. Database search details are outlined in Table 2 and presented in Appendix E.

Priority Ecological Communities (PEC) and Threatened Ecological Communities (TEC) within the Jarrah Forrest Bioregion were examined to determine if any corresponded with the Survey Area. In addition, an EPBC Protected Matters Search (PMST) was undertaken

to identify the potential for Matters of National Environmental Significance (MNES) to occur within or surrounding the Survey Area (Department of the Environment and Energy, 2018).

**Table 2: Database Searches of the Study Area**

DATABASE NAME	DATE RECEIVED	SEARCH TARGET	SEARCH AREA
Threatened and Priority Ecological Communities database (Department of Biodiversity Conservation and Attractions, 2018e)	9 Nov 2018	Listed TECs and PECs	5 km radial search around Survey Area centre point
Threatened and Priority Flora Database (TPFL) (Department of Biodiversity Conservation and Attractions, 2018g)	9 Nov 2018	Threatened and Priority Flora	25 km radial search around Survey Area centre point
DBCA Threatened and Priority Flora Species List (TP list) (Department of Biodiversity Conservation and Attractions, 2018g)	9 Nov 2018		25 km radial search around Survey Area centre point
Western Australian Herbarium flora (Department of Biodiversity Conservation and Attractions, 2018b)	9 Nov 2018		25 km radial search around Survey Area centre point
Threatened and Priority Fauna and Black Cockatoo Search (Department of Biodiversity Conservation and Attractions, 2018f)	9 Nov 2018	Threatened and Priority Fauna	15 km radial search around Survey Area centre point
<i>NatureMap</i> (Department of Biodiversity Conservation and Attractions, 2018d)	9 Nov 2018	Threatened and Priority Flora and Fauna	Flora: 5 km radial search around Survey Area centre point Fauna: 15 km radial search around Survey Area centre point
Protected Matters Search Tool (Department of the Environment and Energy, 2018)	9 Nov 2018		5 km radial search around Survey Area centre point

### 3.2.2 Likelihood of Occurrence

Conservation significant flora and fauna species identified from the database and desktop assessment were further examined to determine a Likelihood of Occurrence both prior and post field survey. The assessment was completed based on the following Likelihood of Occurrence criteria:

#### Recorded:

- Flora and fauna species recorded within the Survey Area during the field survey.



**High Likelihood of Occurrence:**

- **Flora** - Previously recorded within Survey Area; or within 10 km and suitable habitat occurs in the Survey Area; and
- **Fauna** - Preferred habitat is present in the Survey Area and known species distribution has been recorded on more than one occasion within 20 km of the Survey Area in the last 15 years.

**Medium Likelihood of Occurrence:**

- **Flora** - Previously recorded within 10 to 20 km of the Survey Area; and/or suitable habitat occurs in the Survey Area; and
- **Fauna** - The species has been recorded on more than one occasion within 20 km of the Survey Area in the last 15 years, but limited appropriate habitat occurs in the Survey Area; or the High Likelihood of Occurrence criteria has not been met, however the species is known from the general area and has good dispersal abilities; or Preferred habitat for the species occurs in the Survey Area but the species has not been recorded within 20 km in the last 15 years.

**Low Likelihood of Occurrence:**

- **Flora** - No suitable habitat appears to be present in the Survey Area and records are greater than 20 km; and
- **Fauna** - No suitable habitat is present within the Survey Area; or outside the species known distribution; or the species is known from the general area but has poor dispersal abilities.

Only species either recorded within the Survey Area or considered as having a High or Medium Likelihood of Occurrence will be discussed in detail. Species classified as having a Low Likelihood of Occurrence based on the above criteria will not be discussed unless a justification for this classification is required.

**3.2.3 Literature Review**

Relevant biological reports and literature were reviewed to assist with understanding of the key environmental values likely to occur within the Survey Area. The following reports were reviewed:

- *Eucalypt Woodlands of the Western Australian Wheatbelt: a nationally protected ecological community* (Commonwealth of Australia, 2016);
- *Kukerin Waste Water Treatment Plant Flora, Fauna and Black Cockatoo Survey* for the Water Corporation (360 Environmental Pty Ltd, 2016);
- *Railway Dam Biological Assessment* for the Shire of Narrogin (360 Environmental Pty Ltd, 2018); and

- *Newdegate Flora and Fauna Survey* for the CBH Group (360 Environmental Pty Ltd, 2015).

### 3.3 Flora and Vegetation

#### 3.3.1 Field Survey

A Detailed single season Flora and Vegetation Survey was undertaken by qualified field Botanist Sophie Fox (Flora Licence SL012192 and DRF Permit 74-1718) on the 16<sup>th</sup> of November 2018. The field survey included an assessment of three quadrats, mapping notes, vegetation condition notes, opportunistic flora collections and observations and a targeted Priority flora search.

A minimum of three quadrats of 10 x 10 m (100 m<sup>2</sup>) understory and 20 x 20 m (400 m<sup>2</sup>) overstory were installed in representative Vegetation Types. Each quadrat was accurately measured using measuring tapes, and the northwest corner was permanently demarcated with a steel fence dropper and pink flagging tape. At the NW corner of each quadrat, the location was recorded using a handheld Garmin GPS unit, and Fulcrum mobile data collection device with a photograph. Survey effort and quadrat locations are presented in Figure 9.

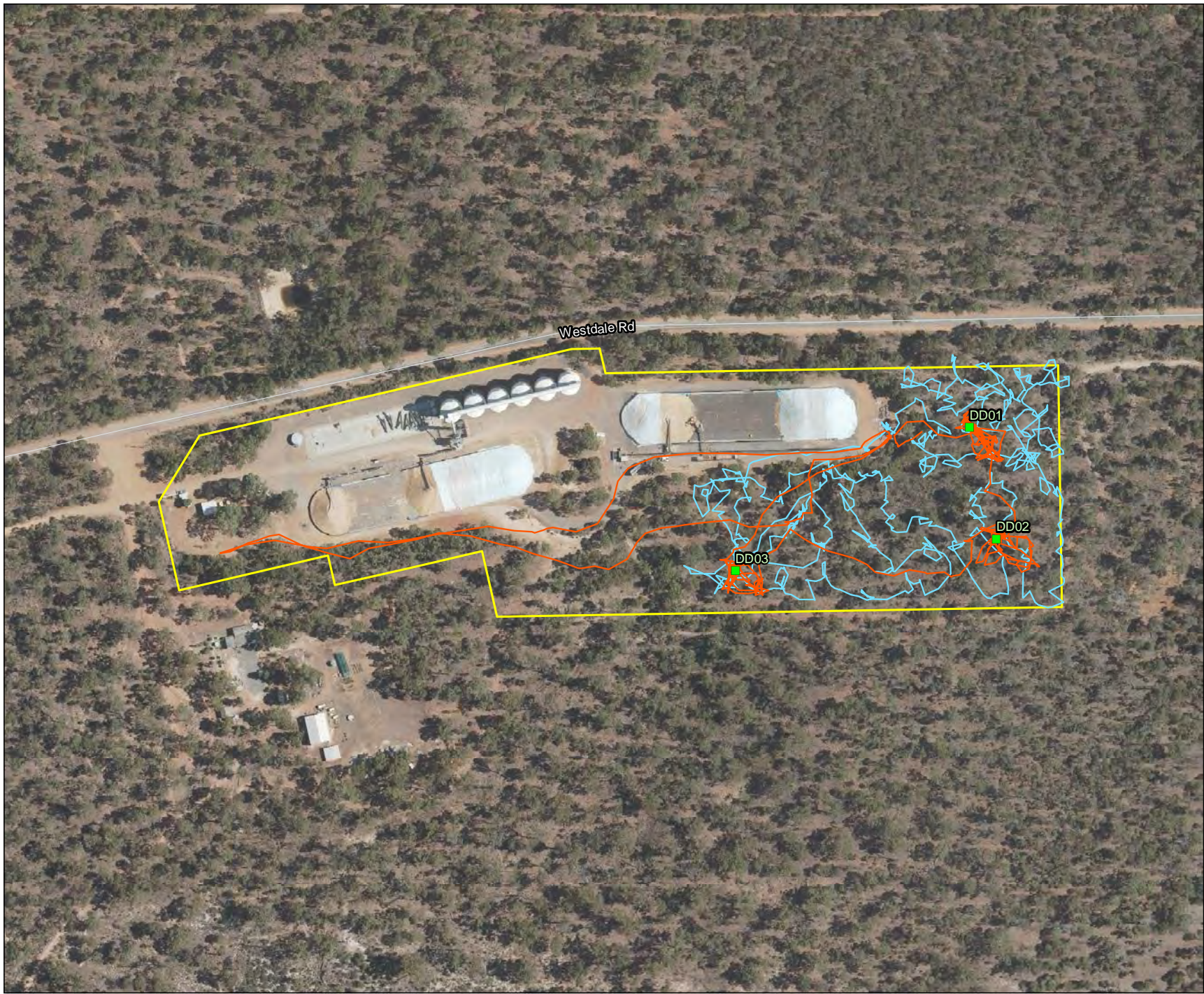
At each quadrat, the following data was recorded:

- Site code – a unique identifier allocated to each quadrat;
- Date and recorder – a record of the date of quadrat sample and a list of the personnel involved in sampling the quadrat;
- Location – GPS coordinates (MGA94) measured from the north west corner of the quadrat;
- Dimensions – the size and shape of the quadrat;
- Landform and soil description – a description of the quadrat habitat;
- Additional site descriptors – location information that might be useful in vegetation classification including, slope, aspect, litter cover, bare ground cover and fire history;
- Species list – a comprehensive vascular flora species list;
- Foliar cover – the estimated total percentage foliar cover for each species recorded;
- Height – the average height (in meters) of each species recorded;
- Vegetation description – a description of the vegetation according to the National Vegetation Information System (NVIS), Level 5. According to this level, vegetation is classified to 'association', where the dominant growth form, height, cover and

species (three species) for the three traditional strata (upper, mid and ground) are described;

- Vegetation condition – assessed according to the vegetation condition scale (Environmental Protection Authority, 2016a) (Appendix F); and
- Photographs – a photograph from the north west corner looking toward the south east corner was taken.



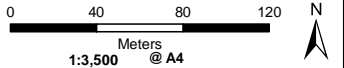


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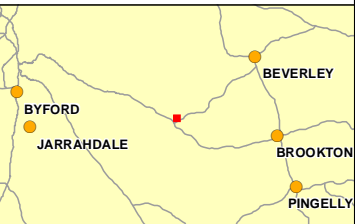
- Survey Area
- Local Road
- Quadrat Locations
- Survey Tracks GPS1
- Survey Tracks GPS2

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**Flora and Fauna Survey**

**Figure 9 Survey Effort and  
 Quadrat Locations**



### 3.3.2 Flora of Conservation Significance

The Survey Area was traversed on foot and opportunistic collections were made to identify flora of conservation significance which were listed in the Desktop assessment.

Specimens were collected for identification and lodgement at the Western Australian Herbarium (WA Herbarium).

### 3.3.3 Taxonomy and Nomenclature

Where field identification of plant taxa was not possible, specimens were collected systematically for later identification using resources of the WA Herbarium. Taxonomy was completed by experienced Botanist Sophie Fox, with assistance from experienced Taxonomist Frank Obbens at the WA Herbarium.

The finalised species list was checked against FloraBase (Department of Biodiversity Conservation and Attractions, 2018b) to determine the species' conservation status and known distribution. Introduced species were compared against the BAM Act Declared Plants list and the WONS list to determine their status (Thorp and Lynch, 2000).

### 3.3.4 Statistical Analyses

All statistics were carried out using Primer-E version 6.1.5 (Clarke and Gorley, 2006). Quadrats were classified on the basis of similarity in species composition. Using the results of the observations made in the field, boundaries of the Vegetation Types were finalised on aerial photographs, at a scale of 1:3,500, with the aid of GPS coordinates taken during the field survey. The Vegetation Types were digitised and produced as electronic mapping data using GIS software.

In order to assess the adequacy of the field survey, a species accumulation curve was generated. The species accumulation curve analysed accumulation rates of species identified from the survey. This statistical test can determine if the area has been adequately surveyed (species accumulation curves can be useful in estimating total species richness). The accumulation curve was based on the presence-absence data and the sample order being random with a maximum of 999 permutations with four estimator curves (Chao 2, Jackknife 1, Jackknife 2 and Bootstrap) (Clarke and Gorley, 2006). These estimator curves help predict the true total number of species that would be observed as the number of sites tends to infinity.

A dendrogram was also generated to illustrate and group quadrat information based on cluster analysis using a Bray-Curtis similarity matrix. Quadrat species presence-absence data was transformed (Square root) and then tested for similarity with outcomes presented in a dendrogram graph (Appendix G).



## 3.4 Vertebrate Fauna

### 3.4.1 Field Survey

A Level 1 Vertebrate Fauna Survey and targeted Black Cockatoo Survey was undertaken on non-consecutive days on the 16<sup>th</sup> and 21<sup>st</sup> of November 2018 by Senior Zoologist Andrew Hide. The purpose of the field survey was to verify the accuracy of the desktop assessment and to further delineate and characterise the fauna assemblages and fauna habitat in the Survey Area. The field survey consisted primarily of fauna habitat assessments, systematic bird searches and opportunistic fauna observations.

### 3.4.2 Fauna Habitat Assessment

Vegetation Types and distinctive landforms 'component of the landscape with characteristic shape produced by natural processes' (Environmental Protection Authority, 2016b) were used to identify the broad faunal habitats in the Survey Area. These fauna habitats were then assessed for their potential to support species of conservation significance and the quality of habitat they provide to a wider suite of fauna.

Each broad habitat type description includes information on:

- Location of the broad habitat type within the Survey Area (GPS co-ordinate) and its relative percentage;
- Habitat condition was assessed using the (Environmental Protection Authority, 2016b) vegetation condition scale (Appendix F);
- Dominant vegetation and structure (e.g. number of vegetation strata);
- Hollow-bearing trees and dead stags (e.g. average size and abundance of hollows);
- Description of any rock and rocky outcrops;
- Logs (e.g. abundance and size);
- Substrate (e.g. leaf litter);
- Description of any observed nests and roosts (if present);
- Associated fauna species observed using the habitat;
- Disturbance (e.g. cattle grazing, fire); and
- Photo showing a typical example of the broad fauna habitat type.

### 3.4.3 Systematic Bird Survey

Systematic bird surveys were undertaken within the Survey Area for 20 minutes in a 2 ha quadrat (Environmental Protection Authority, 2016c) at each fauna habitat assessment location (at a minimum). Where practicable, this was undertaken during typical peak periods of activity when birds are calling and moving about, which is typically in the 3-4 hours of sunrise, particularly during warmer periods.

#### 3.4.4 Opportunistic Observation

Fauna were opportunistically observed and recorded within the Survey Area. Opportunistic observations involved targeted searches of habitats in the Survey Area that potentially support fauna of conservation significance as well as systematic searches which included looking through leaf litter, overturning rocks, looking under decorticated bark and searches for scats, tracks, burrows and other traces of animals. If conservation significant species were located, the coordinates were geospatially recorded with the Fulcrum mobile application providing accurate GPS locations for each record.

In addition, opportunistic records of fauna species encountered while travelling throughout the Survey Area were documented. Opportunistic data comprises records of fauna species by location and coordinates that were recorded using the Fulcrum mobile application.

#### 3.4.5 Taxonomy

Where there was doubt on species names identified in the desktop assessment (through subsequent name changes or taxonomic reviews), an effort was made to determine the current scientific name for each taxon. Taxonomy and nomenclature in this report follows the WA Museum checklist 2018 (Western Australian Museum, 2018) where relevant.

### 3.5 Black Cockatoos

#### 3.5.1 Field Survey

The Black Cockatoo assessment was undertaken alongside the Vertebrate Fauna Survey and involved traversing the Survey Area by foot. The survey was conducted in accordance with the Department of Sustainability, Environment, Water, Population and Community (2012) (now Department of Environment and Energy's) EPBC Act Referral Guidelines for three threatened Black Cockatoo Species: Carnaby's Cockatoo, Baudin's Cockatoo and Forest Red-tailed Black Cockatoo (Department of Sustainability Environment Water Population and Communities, 2012)

#### 3.5.2 Foraging Habitat

The Black Cockatoo assessment involved assessing the habitat for tree and shrub species known to be important dietary items e.g. *Marri* and *Banksia* sp. as outlined within the referral guidelines. It also included looking for:

- Evidence of feeding (chewed cones, seed and nut material); and
- Opportunistic observations of Black Cockatoos foraging or utilising the Survey Area.

#### 3.5.3 Breeding habitat

Any trees meeting each of the following criteria for potential breeding were recorded with a GPS or Fulcrum mobile application:

- Native trees (e.g. Jarrah, Tuart, Marri, Wandoo and Salmon Gum);
- Diameter at Breast Height (DBH @ 1.3 m) > 500 mm (> 300 mm for Wandoo and Salmon Gum) regardless of the presence or absence of hollows;
- Hollows observed within the trees were categorised;
  - Containing hollows = tree contains hollows with an opening diameter < 120 mm; and
  - > 1200 mm = tree containing hollows with an opening diameter > 120 mm, which has the potential of being utilised by Black Cockatoo.

Trees with multiple stems, swellings or forking/branching at breast height were measured separately. In these instances, the diameter was measured just above breast height to gain a more accurate measurement of diameter.

#### 3.5.4 Roosting Habitat

While undertaking the assessment any evidence of roosting or areas identified as having high roosting potential were identified, recorded and mapped.

## 4 Results

### 4.1 Limitations and Constraints

Limitations and constraints of the Detailed Flora and Vegetation Survey, Level 1 Fauna Survey and Black Cockatoo Habitat Assessment are detailed in Table 3.

**Table 3: Limitations and Constraints Associated with the Survey**

VARIABLE	DEGREE OF LIMITATION	POTENTIAL CONSTRAINTS ON SURVEY OUTCOMES
Access	No limitation	The entire Survey Area was accessed either by vehicle or on foot.
Experience	No limitation	<p>The personnel who executed the survey were practitioners suitably qualified in their respective fields:</p> <ul style="list-style-type: none"> <li>● Field Staff: Sophie Fox (Botanist), Andrew Hide (Senior Zoologist);</li> <li>● Flora Taxonomy: Sophie Fox, Frank Obbens;</li> <li>● Data Interpretation and Reporting: Sophie Fox, Evan Webb and Andrew Hide; and</li> <li>● Technical Review: Narelle Whittington (Principal Botanist); and</li> <li>● Report Review: Scott Walker (Principle Ecologist/Group Leader)</li> </ul>
Timing, weather, season	Low limitation	<p>The EPA guidelines recommend that flora surveys within the South-West region are completed during spring (September – November), and that a supplementary survey be completed after Autumn rains.</p> <p>Flora composition changes with time, particularly seasonally as a result of changes in conditions such as rainfall. Therefore, botanical surveys completed at different times of the year will often produce varying results.</p> <p>The survey was completed in November which is within the recommended survey period for the South-West region.</p>
Life forms sampled	Low limitation	<p>Quadrats and opportunistic collections were used to collect data on the species present within the Survey Area. A total of 44 flora taxa were recorded, including one Priority 4 species, <i>Hibbertia montana</i>.</p> <p>As a Level 1 Vertebrate Fauna Survey was carried out, many species that occur in the Survey Area would not have been observed, particularly small ground-dwelling fauna</p>

VARIABLE	DEGREE OF LIMITATION	POTENTIAL CONSTRAINTS ON SURVEY OUTCOMES
		that are normally captured by methods such as trapping. All conservation significant species previously recorded in the area have been considered. Based on the fauna habitat present, those species deemed to have a High or Medium Likelihood of Occurrence within the Survey Area have been addressed in this report.
<b>Completeness</b>	No limitation	A Detailed single season Flora, Vegetation and Level 1 Vertebrate Fauna survey was completed. A total of three flora quadrats and three fauna habitat assessments were completed. One Vegetation Type occurred within the Survey Area, which was adequately surveyed with a minimum of three quadrats completed as per the EPA requirements. GPS tracks were not recorded for the western half of the Survey Area (Figure 9), due to GPS fault during the survey.
<b>Disturbance / Current land use</b>	Moderate limitation	Parts of the Survey Area have been cleared previously and are subject to some soil disturbance.

## 4.2 Literature Review

Relevant biological reports are summarised below:

***Eucalypt Woodlands of the Western Australian Wheatbelt: a nationally protected ecological community* (Commonwealth of Australia, 2016)**

The *Eucalypt Woodlands of the Western Australian Wheatbelt: a nationally protected ecological community* document is a guide to what represents a *Eucalypt Woodland of the Western Australian Wheatbelt*. Including the features and characteristics, minimum patch size, vegetation health requirements, distribution and what is not included.

***Kukerin Waste Water Treatment Plant Flora, Fauna and Black Cockatoo Survey for the Water Corporation* (360 Environmental Pty Ltd, 2016)**

360 Environmental was commissioned by the Water Corporation to complete a flora, vegetation, fauna and Black Cockatoo assessment within the Kukerin waste water treatment plant in June 2016. A total of five vegetation types were described for the Survey Area, none of which were considered to represent the federally listed TEC, the Critically Endangered Eucalypt Woodlands of the Western Australian Wheatbelt. A flora taxa inventory of 57 plant taxa was compiled for the Survey Area. No Threatened species were recorded during the survey, one Priority 4 species, *Banksia densa* var. *parva*, was recorded.

A total of two fauna habitats were recorded within the Survey Area. No fauna of conservation significance were recorded during the survey. No potential Black Cockatoo breeding trees were recorded, and no foraging habitat was recorded.

***Railway Dam Biological Assessment for the Shire of Narrogin (360 Environmental Pty Ltd, 2018)***

360 Environmental was commissioned by the Shire of Narrogin to assist in developing a Management Plan for the Railway Dam Reserve. 360 completed a flora, vegetation, fauna and Black Cockatoo assessment in March 2018. A total of 21 flora taxa were recorded within the site, of those, 13 were introduced species. Suitable Black Cockatoo habitat species were identified within the Survey Area.

***Newdegate Flora and Fauna Survey for the CBH Group (360 Environmental Pty Ltd, 2015)***

360 Environmental was commissioned by the CBH Group (CBH) in Jul 2015 to undertake a Detailed flora and vegetation assessment on Lake Biddy Road, Newdegate. A total of 130 taxa were recorded, including 20 introduced species. Six Vegetation Types were identified within the Survey Area, four of these are considered to represent the Priority 3 listed Ecological Community, *Eucalypt Woodlands of the Western Australian Wheatbelt*. Two of the Vegetation Types are considered to represent the Priority 1 Ecological Community, *Red Morrel Woodlands of the Wheatbelt*.

## 4.3 Flora and Vegetation

### 4.3.1 Desktop Assessment

Results of the DBCA Flora database searches are illustrated in Figure 10 and the results of all database searches are presented in Appendix E. A total of 99 species of conservation significance were identified as occurring within a 25 km buffer of the Survey Area, including two presumed Extinct flora, 15 Threatened flora and 82 Priority flora.

The Survey Area occurs approximately 2.8 km from one federally listed Threatened Ecological Community; *Eucalypt Woodlands of the Western Australian Wheatbelt* (Figure 11). *Eucalypt Woodlands of the Western Australian Wheatbelt* is classified as a Critically Endangered TEC under the EPBC Act and is also classified as a Priority 3 Ecological Community by the DBCA and typified as (Commonwealth of Australia, 2016):

*Eucalypt-dominated woodlands in the Western Australian Wheatbelt region as defined by the IBRA Avon Wheatbelt 1 and 2 and Western Mallee subregions with the specific exceptions of; woodlands and forests dominated by Jarrah (E. marginata) or Marri (Corymbia calophylla) where they occur without York Gum present; and non-woodland communities dominated by eucalypts, specifically those dominated by eucalypts with a mallee growth form. Community is defined primarily by its structure as a woodland. The presence in the canopy layer of eucalypt trees – most commonly Salmon gum, York gum, Red Morrel or Gimlet defines the Wheatbelt woodlands. Several of the other emergent*

*eucalypt species which may be present as a defining species e.g. Kondinin Blackbutt, E. myriadena, Salt River Gum, Silver Mallet and Mallet are found only in the Western Australian Wheatbelt.*

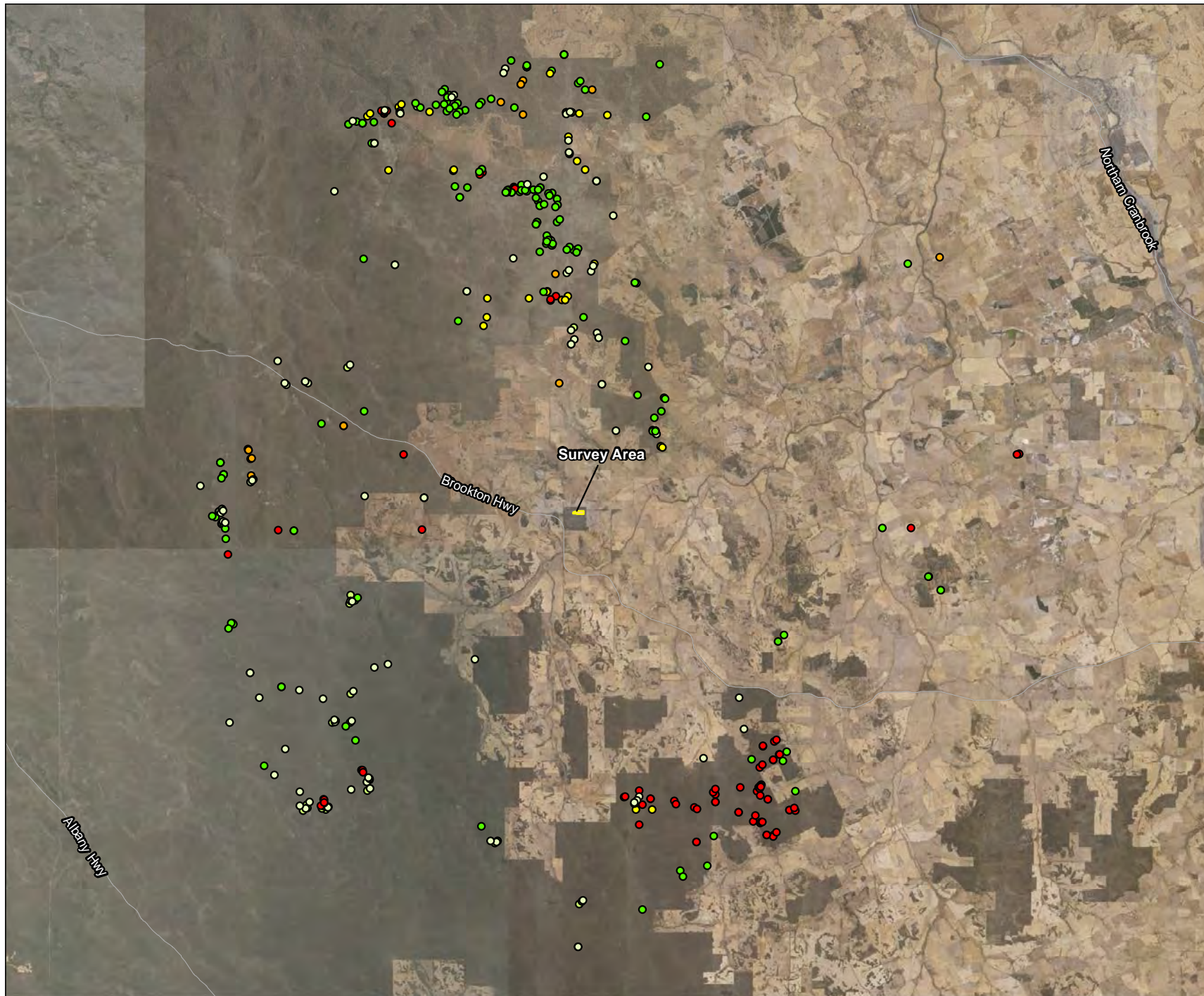
*Eucalypt Woodlands of the WA Wheatbelt* were protected on December 2015 as a nationally TEC under Australia's national environment law.

#### 4.3.1.1 Likelihood of Occurrence

A Likelihood of Occurrence assessment was completed on the 99 species of conservation significance recorded in the database searches. The Likelihood of Occurrence of these species was then re-assessed post-field survey and identified one species with a Medium Likelihood of Occurrence within the Survey Area (Appendix H);

- *Drakaea micrantha* (T).





## Legend

Survey Area

State Road

## DBCA Threatened and Priority Flora Records

● Threatened

● Priority 1

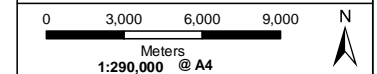
● Priority 2

● Priority 3

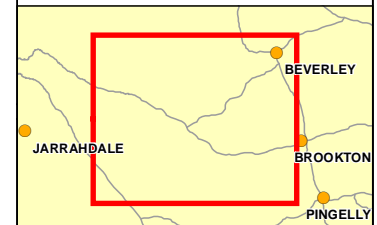
● Priority 4

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**Flora and Fauna Survey**

**Figure 10 DBCA Threatened and Priority Flora Records**





## Legend

Survey Area

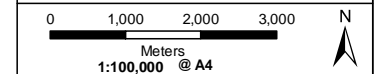
State Road

## TECs and PECs - 200m buffers

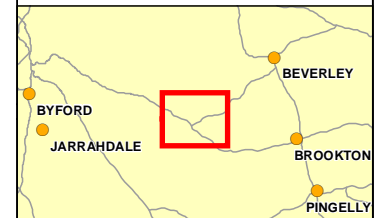
Priority 3, Eucalypt woodlands of the Western Australian Wheatbelt

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**Flora and Fauna Survey**

**Figure 11 Threatened and Priority Ecological Communities**

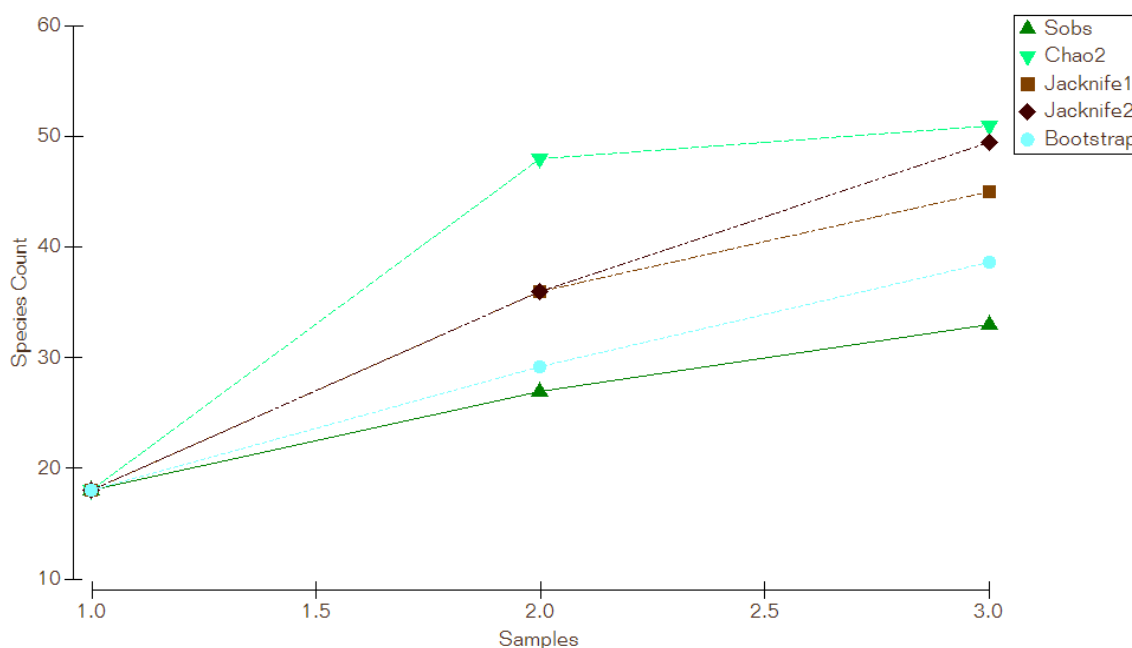
#### 4.3.2 Flora

A total of 44 flora species (including species, subspecies, varieties and forms) from 19 families and 34 genera were identified within the Survey Area from three quadrats and opportunistic collections and observations. The most commonly occurring families were Poaceae (nine taxa), Fabaceae (five taxa) and Proteaceae (five taxa). The most frequently recorded genus were *Acacia* and *Banksia*.

All specimens collected were able to be fully identified.

A species accumulation curve was generated using quadrat floristic data showing diversity of actual species collected (Sobs) and estimated floristic diversity based on the four estimator tests in Chao 2 (155), Jackknife 1 (148), Jackknife 2 (170) and Bootstrap (127) (Clarke and Gorley, 2006) (Figure 12). A total of 44 taxa were recorded from three quadrats, while the four species extrapolator curves gave an estimated range of 38 to 51 taxa for the Survey Area.

The site versus species matrix can be viewed in Appendix I, a systematic flora species list is presented in Appendix J and site data is presented in Appendix K.



**Figure 12: Species Accumulation Curve for Species Richness within the Survey Area**

No Threatened flora species pursuant to the EPBC Act 1999 and/or gazetted as Threatened/Declared Rare Flora pursuant to the WC Act 1950 were recorded during the survey. One Priority species as listed by DBCA was recorded within the Survey Area, *Hibbertia montana* (P4) (Quadrat location DD03, Zone 50H, E464659, N6425251).

#### *Hibbertia montana* (P4)

*H. montana* is an erect, straggling or sprawling shrub growing to 0.7m in height. It produces yellow flowers between July to October. It is known to grow on loam over granite, lateritic

soils and gravel (Department of Biodiversity Conservation and Attractions, 2018c). The identification of this specimen was confirmed at the WA Herbarium by Sophie Fox and Frank Obbens and has been submitted along with a Threatened and Priority Flora Report Form (Appendix L).

#### 4.3.3 Other Significant Flora

No species identified within the Survey Area are considered to represent an extension of their known range, when compared to the current records of known locations on Florabase (Department of Biodiversity Conservation and Attractions, 2018b).

#### 4.3.4 Introduced Flora

A total of seven introduced species were recorded within the Survey Area, representing approximately 16 % of the total taxa recorded. None of these are listed as Declared Pests (Department of Primary Industries and Regional Development, 2018) or WoNS under the BAM Act (Table 4).

**Table 4: Introduced Flora Species within the Survey Area**

Species	Common Name
<i>Aira caryophyllea</i>	Silvery Hairgrass
<i>Avena barbata</i>	Bearded Oat
<i>Briza maxima</i>	Blowfly Grass
<i>Briza minor</i>	Shivery Grass
<i>Bromus diandrus</i>	Madrid Brome
<i>Ehrharta calycina</i>	Perennial Veldt Grass
<i>Ursinia anthemoides</i>	Ursinia


#### 4.3.5 Vegetation Types

A total of one Vegetation Type was mapped within the Survey Area. A description and representative photo are presented in Table 5.

Vegetation Type mapping is presented in Figure 13. The data collected from each quadrat are presented in Appendix K.



Table 5: Vegetation Type Description and Extent within the Survey Area

VEGETATION TYPE CODE	VEGETATION TYPE DESCRIPTION	SITES	EXTENT (HA) IN THE SURVEY AREA	EXTENT (%) IN THE SURVEY AREA	REPRESENTATIVE PHOTO
EwCc	<i>Eucalyptus wandoo</i> mid open forest over <i>Corymbia calophylla</i> low isolated trees over <i>Xanthorrhoea preissii</i> , <i>Macrozamia reidleyi</i> isolated clumps of shrubs over <i>Acacia lasiocarpa</i> var. <i>sedifolia</i> , <i>Lepidosperma leptostachyus</i> low isolated clumps of shrubs and sedges	DD01 DD02 DD03	4.67	55	
Cleared areas			3.76	45	
Total Area			<b>8.43</b>	<b>100</b>	





### Legend

- Survey Area
- Local Road
- Quadrat Locations

### Vegetation Types

- EwCc
- Cleared

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS  
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 - OTHER DATA SOURCED LANDGATE 2018  
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#### LOCALITY MAP

PROJECT ID 3004		DATE 17/01/2019	
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### Figure 13 Vegetation Types



#### 4.3.6 Vegetation Condition

Vegetation condition within the Survey Area ranged from Very Good to Completely Degraded. The majority of remnant vegetation within the Survey Area was considered to be in Very Good condition (26 %). The areas considered to be in Completely Degraded condition (45 %) lack remnant vegetation as they have been previously cleared and are currently occupied by infrastructure. Disturbances included areas of historical clearing, litter, tracks and weeds. Vegetation condition and its extent within the Survey Area is presented in Table 6 and Figure 14.

**Table 6: Vegetation Condition Assessed within the Survey Area**

VEGETATION CONDITION	EXTENT WITHIN SURVEY AREA	EXTENT WITHIN SURVEY AREA
	(HA)	(%)
Very Good	2.23	26
Good	1.07	13
Degraded	1.37	16
Cleared/Completely Degraded	3.76	45
<b>Total Area</b>	<b>15.8</b>	<b>100</b>

#### 4.3.7 Threatened and Priority Ecological Communities

The database search showed that the Survey Area occurs near to the buffer of the federally listed TEC and Priority 3 PEC, *Eucalypt Woodlands of the Western Australian Wheatbelt* (Figure 11).

For the Survey Area to be considered as part of the *Eucalypt Woodlands of the Western Australian Wheatbelt* the following key elements are required as specified by the Commonwealth of Australia 2016;

- Must be located within the Avon Wheatbelt one or two subregions, or the Western Mallee subregion;
- An intact area of woodland must be in Good to Pristine condition as per Keighery (Environmental Protection Authority, 2016a);
- The area must contain Eucalypt species such as York gum (*Eucalyptus loxophleba* subsp. *loxophleba*), Salmon gum (*Eucalyptus salmonophloia*), Wandoo (*Eucalyptus wandoo*) or Silver mallet (*Eucalyptus falcata*);
- Mallee species of Eucalypt are not included as part of the *Eucalypt Woodlands of the Western Australian Wheatbelt*;
- The area must contain some native understorey vegetation as listed in the EPBC Act 1999;
- A minimum patch size of 2 ha is required for areas where:

- A high-quality native understorey remains – i.e. no more than 30% total vegetation cover of exotic plant species; OR
- Exotic plant species account for over 30 to 50 % total vegetation understorey cover AND mature trees are present, with at least five such trees per half hectare. Mature trees have a diameter at breast height (DBH) of 30 cm or more, and often contain hollows.
- A minimum patch size of 5 ha is required for areas where:
  - Vegetation patches where exotic plant species account for up to or over 50% total vegetation understory cover, where there are no less than five mature trees per half hectare; OR
  - Exotic plant species account for over 50 – 70% total vegetation understorey cover AND mature trees are present, with at least five such trees per half hectare.

Based on examination of the database searches, and the known characteristics of the *Eucalypt Woodlands of the Western Australian Wheatbelt* as listed in Commonwealth of Australia 2016, it has been concluded that Vegetation Type EwCc within the Survey Area is representative of the *Eucalypt Woodlands of the Western Australian Wheatbelt* TEC/PEC. This conclusion has been drawn based on the following;

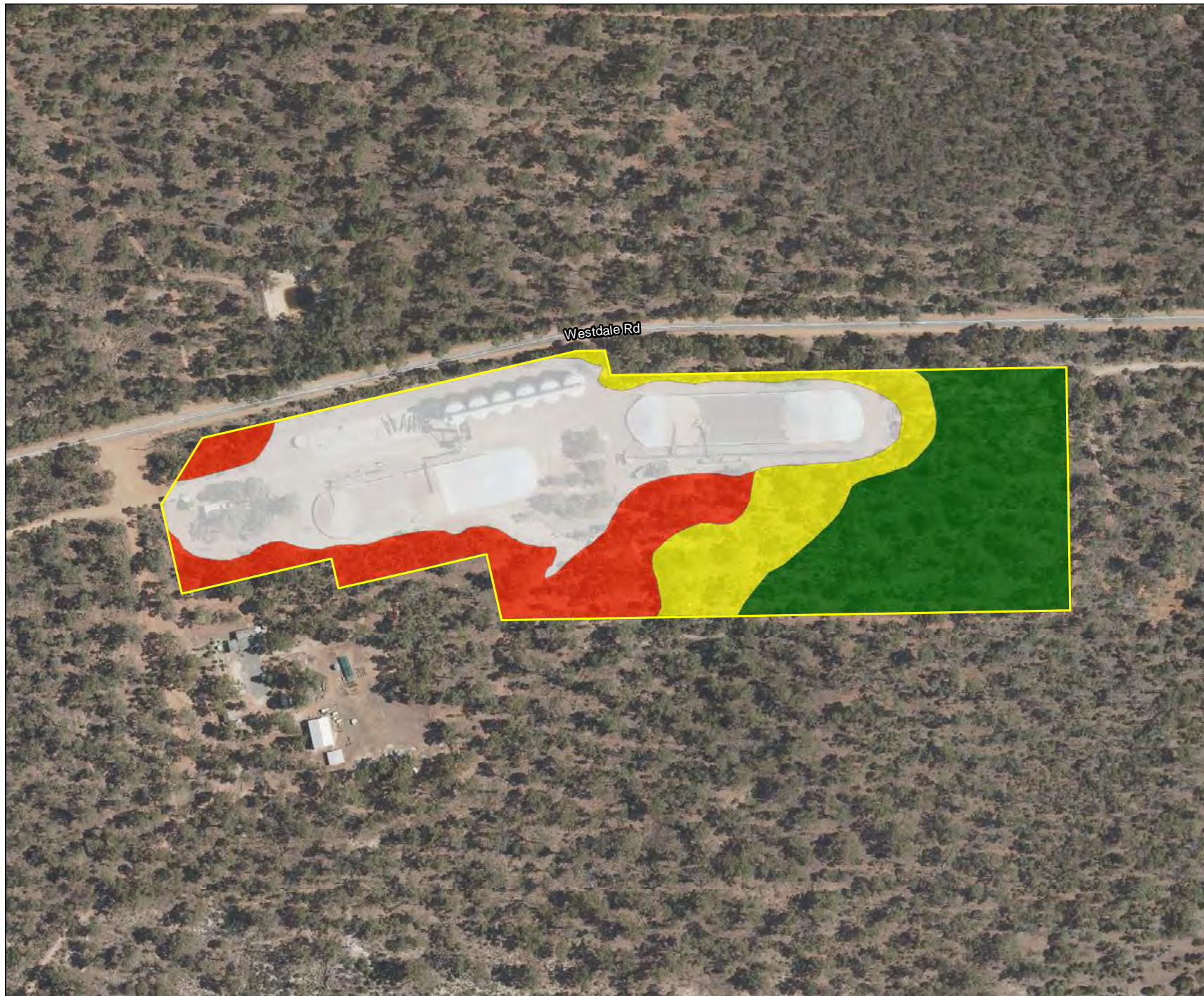
- Despite the Survey Area being classified as occurring within the Jarrah Forrest bioregion, it occurs 11 km from the border to the Avon Wheatbelt bioregion, and 2.8 km from existing known TECs of *Eucalypt Woodland of the Swan Coastal Plain*, which occur within the Jarrah Forrest (Figure 11);
- Within the Survey Area a total of 4.67 ha of woodland is present, however, this forms part of a larger patch size of approximately 160 ha in size;
- The vegetation condition of EwCc within the Survey Area ranges Degraded to Very Good. The portion of the Survey Area considered to be in Good to very Good condition covers an area of 3.30 ha;
- The species present within the Survey Area corresponds with the species list as listed by the approved conservation advice species list which include *Eucalyptus wandoo*, *Corymbia calophylla*, *Banksia sessilis*, *Bossiaea eriocarpa*, *Acacia lasiocarpa*, *Gastrolobium spinosum*, and *Hakea lissocarpha*; and
- The woodland within the Survey Area contains 169 trees which were recorded as having a DBH of over 30 cm; 18 of these have hollows of a size which could be utilised by Black Cockatoos.

#### 4.3.8 Regional Representation

Vegetation Types described in the Survey Area were correlated with the Broad Vegetation Types (Beard, J. S. 1976) and (Shepherd, Beeston and Hopkins, 2002) by examining

similarities in vegetation descriptions. Differences exist with the terminology used in the descriptions as they are based on different methods of categorising and characterising Vegetation Types, and the different spatial scale of the analysis (i.e. region vs. local scale). The EwCc Vegetation Type corresponds with Bannister 4, which is characterised by southwest woodland dominated by Jarrah (*Eucalyptus marginata*), Marri (*Corymbia calophylla*) and Wandoo (*E. wandoo*). The current representation of Bannister 4 at a local, regional and state level is shown in Table 1, Section 2.3.1.

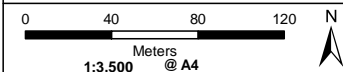




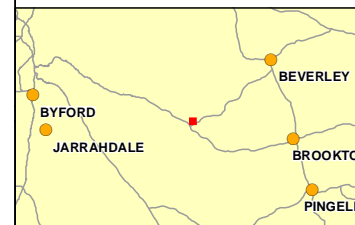
- Legend**
- Survey Area
  - Local Road
- Vegetation Condition**
- Very Good
  - Good
  - Degraded
  - Cleared/Completely Degraded

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS  
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 - OTHER DATA SOURCED LANDGATE 2018  
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**LOCALITY MAP**



<b>PROJECT ID</b>	<b>DATE</b>
3004	14/01/2019

<b>HORIZONTAL DATUM AND PROJECTION</b>	
GDA 1994 MGA Zone 50	

<b>CREATED</b>	<b>CHECKED</b>	<b>APPROVED</b>	<b>REVISION</b>
SL	AH	SW	0

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**Figure 14 Vegetation Condition**



## 4.4 Vertebrate Fauna

### 4.4.1 Desktop Assessment

Twenty-four conservation significant fauna species were recorded from the database searches. These species comprised:

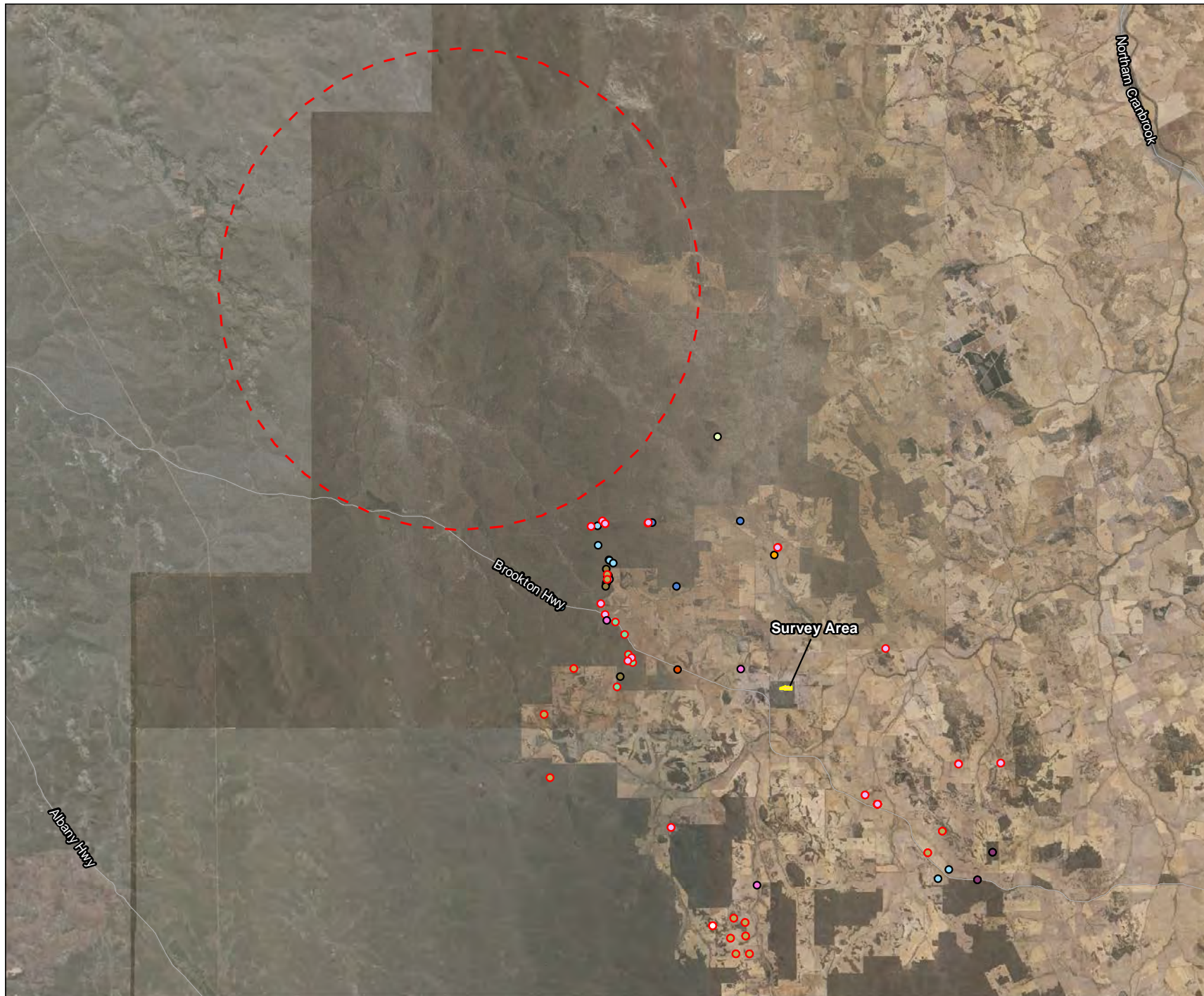
- Seventeen bird species from 11 families; and
- Seven mammal species from five families.

The results of the database searches are displayed in Figure 15 and Appendix E.

#### 4.4.1.1 Likelihood of Occurrence

The results of the Likelihood of Occurrence assessment are displayed in Appendix H and summarised below. The assessment determined that:

- Two species of list as Marine under the EPBC Act were recorded during the survey:
  - Pallid Cuckoo (*Cacomantis pallidus*); and
  - Rainbow Bee-eater (*Merops ornatus*).
- A total of six species are considered to have a High Likelihood of Occurrence within the Survey Area:
  - Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*);
  - Baudin's Black Cockatoo (*Calyptorhynchus baudinii*);
  - Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*);
  - Peregrine Falcon (*Falco peregrinus*);
  - Chuditch (*Dasyurus geoffroii fortis*); and
  - Western Brush Wallaby (*Notamacropus irma*).
- A total of three species are considered to have a Medium Likelihood of Occurrence within the Survey Area:
  - Malleefowl (*Leipoa ocellata*);
  - Red-tailed Phascogale (*Phascogale calura*); and
  - Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*).
- A total of 14 species are considered to have a Low Likelihood of Occurrence within the Survey Area.



## Legend

- Survey Area
- State Road
- Possible Carnaby's Breeding Area

## DBCA Threatened and Priority Fauna Records

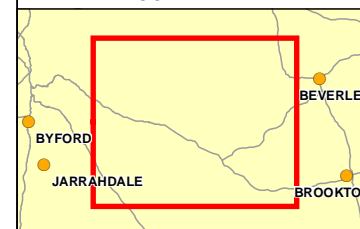
- Baudin's cockatoo, EN
- Carnaby's cockatoo, EN
- Bilby, dalgite, ninu, VU
- Chuditch, western quoll, VU
- Forest red-tailed black cockatoo, VU
- Numbat, walpuri, EN
- Peregrine falcon, OS
- Shield-backed trapdoor spider, EN
- South-western brush-tailed phascogale, wambenger, CD
- Western brush wallaby, P4
- White-tailed black cockatoo, EN
- Woylie, brush-tailed bettong, CR

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS  
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## LOCALITY MAP



PROJECT ID 3004		DATE 8/01/2019	
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Flora and Fauna Survey

**Figure 15 DBCA Threatened and Priority Fauna Records**



#### 4.4.2 Field Survey

A total of 17 fauna species from 18 families were recorded within the Survey Area . This included:

- 16 bird species from 14 families;
- two mammal species from two families; and
- two reptile species from two families.

A systematic fauna species list is presented in Appendix M.

#### 4.4.3 Fauna Habitat

A total of three fauna habitat assessments were undertaken during the survey and 4.67 ha of a single Wandoo Woodland fauna habitat was identified (Appendix N).

The Wandoo Woodland (Plate 1) is dominated by tall Wandoo (*Eucalyptus wandoo*) trees with an average height of around 25 m. While the canopy was not completely closed, it maintained a high level of connectivity between trees and constituted valuable habitat for canopy-dwelling mammals and birds. The condition of the habitat was good – very good, however there was evidence of grazing in the understorey vegetation.

Leaf litter, woody debris and logs were moderately abundant within the remnant woodland and provide important microhabitats for mammals and reptiles. Hollows were also moderately abundant, providing important roosting and nesting opportunities for a variety of mammals and birds. No water sources occurred directly within the remnant woodland, however there are dams within 500 m of the habitat.



Plate 1: Wandoo Woodland Fauna Habitat





**Legend**

Survey Area

Local Road

**Fauna Habitats**

Wandoo Woodland

Cleared

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**LOCALITY MAP**

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**Flora and Fauna Survey**

**Figure 16 Fauna Habitat**



#### 4.4.4 Conservation Significant Fauna

No Threatened or Priority fauna were recorded within the Survey Area.

Two fauna species of conservation significance were recorded within the Survey Area in the Pallid Cuckoo (*Cacomantis pallidus*) and the Rainbow Bee-eater (*Merops ornatus*), which are listed as Marine under the EPBC Act.

Potential evidence of Black Cockatoo foraging was identified in the form of chewed *Allocasuarina* fruit, however it is possible that these were left by a different parrot species. No additional evidence of fauna species of conservation significance, such as scats or tracks, was recorded.

### 4.5 Black Cockatoos

No sightings of Black Cockatoos were recorded during the field survey.

Potential evidence of Black Cockatoo foraging was identified in the form of chewed *Allocasuarina* fruit, however it is possible that these were left by a different parrot species.

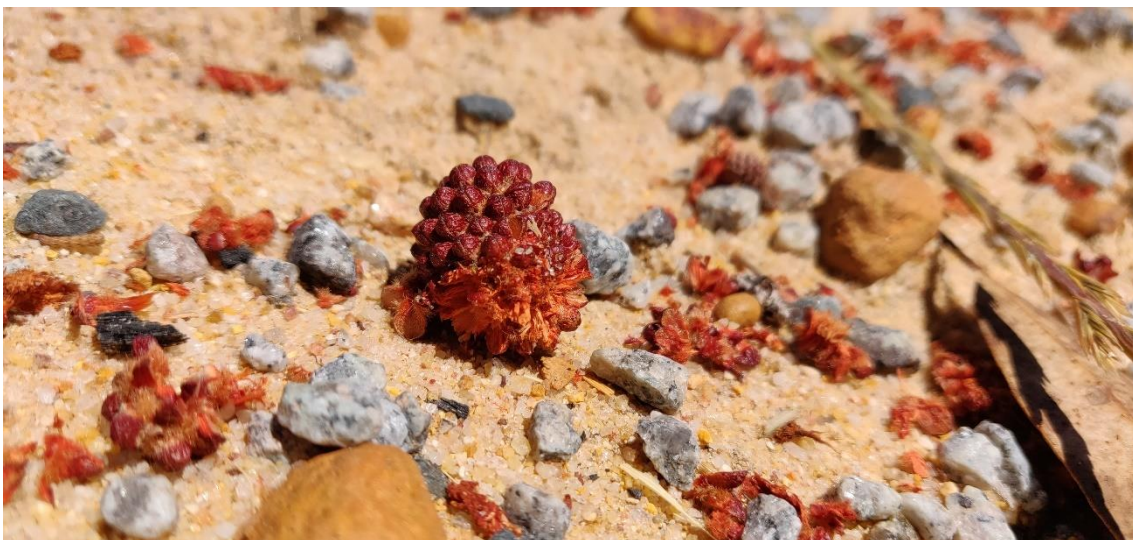


Plate 2: Chewed *Allocasuarina* fruit

#### 4.5.1 Foraging Habitat

A total of 4.67 ha of Black Cockatoo foraging habitat was identified within the Survey Area (Figure 17) which consisted of Wandoo Woodland.

#### 4.5.2 Breeding Habitat

The desktop assessment identified a possible Carnaby's Black Cockatoo breeding area approximately 25 km northwest of the Survey Area (Figure 15).

A total of 169 native trees that meet the criteria for breeding habitat as described in Section 3.5.3 were recorded within the Survey Area (Figure 18; Appendix O), of which:

- 155 were Wandoo;

- Five were Marri; and
- Nine were stags.

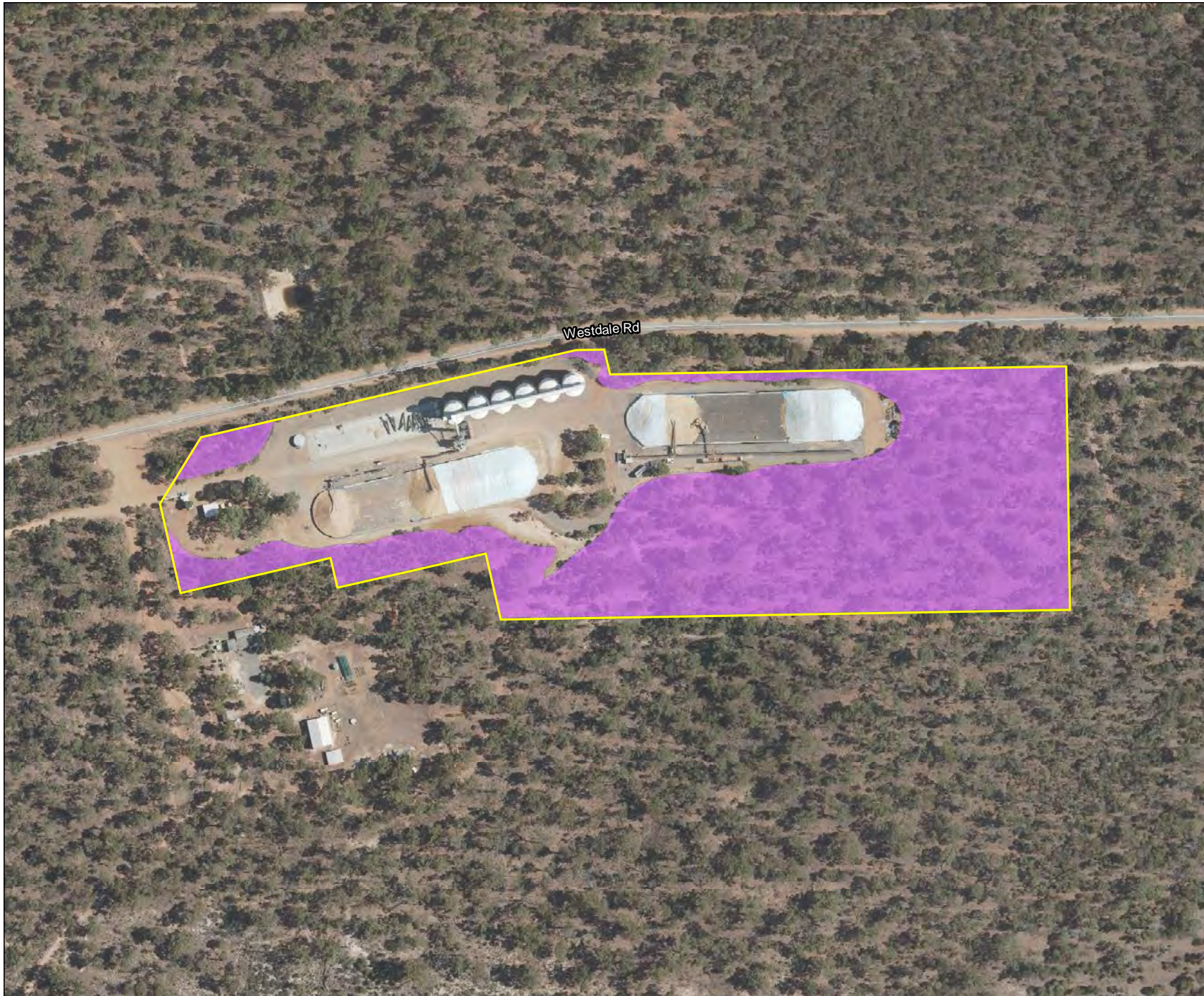
Sixty-four of the potential breeding trees were observed as containing hollows, of which 18 had an estimated opening diameter of >120 mm and are therefore potentially large enough for a Black Cockatoo to enter the hollow.

No evidence of Black Cockatoo breeding was recorded within the Survey Area.

#### 4.5.3 Roosting Habitat

The Wandoo Woodland habitat type comprises suitable roosting habitat. No evidence of Black Cockatoo roosting was found within the Survey Area.





### Legend

- Survey Area
- Local Road
- Black Cockatoo Foraging Habitat

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS

- LOCALITY MAP SOURCED LANDGATE 2017

- OTHER DATA SOURCED LANDGATE 2018

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LOCALITY MAP

●	PROJECT ID 3004	DATE 14/01/2019
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**Figure 17**  
**Black Cockatoo Foraging Habitat**

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**Legend**

Survey Area

Local Road

**Potential Breeding Trees (Diameter at Breast Height)**

Marri (*Corymbia calophylla*)

- 500 - 750 mm
- > 1000 mm

Wandoo (*Eucalyptus wandoo*)

- < 500 mm
- 500 - 750 mm
- 750 - 1000 mm
- > 1000 mm

Stag

- < 500 mm
- 500 - 750 mm
- > 1000 mm

**Black Cockatoo Breeding Trees**

- Contains hollow/s
- Contains hollow/s with estimated entrance > 120 mm

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS  
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**LOCALITY MAP**

BYFORD JARRAHDALE BEVERLEY BROOKTON PINGELLY

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**Figure 18  
Black Cockatoo Breeding Habitat**



## 5 Discussion

### 5.1 Flora

The post-survey Likelihood of Occurrence assessment found that no species were considered to have a High Likelihood of Occurrence within the Survey Area and one species was considered to have a Medium Likelihood of Occurrence based on known distance to the Survey Area, flowering period of the species and its preferred habitat being present; *Drakaea micrantha* (T).

- *D. micrantha* (T) is an orchid species with a flowering period of September to October. The survey was completed outside of the flowering period for this species, therefore if it does occur within the Survey Area, it may not have been recorded.

One Priority flora species was recorded within the Survey Area:

- *Hibbertia montana* (P4).

*H. montana* (P4) was recorded within quadrat DD03, occurring within the Vegetation Type EwCc – *Eucalyptus Wandoo* and *Corymbia calophylla* Woodland.

The presence of a P4 taxa does not form a statutory constraint for the Survey Area. There is no written policy on how to respond to the presence of Priority flora species within proposed development sites. The presence of the species is dealt with by DBCA on a case-by-case basis.

No Declared Plants or WoNS were recorded within the Survey Area. Weed species diversity was moderate on average, with seven weed species recorded.

The majority of the remnant vegetation within the Survey Area was considered to be in Very Good condition (26%). Sections of the Survey Area have previously been cleared and are currently occupied by infrastructure.

One Vegetation Type was described for the Survey Area, EwCc. The Survey Area is situated within the Northern Jarrah Forest subregion; however, it occurs approximately 11 km west of the Avon Wheatbelt bioregion. The species present and vegetation condition meets the criteria to be considered representative of the TEC/PEC *Eucalypt Woodland of the Western Australian Wheatbelt*. The desktop assessment supported the field assessment with records of this TEC/PEC occurring approximately 2.8 km from the Survey Area, within the Jarrah bioregion. Therefore, the Survey Area is considered to represent the TEC/PEC *Eucalypt Woodland of the Western Australian Wheatbelt*.

### 5.2 Vertebrate Fauna

Of the 24 conservation significant fauna species (including Priority species), nine of these are wetland birds. As the Survey Area does not contain wetland habitat, these species

have been excluded from any further discussion and are considered unlikely to be negatively impacted by any disturbance within the Survey Areas.

Any species with a conservation listing which is solely Marine under the EPBC Act, such as the Pallid Cuckoo and Rainbow Bee-eater (which was previously listed as Migratory, but has recently been delisted), will not be discussed further, as the Survey Area contains no marine habitat.

#### **5.2.1 Species Considered to have a High Likelihood of Occurrence**

Three Black Cockatoo species are discussed in detail in Section 5.3.4. The remaining three species of conservation significance considered to have a High Likelihood of Occurrence are discussed below.

##### **Peregrine Falcon (*Falco peregrinus*) – Priority 4 (State)**

The Peregrine Falcon is an uncommon but wide-ranging bird across Australia (Barrett *et al.*, 2003). It occurs mainly along rivers and ranges as well as wooded watercourses and lakes and nests primarily on cliffs, granite outcrops and quarries. The diet of the Peregrine Falcon has been well studied and primarily includes flocking species such as Parrots, Pigeons and on the east coast European Starlings (Olsen and Fuentes, 2008).

The Peregrine Falcon was not detected utilising the Survey Area at the time of the survey. The species is highly mobile and any individuals that may currently utilise the Survey Area will be capable of dispersion, therefore impacts to the species caused by disturbance within the Survey Area are likely to be minimal.

##### **Chuditch (*Dasyurus geoffroii fortis*) – Vulnerable (State and Federal)**

Knowledge of the ecology of the Chuditch is largely restricted to its distribution in mesic Jarrah forests. Here, population densities are three times greater than in semi-arid zones where rainfall and consequently productivity are lower than mesic forests and home ranges are larger (Rayner *et al.* 2012). Since European settlement, the range of the Chuditch has dramatically reduced. The species is now only found in sclerophyll forest, woodland and mallee shrubland (Van Dyck and Strahan 2008).

The Chuditch was not detected utilising the Survey Area at the time of the survey. The species is highly mobile and any individuals that may currently utilise the Survey Area will be capable of dispersion, therefore impacts to the species caused by disturbance within the Survey Area are likely to be minimal.

##### **Western Brush Wallaby (*Notamacropus irma*) – Priority 4 (State)**

The Western Brush Wallaby is locally common in sclerophyll forest and woodland in southwest Western Australia, also found in mallee and thickets of shrubs (Menkhorst and Knight 2004).



The Survey Area is within the current distribution of the species, however, due to the sparse understorey within the Wandoo Woodland disturbance within the Survey Area is unlikely to impact to the species.

### **5.2.2 Species Considered to have a Medium Likelihood of Occurrence**

A total of three species of conservation significance considered to have a Medium Likelihood of Occurrence are discussed below.

#### **Malleefowl (*Leipoa ocellata*) – Vulnerable (State and Federal)**

The Malleefowl is listed Vulnerable under the EPBC Act and WC Act. The species inhabits dry, open forest and mallee, growing on sandy or gravelly soils with dense, scrubby, litter forming understorey, where it builds nest mounds up to 5 m in diameter and 1 m tall, composed primarily of sand and leaf litter (Menkhorst et al. 2017).

The Survey Area is within the current distribution of the species, however, due to the sparse understorey within the Wandoo Woodland disturbance within the Survey Area is unlikely to impact to the species.

#### **Red-tailed Phascogale (*Phascogale calura*) – Conservation Dependent (State), Vulnerable (Federal)**

Once widespread throughout the woodlands of inland south and central Australia, the Red-tailed Phascogale is now restricted to mature woodlands or Wandoo, Sheoak or York Gum Habitat within the southern wheatbelt (Menkhorst and Knight, 2004; Short, Hide and Stone, 2011; Short and Hide, 2012).

The Survey Area occurs within the species current known distribution and contains preferred habitat of the species in the Wandoo Woodland. Any disturbance within the hollow-bearing *Eucalyptus* trees will potentially reduce breeding opportunities for the species.

#### **Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*) – Conservation Dependent (State)**

The Brush-tailed Phascogale is listed Vulnerable under the WC Act. The species is sparsely distributed outside the semi-arid zone in dry sclerophyll forest and monsoonal forest and woodland. It is generally rare and threatened by habitat fragmentation, most common within south-west WA (Menkhorst and Knight 2004). The species is difficult to detect as it is shy, nocturnal and avoids spotlight beams by hiding behind the branch (Menkhorst and Knight 2004).

The Survey Area occurs within the species current known distribution and contains preferred habitat of the species in the Wandoo Woodland. Any disturbance within the hollow-bearing *Eucalyptus* trees potentially reduce breeding opportunities for the species.

## 5.3 Black Cockatoos

### 5.3.1 Foraging Habitat

Marri is a key foraging species for all three Black Cockatoo species, however this tree species only occurs in isolated pockets within the Survey Area (Department of Sustainability Environment Water Population and Communities, 2012). Additionally, Forest Red-tailed Black Cockatoos will forage on the seeds of *Allocasuarina*, but these also occur in isolated pockets. The primary foraging species occurring within the Survey Area is Wandoo, which can be utilised by Carnaby's Black Cockatoos which may forage on Wandoo nectar and flowers (Department of Sustainability Environment Water Population and Communities, 2012), but this is not considered to be a key food source for the species and therefore is considered to be low quality foraging habitat for Black Cockatoo species.

Minimal potential evidence of foraging was found during the field survey, which suggests that the Survey Area has not been extensively utilised by Black Cockatoos for foraging recently.

### 5.3.2 Breeding Habitat

Maintaining the long-term supply of trees of a certain size with suitable nest hollows is crucial in woodland stands that are known to support Black Cockatoo breeding (Department of Sustainability Environment Water Population and Communities, 2012). While no evidence of Black Cockatoo nesting was recorded during the field survey, the Survey Area does contain a high density of hollows, and the 18 hollows with an opening diameter greater than 12 cm are of particular value. The Survey Area is considered to provide valuable potential breeding habitat to all three species of Black Cockatoos.

### 5.3.3 Roosting Habitat

Although no evidence of roosting was observed within the Survey Area, both Wandoo and Marri are considered roosting habitat according to the EPBC Referral Guidelines (Department of Sustainability Environment Water Population and Communities, 2012).

### 5.3.4 Black Cockatoo Species

Each of the three Black Cockatoo species are discussed individually below:

#### **Forest Red-tailed Black Cockatoo (*Calyptrorhynchus banksii naso*) – Vulnerable (State and Federal)**

The Survey area falls within the species known and predicted distribution (Department of Environment and Energy, 2017) and a total of 13 DBCA records have been recorded within 15 km in the last 15 years (Department of Biodiversity Conservation and Attractions, 2018a). The Wandoo Woodland contains foraging habitat for the species in the form of Sheoak and Marri seeds, potential breeding hollows and roosting opportunities. Therefore,

disturbance occurring within the Survey Area may impact foraging, roosting and breeding opportunities for the species.

**Baudin's Black Cockatoo (*Calyptrorhynchus baudinii*) - Endangered (State and Federal)**

The Survey area occurs near the eastern boundary of the species predicted distribution (Department of Environment and Energy, 2017) and a total of five DBCA records have been recorded within 15 km in the last 15 years (Department of Biodiversity Conservation and Attractions, 2018a). The Wandoo Woodland contains foraging habitat for the species in the form of Marri seeds and Wandoo flowers, potential breeding hollows and roosting opportunities. Therefore, disturbance occurring within the Survey Area may impact foraging, roosting and breeding opportunities for the species.

**Carnaby's Black Cockatoo (*Calyptrorhynchus latirostris*) - Endangered (State and Federal)**

The Survey Area falls within the species known and predicted distribution (Department of Environment and Energy, 2017) and a total of 17 DBCA records have been recorded within 15 km in the last 15 years (Department of Biodiversity Conservation and Attractions, 2018a). The Wandoo Woodland contains foraging habitat for the species in the form of Marri seeds and Wandoo flowers, potential breeding hollows and roosting opportunities. Therefore, disturbance occurring within the Survey Area may impact foraging, roosting and breeding opportunities for the species.



## 6 Conclusion

### 6.1 Flora and Vegetation

In summary, the following conclusions on the existing flora and vegetation are made:

- No Threatened flora species pursuant to the EPBC Act and/or gazetted as Declared Rare Flora pursuant to the WC Act were recorded during the survey or are considered to have a High Likelihood of Occurrence in the Survey Area;
- One DBCA listed Priority flora was recorded, *Hibbertia montana* (P4). The presence of this species is unlikely to form a statutory constraint for the Survey Area, and is dealt with by DBCA on a case by case basis;
- Seven introduced species were recorded during the survey. None are listed as a Declared Pests or WoNS;
- One Vegetation Type was mapped within the Survey Area; and
- Vegetation Type EwCc is considered to represent the Federally listed TEC and State listed PEC (P3), *Eucalypt Woodlands of the Western Australian Wheatbelt*.

### 6.2 Vertebrate Fauna

In summary, the following conclusions on the vertebrate fauna of the Survey Area are made:

- Twenty-four conservation significant vertebrate fauna species were assessed for their Likelihood of Occurrence based on database searches and the field survey:
  - Two were recorded during the survey in the Pallid Cuckoo and Rainbow Bee-eater (both Listed as Marine);
  - Six are considered to have a High Likelihood of Occurrence within the Survey Area in the Forest Red-tailed Black Cockatoo, Baudin's Black Cockatoo, Carnaby's Black Cockatoo, Peregrine Falcon, Chuditch and Western Brush Wallaby;
  - Three are considered to have a Medium Likelihood of Occurrence within the Survey Area in the Malleefowl, Red-tailed Phascogale and Brush-tailed Phascogale; and
  - Thirteen species are considered to have a Low Likelihood of Occurrence within the Survey Area.
- The fauna assessment was undertaken at a time considered appropriate for the species of conservation significance considered to have a High or Medium Likelihood of Occurrence within the Survey Area.

- A total of 17 fauna species were recorded within the Survey Area during the Survey, from 18 families. This included:
  - Sixteen bird species from 14 families;
  - Two mammal species from two families; and
  - Two reptile species from two families.
- Three habitat assessments were undertaken during the field survey and one Wandoo Woodland fauna habitat was identified and mapped.

### 6.3 Black Cockatoos

In summary, the following conclusions on Black Cockatoos within the Survey Area are made:

- A total of 4.67 ha of Black Cockatoo foraging and roosting habitat was identified;
- A total of 169 native trees met the criteria for breeding habitat. Sixty-four of these trees contained hollows, of which 18 had an estimated opening diameter of >120 mm; and
- No evidence of Black Cockatoo foraging, breeding or roosting was identified within the Survey Area.

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# APPENDIX A

## Legislative and Non-Legislative Descriptions Definition of Declared Rare/Priority/Threatened Flora and Fauna



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

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

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

## **Wildlife Conservation Act 1950**

The WA DBCA lists flora and fauna under the provisions of the WC Act as protected according to their need for protection.

Flora is given Declared Rare status when populations are geographically restricted or are threatened by local processes. In addition, under the WC Act, by Notice in the WA Government Gazette of 9 October 1987, all native flora (spermatophytes, pteridophytes, bryophytes and thallophytes) is protected throughout the State. Fauna are classified as Schedule 1 to Schedule 4 according to their need for protection.

## **Biodiversity Conservation Act 2016**

The *Biodiversity Conservation Act 2016* replaces the *Wildlife Conservation Act 1950* and the *Sandalwood Act 1929*. The BC Act aims to conserve and protect biodiversity and biodiversity components within the State and to promote ecologically sustainable use of biodiversity components in the State. The Act covers important biodiversity conservation matters not previously recognised in the WC Act, including threatened ecological communities, threatening processes, critical habitats and environmental pests and weeds. The Act also provides incentives for private and community conservation initiatives through new biodiversity conservation agreements and biodiversity conservation covenants. In addition, the Act provides for new public and landholder consultation mechanisms previously absent from the WC Act.

## **Environmental Protection Act 1986**

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

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

Plants may be 'Declared' by the Minister for Agriculture and Food under the BAM Act. The Western Australian Organism List contains information on the area(s) in which a plant is declared and the control and keeping categories to which, it has been assigned in

Western Australia. Details of the definitions of these categories are provided in Appendix C. A declaration may apply to the whole State, to districts, individual properties or even to single paddocks. If a plant is 'Declared', landholders are obliged to control that plant on their properties (DAFWA 2017).

### **Weeds of National Significance**

The Australian Government, along with the State and Territory Governments, has endorsed 32 Weeds of National Significance (WONS). Four major criteria were used in determining WONS:

- The invasiveness of a weed species;
- A weed's impact(s);
- The potential for spread of a weed; and
- Socio-economic and environmental values.

Each WONS has a national strategy and a national coordinator responsible for implementing the strategy. WONS are regarded as priority weeds in Australia because of their invasiveness, potential for spread and economic and environmental impacts (Thorp and Lynch 2000).

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

DBCA lists 'Priority' flora and fauna that have not been assigned statutory protection as Declared Rare or 'Scheduled' under the WC Act and are under consideration for declaration as Threatened. Flora and fauna assessed as Priority 1-3 are considered to be in urgent need of further survey. Priority 4 flora requires monitoring every 5 -10 years and Priority 5 flora and fauna is subject to a specific conservation program.

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

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

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

# APPENDIX B

## Definition of Declared Rare/Priority/Threatened Flora and Fauna



## Categories of Threatened flora species under the EPBC Act (Department of the Environment and Energy, 1999)

CONSERVATION CODE	DESCRIPTION
<b>Ex</b>	<b>Extinct</b> A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
<b>ExW</b>	<b>Extinct in the Wild</b> A native species is eligible to be included in the extinct category at a particular time if, at that time, it 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.
<b>CE</b>	<b>Critically Endangered</b> A native species is eligible to be included in the extinct category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
<b>E</b>	<b>Endangered</b> A native species is eligible to be included in the extinct category at a particular time if, at that time, it is not critically endangered and it is facing a very high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
<b>V</b>	<b>Vulnerable</b> A native species is eligible to be included in the extinct category at a particular time 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, as determined in accordance with the prescribed criteria.
<b>CD</b>	<b>Conservation Dependent</b> A native species is eligible to be included in the extinct category 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 within a period of 5 years.

## Categories of Declared Rare Flora (WC Act) and DBCA Priority flora rankings (DBCA 2013)

CONSERVATION CODE	DESCRIPTION
<b>X</b>	<b>Presumed Extinct Flora (Declared Rare Flora – Extinct)</b> “Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such (Schedule 2 under the <i>Wildlife Conservation Act 1950</i> ).”
<b>T</b>	<b>Threatened Flora (Declared Rare Flora – Extant)</b> “Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such (Schedule 1 under the <i>Wildlife Conservation Act 1950</i> ).” “Threatened Flora (Schedule 1) are further ranked by the Department according to their level of threat using IUCN Red List criteria: CR: Critically Endangered – considered to be facing an extremely high risk of extinction in the wild; EN: Endangered – considered to be facing a very high risk of extinction in the wild; VU: Vulnerable – considered to be facing a high risk of extinction in the wild.”
<b>P1</b>	<b>Priority One: Poorly-known taxa</b> “Taxa which 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. Taxa 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.”
<b>P2</b>	<b>Priority Two: Poorly-known taxa</b> “Taxa which 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. Taxa 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.”

CONSERVATION CODE	DESCRIPTION
P3	<b>Priority Three: Poorly-known taxa</b> "Taxa which are known from collections or sight records from several localities not under imminent threat, or few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Taxa 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	<b>Priority Four: Rare, Near Threatened and other taxa in need of monitoring</b> a. Rare. "Taxa which 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 taxa are usually represented on conservation lands." b. Near Threatened. "Taxa 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. "Taxa that have been removed from the list of threatened species during the past five years for reasons other than taxonomy."
P5	<b>Priority Five: Conservation Dependent taxa</b> "Taxa that are not threatened but are subject to a specific conservation program, the cessation of which would result in the taxon becoming threatened within five years."

Source: Department of Parks and Wildlife (2013). Online: <http://florabase.dpaw.wa.gov.au>.



# APPENDIX C

## Conservation Categories of Threatened or Priority Ecological Communities

## Definitions of Threatened Ecological Communities as Endorsed by the Western Australian Minister for the Environment (Department of Environment and Conservation, 2013)

### PRESUMED TOTALLY DESTROYED (PD)

An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B);

- A) Records within the last 50 years have not been confirmed despite thorough searches or known or likely habitats or
- B) All occurrences recorded within the last 50 years have since been destroyed.

### CRITICALLY ENDANGERED (CR)

An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):

- A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii)
  - i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 5 years)
  - ii) modification throughout its range is continuing such that in the immediate future (within approximately 5 years) the community is unlikely to be capable of being substantially rehabilitated.
- B) Current distribution is limited, and one or more of the following apply (i, ii or iii):
  - i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 5 years)
  - ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes
  - iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes
- C) The ecological community exists only as highly modified occurrences which may be capable of being rehabilitated if such work begins in the immediate future (within approximately 5 years)

**ENDANGERED (EN)**

An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):

A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 70% and either or both of the following apply (i or ii)

i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term (within approximately 10 years)

ii) modification throughout its range is continuing such that in the short term future (within approximately 10 years) the community is unlikely to be capable of being substantially restored or rehabilitated.

B) Current distribution is limited, and one or more of the following apply (i, ii or iii):

i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 10 years)

ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes

iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes

C) The ecological community exists only as highly modified occurrences which may be capable of being rehabilitated if such work begins in the short term future (within approximately 10 years).

**VULNERABLE (VU)**

An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction in the medium to long term future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):

A) The ecological community exists largely as modified occurrences which are likely to be capable of being substantially restored or rehabilitated.

B) The ecological community can be modified or destroyed and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.

C) The ecological community may still be widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.



## Definitions of Priority Ecological Communities as listed DPCA (Department of Environment and Conservation, 2013)

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community Lists under Priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community, and evaluation of conservation status, so that consideration can be given to their declaration as threatened ecological communities. 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. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

### PRIORITY ONE: POORLY KNOWN ECOLOGICAL COMMUNITIES

Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

### PRIORITY TWO: POORLY KNOWN ECOLOGICAL COMMUNITIES

Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation.

Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

### PRIORITY THREE: POORLY KNOWN ECOLOGICAL COMMUNITIES

- (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or;
- (ii) Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or;
- (iii) Communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

**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.**

These communities require regular monitoring.

- (a) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.
- (b) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.
- (c) Ecological communities that have been removed from the list of threatened communities during the past five years.

**PRIORITY FIVE: CONSERVATION DEPENDENT ECOLOGICAL COMMUNITIES.**

Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years

# APPENDIX D

## WoNS, Declared Plant and Environmental Weed Categories



To help focus national efforts to address weed problems in Australia, a list of Weeds of National Significance (WoNS) was compiled. Plant species were selected on the basis of their invasiveness and impact characteristics, their potential and current area of spread and their primary industry, environmental and socioeconomic impacts. Thirty-two WoNS have been identified by Australian governments. In Western Australia many of these WoNS are also declared pests under the *Biosecurity and Agriculture Management Act 2007*.

To protect Western Australia's agriculture, the Department of Primary Industries and Regional Development:

- Regulates weeds under the Biosecurity and Agriculture Management Act 2007 (BAM Act);
- Provides a weed identification service; and
- Provides information on weed control, crop weeds, regulated/declared plants and herbicides.

Under the BAM Act, all declared pests are placed in one of three categories, namely C1 (exclusion), C2 (eradication) or C3 (management).

#### Declared pest categories under the BAM Act (Department of Primary Industries and Regional Development, 2018)

C1 CATEGORY (EXCLUSION)
Pests will be assigned to this category if they are not established in WA and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2 CATEGORY (ERADICATION)
Pests will be assigned to this category if they are present in WA in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3 CATEGORY (MANAGEMENT)
Pests will be assigned to this category if they are established in WA but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

The Weed Prioritisation Process for DBCA contains criteria for the assessment and ranking of weeds in terms of their environmental impact on biodiversity (Department of Parks and Wildlife, 2013). These criteria are as follows:

- **Potential Distribution** – Area of potential habitat in the Region that could be occupied or the area at risk of invasion by the weed;
- **Current Distribution** - Area of habitat in the Region currently occupied by the weed, in relation to the habitat that it could invade;
- **Ecological Impact** - Impact of species within the Region, from low impact (causes minimal disruption to ecological processes or loss of biodiversity) to high (causes acute disruption of ecological processes, dominates and/or significantly alters vegetation structure, composition and function of ecosystems);
- **Invasiveness** – rate of spread of a weed in native vegetative, encompassing factors of establishment, reproduction and long distance dispersal (>100m); and
- **Feasibility of Control** - The longer a coordinated control program takes to achieve its desired goal, the more expensive and less feasible it becomes. Is it feasible to eradicate or at least contain the infestation?

Weed Prioritisation Process prioritises weeds in each DBCA region in terms of Ecological impact under each of the categories of very high (VH), high (H), medium (M), low (L) and negligible (N). Weeds are also prioritised by regions in relation to invasiveness according to the categories of slow (S), Moderate (M), Rapid (R) and Unknown (U) ((Department of Parks and Wildlife, 2013).

# APPENDIX E

## Database Assessment Search Results



NAME_SCI	SOURCE	SOURCE_ID	NAME_ID	FAMILY	GENUS	SPECIES	SUBSPECIES	NAME_COM	KINGDOM	CLASS	CONS	CERTAINTY	METHOD	TYPE	COUNT	LOCALITY	SITE	ACCURACY	DAY	MONTH	YEAR
Bettongia penicillata ogilbyi	TFAUNA	5421	24162	Potoroidae	Bettongia	penicillata	ogilbyi	woylie, brush-tailed bettong	Animalia	MAMMAL	CR	Certain	Translocation	Released	27	DALE	Dobaderry (Plot no	50	1	1	1995
Calyptrorhynchus banksii naso	TFAUNA	15866	24731	Cacatuidae	Calyptrorhynchus	banksii	naso	forest red-tailed black cockatoo	Animalia	BIRD	VU	Certain	Survey	Day sighting	2	FLINT	Mining Lease 2583	1000	18	12	2007
Calyptrorhynchus banksii naso	TFAUNA	15887	24731	Cacatuidae	Calyptrorhynchus	banksii	naso	forest red-tailed black cockatoo	Animalia	BIRD	VU	Certain	Survey	Day sighting	7	FLINT	Mining Lease 2583	1000	20	12	2007
Calyptrorhynchus banksii naso	TFAUNA	95537	24731	Cacatuidae	Calyptrorhynchus	banksii	naso	forest red-tailed black cockatoo	Animalia	BIRD	VU	Very Certain	Regular monitor	Remote sensing	0	FLINT	Yorraling SF	1000	23	2	2017
Calyptrorhynchus banksii naso	TFAUNA	95573	24731	Cacatuidae	Calyptrorhynchus	banksii	naso	forest red-tailed black cockatoo	Animalia	BIRD	VU	Very Certain	Regular monitor	Remote sensing	0	JELCOBINE	Bush on agricultural	1000	21	9	2017
Calyptrorhynchus banksii naso	TFAUNA	95574	24731	Cacatuidae	Calyptrorhynchus	banksii	naso	forest red-tailed black cockatoo	Animalia	BIRD	VU	Very Certain	Regular monitor	Remote sensing	0	JELCOBINE	Bush on agricultural	1000	21	9	2017
Calyptrorhynchus banksii naso	TFAUNA	95575	24731	Cacatuidae	Calyptrorhynchus	banksii	naso	forest red-tailed black cockatoo	Animalia	BIRD	VU	Very Certain	Regular monitor	Remote sensing	0	JELCOBINE	Dam on agricultural	1000	21	9	2017
Calyptrorhynchus banksii naso	TFAUNA	95576	24731	Cacatuidae	Calyptrorhynchus	banksii	naso	forest red-tailed black cockatoo	Animalia	BIRD	VU	Very Certain	Regular monitor	Remote sensing	0	JELCOBINE	Agricultural land w	1000	21	9	2017
Calyptrorhynchus banksii naso	TFAUNA	95577	24731	Cacatuidae	Calyptrorhynchus	banksii	naso	forest red-tailed black cockatoo	Animalia	BIRD	VU	Very Certain	Regular monitor	Remote sensing	0	JELCOBINE	Agricultural land w	1000	21	9	2017
Calyptrorhynchus banksii naso	TFAUNA	95578	24731	Cacatuidae	Calyptrorhynchus	banksii	naso	forest red-tailed black cockatoo	Animalia	BIRD	VU	Very Certain	Regular monitor	Remote sensing	0	JELCOBINE	Agricultural land w	1000	21	9	2017
Calyptrorhynchus banksii naso	TFAUNA	95579	24731	Cacatuidae	Calyptrorhynchus	banksii	naso	forest red-tailed black cockatoo	Animalia	BIRD	VU	Very Certain	Regular monitor	Remote sensing	0	JELCOBINE	Jelcobine	1000	23	2	2017
Calyptrorhynchus banksii naso	TFAUNA	95580	24731	Cacatuidae	Calyptrorhynchus	banksii	naso	forest red-tailed black cockatoo	Animalia	BIRD	VU	Very Certain	Regular monitor	Remote sensing	0	JELCOBINE	Jelcobine	1000	23	2	2017
Calyptrorhynchus banksii naso	TFAUNA	95704	24731	Cacatuidae	Calyptrorhynchus	banksii	naso	forest red-tailed black cockatoo	Animalia	BIRD	VU	Very Certain	Regular monitor	Remote sensing	0	WESTDALE	Flint farmland	1000	23	2	2017
Calyptrorhynchus banksii naso	TFAUNA	95705	24731	Cacatuidae	Calyptrorhynchus	banksii	naso	forest red-tailed black cockatoo	Animalia	BIRD	VU	Very Certain	Regular monitor	Remote sensing	0	WESTDALE	Flint farmland	1000	23	2	2017
Calyptrorhynchus baudinii	WAM_BIRDS	AVIF:38237	24733	Cacatuidae	Calyptrorhynchus	baudinii		Baudin's cockatoo	Animalia	BIRD	EN	WAM Vouchered	Collection	Specimen	1	FLINT	Brookton Highway	10000	27	12	2002
Calyptrorhynchus baudinii	WAM_BIRDS	AVIF:38247	24733	Cacatuidae	Calyptrorhynchus	baudinii		Baudin's cockatoo	Animalia	BIRD	EN	WAM Vouchered	Collection	Specimen	1	FLINT	Collins Road West	10000	9	7	2004
Calyptrorhynchus baudinii	WAM_BIRDS	AVIF:38281	24733	Cacatuidae	Calyptrorhynchus	baudinii		Baudin's cockatoo	Animalia	BIRD	EN	WAM Vouchered	Collection	Specimen	1	FLINT	Collins road West	10000	9	7	2004
Calyptrorhynchus baudinii	WAM_BIRDS	AVIF:38283	24733	Cacatuidae	Calyptrorhynchus	baudinii		Baudin's cockatoo	Animalia	BIRD	EN	WAM Vouchered	Collection	Specimen	1	WESTDALE	Brookton Highway	10000	9	7	2004
Calyptrorhynchus baudinii	TFAUNA	18604	24733	Cacatuidae	Calyptrorhynchus	baudinii		Baudin's cockatoo	Animalia	BIRD	EN	Certain	Survey	Day sighting	1	FLINT	Mundaring State F	1000	13	9	2004
Calyptrorhynchus baudinii	BIRDATLAS2	287251/266	24733	Cacatuidae	Calyptrorhynchus	baudinii		Baudin's cockatoo	Animalia	BIRD	EN	Moderately Certain	Observational	Sighting	1	FLINT	Darkin Road	100	2	6	2003
Calyptrorhynchus baudinii	BIRDATLAS2	428052/266	24733	Cacatuidae	Calyptrorhynchus	baudinii		Baudin's cockatoo	Animalia	BIRD	EN	Moderately Certain	Observational	Sighting	1	WESTDALE	Brookton Hwy	100	17	5	2004
Calyptrorhynchus latirostris	TFAUNA	18598	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Survey	Day sighting	13	FLINT	Mundaring State F	1000	12	9	2004
Calyptrorhynchus latirostris	TFAUNA	18602	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Survey	Day sighting	35	FLINT	Mundaring State F	1000	13	9	2004
Calyptrorhynchus latirostris	TFAUNA	18603	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Survey	Day sighting	4	FLINT	Mundaring State F	1000	13	9	2004
Calyptrorhynchus latirostris	TFAUNA	18610	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Survey	Day sighting	21	FLINT	Mundaring State F	1000	14	9	2004
Calyptrorhynchus latirostris	TFAUNA	27263	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Survey	Day sighting	2	JELCOBINE	Pike Road, Cooke	1000	29	8	2005
Calyptrorhynchus latirostris	TFAUNA	34482	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Historical (writte	Day sighting	6	JELCOBINE	Brookton Hwy, On	1000	0	0	0
Calyptrorhynchus latirostris	TFAUNA	34483	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Historical (writte	Day sighting	6	JELCOBINE	Brookton Hwy, On	1000	0	0	0
Calyptrorhynchus latirostris	TFAUNA	34484	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Survey	Day sighting	9	JELCOBINE	Brookton Hwy, On	1000	3	8	2005
Calyptrorhynchus latirostris	TFAUNA	34485	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Survey	Day sighting	19	JELCOBINE	Brookton Hwy, On	1000	15	11	2003
Calyptrorhynchus latirostris	TFAUNA	34486	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Survey	Day sighting	6	JELCOBINE	Brookton Hwy, On	1000	9	1	2003
Calyptrorhynchus latirostris	TFAUNA	34487	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Survey	Day sighting	7	JELCOBINE	Brookton Hwy, On	1000	6	1	2003
Calyptrorhynchus latirostris	TFAUNA	34506	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Monitoring	Secondary sign	1	JELCOBINE	Brookton Hwy, Da	1000	7	4	2010
Calyptrorhynchus latirostris	TFAUNA	34507	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Survey	Day sighting	2	JELCOBINE	Brookton Hwy, Da	1000	23	8	2008
Calyptrorhynchus latirostris	TFAUNA	34508	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Monitoring	Secondary sign	1	JELCOBINE	Brookton Hwy, Da	1000	14	9	2007
Calyptrorhynchus latirostris	TFAUNA	34509	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Survey	Day sighting	2	JELCOBINE	Brookton Hwy, Da	1000	17	6	2005
Calyptrorhynchus latirostris	TFAUNA	36295	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Survey	Day sighting	3	WESTDALE	Albany Hwy, Dale	1000	21	6	2007
Calyptrorhynchus latirostris	TFAUNA	75818	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Moderately Certain	Survey	Day sighting	3	DALE	Turner Gully Pstact	1000	14	9	2013
Calyptrorhynchus latirostris	TFAUNA	75819	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Moderately Certain	Survey	Day sighting	60	DALE	Lot 91 corner of Bl	1000	28	9	2013
Calyptrorhynchus latirostris	TFAUNA	75821	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Moderately Certain	Survey	Day sighting	4	WESTDALE	1137 Edison Mill F	1000	8	10	2013
Calyptrorhynchus latirostris	FAUNASURVEY	133267	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Certain	Survey	Unknown	20	FLINT	WorsleyBrooktonA	100	16	12	2009
Calyptrorhynchus latirostris	BIRDATLAS2	151526/1794	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Moderately Certain	Observational	Sighting	1	WESTDALE	Earus Farm, Dave	5000	12	5	2001
Calyptrorhynchus latirostris	BIRDATLAS2	405971/794	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Moderately Certain	Observational	Sighting	1	FLINT	Brookton Hwy	100	23	10	1999
Calyptrorhynchus latirostris	BIRDATLAS2	488498/1794	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Moderately Certain	Observational	Sighting	1	WESTDALE	Darkin Rd	100	9	10	2007
Calyptrorhynchus latirostris	BIRDATLAS2	5000796/794	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Moderately Certain	Observational	Sighting	1	FLINT	Collins Rd	0	3	4	2004
Calyptrorhynchus latirostris	BIRDATLAS2	1111464/1794	24734	Cacatuidae	Calyptrorhynchus	latirostris		Carnaby's cockatoo	Animalia	BIRD	EN	Moderately Certain	Observational	Sighting	1	FLINT	Collins Road	100	26	2	2012
Calyptrorhynchus sp. white-tailed	BIRDATLAS1	110046/266	0	Cacatuidae	Calyptrorhynchus	sp. white-tailed black cockat		white-tailed black cockatoo	Animalia	BIRD	EN	Moderately Certain	Observational	Sighting	1	JELCOBINE	JELCOBINE	18000	29	10	1980
Calyptrorhynchus sp. white-tailed	BIRDATLAS1	1171/266	0	Cacatuidae	Calyptrorhynchus	sp. white-tailed black cockat		white-tailed black cockatoo	Animalia	BIRD	EN	Moderately Certain	Observational	Sighting	1	JELCOBINE	JELCOBINE	18000	4	2	1977
Calyptrorhynchus sp. white-tailed	BIRDATLAS1	143496/266	0	Cacatuidae	Calyptrorhynchus	sp. white-tailed black cockat		white-tailed black cockatoo	Animalia	BIRD	EN	Moderately Certain	Observational	Sighting	1	JELCOBINE	JELCOBINE	18000	4	11	1981
Calyptrorhynchus sp. white-tailed	BIRDATLAS1	16811/266	0	Cacatuidae	Calyptrorhynchus	sp. white-tailed black cockat		white-tailed black cockatoo	Animalia	BIRD	EN	Moderately Certain	Observational	Sighting	1	JELCOBINE	JELCOBINE	18000	30	11	1977
Calyptrorhynchus sp. white-tailed	BIRDATLAS1	22817/266	0	Cacatuidae	Calyptrorhynchus	sp. white-tailed black cockat		white-tailed black cockatoo	Animalia	BIRD	EN	Moderately Certain	Observational	Sighting	1	JELCOBINE	JELCOBINE	18000	11	11	1977
Calyptrorhynchus sp. white-tailed	BIRDATLAS1	55745/266	0	Cacatuidae	Calyptrorhynchus	sp. white-tailed black cockat		white-tailed black cockatoo	Animalia	BIRD	EN	Moderately Certain	Observational	Sighting	1	JELCOBINE	JELCOBINE	18000	9	3	1979
Dasyurus geoffroi	WAM_MAMMALS	MAMM:M29263	24092	Dasyuridae	Dasyurus	geoffroi		chuditch, western quoll	Animalia	MAMMAL	VU	WAM Vouchered	Collection	Specimen	1	DALE	DALE	10000	1	4	1989
Dasyurus geoffroi	TFAUNA	1034	24092	Dasyuridae	Dasyurus	geoffroi		chuditch, western quoll	Animalia	MAMMAL	VU	Certain	Opportunistic si	Dead	1	FLINT	Noonan Rd.	50	22	6	1994
Dasyurus geoffroi	TFAUNA	18597	24092	Dasyuridae	Dasyurus	geoffroi		chuditch, western quoll	Animalia	MAMMAL	VU	Certain	Survey	Caught or trapp	1	FLINT	Mundaring State F	1000	13	9	2004
Dasyurus geoffroi	TFAUNA	89071	24092	Dasyuridae	Dasyurus	geoffroi		chuditch, western quoll	Animalia	MAMMAL	VU	Moderately Certain	Opportunistic si	Sighting	1	FLINT	Brookton Hwy, Flir	1000	16	3	2017
Falco peregrinus	TFAUNA	15964	25624	Falconidae	Falco	peregrinus		peregrine falcon	Animalia	BIRD	OS	Certain	Survey	Day sighting	2	WESTDALE	Mining Lease 2583	1000	18	12	2007
Falco peregrinus	TFAUNA	15965	25624	Falconidae	Falco	peregrinus		peregrine falcon	Animalia	BIRD	OS	Certain	Survey	Day sighting	1	FLINT	Mining Lease 2583	1000	17	12	2007
Falco peregrinus	TFAUNA	15966	25624	Falconidae	Falco	peregrinus		peregrine falcon	Animalia	BIRD	OS	Certain	Survey	Day sighting	2	FLINT	Mining Lease 2583	1000	17	12	2007
Falco peregrinus	TFAUNA	15967	25624	Falconidae	Falco	peregrinus		peregrine falcon	Animalia	BIRD	OS	Certain	Survey	Day sighting	1	FLINT	Mining Lease 2583	1000	18	12	2007
Falco peregrinus	TFAUNA	15968	25624	Falconidae	Falco	peregrinus		peregrine falcon	Animalia	BIRD	OS	Certain	Survey	Day sighting	1	FLINT	Mining Lease 2583	1000	20	12	2007
Falco peregrinus	FAUNASURVEY	133275	25624	Falconidae	Falco	peregrinus		peregrine falcon	Animalia	BIRD	OS	Certain	Survey	Unknown	2	FLINT	WorsleyBrooktonA	100	16	12	2009
Falco peregrinus	BIRDATLAS2	133767/237	25624	Falconidae	Falco	peregrinus		peregrine falcon	Animalia	BIRD	OS	Moderately Certain	Observational	Sighting	1	FLINT	Flint SF	100	7	1	2001
Idiosoma nigrum	TFAUNA	9011	33917	Idiopidae	Idiosoma	nigrum		shield-backed trapdoor spider	Animalia	INVERTEBRATE	EN	Certain	Survey	Caught or trapp	1	FLINT	Flint Gully, Brookt	1000	18	5	1955
Idiosoma nigrum	TFAUNA	9012	33917	Idiopidae	Idiosoma	nigrum		shield-backed trapdoor spider	Animalia	INVERTEBRATE	EN	Certain	Survey	Caught or trapp	1	JELCOBINE	Connolly Gully, (S	1000	18	5	1955
Idiosoma nigrum	TFAUNA	9035	33917	Idiopidae	Idiosoma	nigrum		shield-backed trapdoor spider	Animalia	INVERTEBRATE											

NAME_SCI	SOURCE	SOURCE_ID	NAME_ID	FAMILY	GENUS	SPECIES	SUBSPECIES	NAME_COM	KINGDOM	CLASS	CONS.	CERTAINTY	METHOD	TYPE	COUNT	LOCALITY	SITE	ACCUR.	DAY	MONTH	YEAR
Notamacropus irma	TFAUNA	16028	48022	Macropodidae	Notamacropus	irma		western brush wallaby	Animalia	MAMMAL	P4	Certain	Survey	Day sighting	2	FLINT	Mining Lease 2588	1000	22	12	2007
Notamacropus irma	FAUNASURVEY	1357843	48022	Macropodidae	Notamacropus	irma		western brush wallaby	Animalia	MAMMAL	P4	Certain	Survey		1	FLINT	Flint, Brookton Hw	3000	8	12	2017
Phascogale tapostafa wambenger	WAM_MAMMALS	MAMM:M44167	0	Dasyuridae	Phascogale	tapostafa	wambenger	south-western brush-tailed phascogale	Animalia	MAMMAL	CD	WAM Vouchered	Collection	Specimen	1	WESTDALE	BROOKTON HWY	10000	11	2	1999

FID	Sheet	NameID	Taxon	Cons_Code	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_Me	Precision	Date
4739	8935556	43201	Adelphacme minima	3	Caespitose herb	Bare dry grey	Associated sp	uncommon; c.	Population str	Lake Monjingu	GPS	1	28/10/2016
7049	7347464	42787	Astartea reticulata	3	Spreading lax	Winter wet low	Dense rushes	c. 350 plants i		18 km WNW of	GPS	1	27/02/2006
7050	7347472	42787	Astartea reticulata	3	Erect, straggly	Winter wet low	Dense rushes	8 plants at we	Disturbed rem	18 km WNW of	GPS	1	27/02/2006
7054	6586155	42787	Astartea reticulata	3	Flowers 7-9 m	Low-lying wint	Melaleuca (pa			On Telegraph	GPS	1	10/12/2003
7057	7360177	42787	Astartea reticulata	3	Perennial shrub	Rpad verge. S	Small Yate sw			Telegraph Road	GPS	1	9/01/2004
7058	7360169	42787	Astartea reticulata	3	Perennial 1.5 m		Low shrubland		Percentage of	Telegraph Road	GPS	1	9/01/2004
7059	6586147	42787	Astartea reticulata	3	Shrub 1.5 m h	Low-lying wint	Melaleuca (pa			On Telegraph	GPS	1	10/12/2003
7251	7361912	14503	Astroloma sp. Grass Patch (A.J.G. Wilson 110)	2	Compact shrub	Edge of saline	Mallee woodla	occasional.		5 km NE of Gi	GPS	1	29/06/2006
7479	8179824	35317	Austrostipa mundula	3	Grass 35 cm h	Plain, road ver	Pultenaea het	2-5 plants.		11 Mile Beach	MAN	3	7/09/2008
9287	8187592	32145	Banksia prolata subsp. calcicola	4	Shrub to 1 m t	Coastal ridge.	Heathland. Wi	100's of plants		W of Twilight	GPS	1	30/01/2008
9288	1108735	32145	Banksia prolata subsp. calcicola	4		Stony slopes.				S side of Espe	MAN	4	12/09/1964
9289	1108743	32145	Banksia prolata subsp. calcicola	4	To 3 ft high.	In limestone-s				Near Esperan	MAN	4	9/09/1966
9290	4347625	32145	Banksia prolata subsp. calcicola	4						Esperance	AUTO	3	/11/1909
9291	4669185	32145	Banksia prolata subsp. calcicola	4	Shrub to 1 m t	Headland. Wh	Mallee over he			Esperance to	GPS	1	31/01/1997
9292	4669193	32145	Banksia prolata subsp. calcicola	4	Shrub to 1 m t	Coastal ridge.	Heathland wit			W of Twilight	GPS	1	31/01/1997
9293	5132347	32145	Banksia prolata subsp. calcicola	4						Dempster Hea	AUTO	3	9/10/1985
9294	4228839	32145	Banksia prolata subsp. calcicola	4	Shrub to 40 cr	In sand over li	Low Kwongan			W of Twilight	MAN	0	13/10/1994
9295	4228812	32145	Banksia prolata subsp. calcicola	4	Shrub to 40 cr	In sand over li	Low Kwongan			W of Twilight	MAN	0	13/10/1994
9296	4228820	32145	Banksia prolata subsp. calcicola	4	Shrub to 40 cr	In sand over li	Low Kwongan			W of Twilight	MAN	0	13/10/1994
9297	6037968	32145	Banksia prolata subsp. calcicola	4		In exposed lim	With Melaleuc	3 plants seen.		On hill above	MAN	2	29/10/2000
9299	7782209	32145	Banksia prolata subsp. calcicola	4	Shrub to 1 m t	White sand ov	Mallee over he	over 25 plants		Esperance to	GPS	1	15/12/2007
9302	4634888	32145	Banksia prolata subsp. calcicola	4	Sprawling shrub	In limestone, c	In thick scrub.			S side of Espe	MAN	0	13/10/1994
11643	8386536	17922	Brachyloma mogin	3	Perennial shrub	Plain. Reserve	Low shrubland	6-20 plants.		Helms Reserv	GPS	1	4/06/2012
14475	1015508	6342	Coleanthera coelophylla	1	Flowers white					Gibson's Soak	MAN	3	4/11/1901
14505	8330603	14664	Comesperma calcicola	3	Herb 5 cm hig	Salt lake. Wet	Taxandria, Ga	6-20 plants.		Lake fringe, H	GPS	1	6/06/2011
14506	8359695	14664	Comesperma calcicola	3	Perennial herb	Plain. Part of a	Low shrubland	2-5 plants.		Myrup Fly In E	GPS	1	6/03/2006
14513	8417008	14663	Comesperma griffinii	2	Perennial, cae	Plain. Grey sa	Low shrubland	2-5 plants.		Helms Forest	GPS	1	2/01/2012
14600	2488035	40924	Commersonia rotundifolia	3	Straggling shr				Checked in W	Gibson Soak,	MAN	0	17/10/1931
14603	6144179	40924	Commersonia rotundifolia	3	Straggling shr				Checked in W	Gibson Soak,	MAN	3	17/10/1931
14608	4047834	40924	Commersonia rotundifolia	3						Gibson Soak,	AUTO	3	17/10/1931
14609	2488019	40924	Commersonia rotundifolia	3	Straggling shr				Checked in W	Gibson Soak,	MAN	3	17/10/1931
15754	4367251	43962	Cyathostemon sp. Esperance (A. Fairall 2431)	1	Shrub 4 ft, flor	Sandy gravel.				Near Esperan	AUTO	3	19/10/1967
15862	8273812	7431	Dampiera decurrens	2	Erect shrub 0.	Brown sand ov	Hibbertia ulcif		Percentage of	Woody Island,	GPS	1	24/08/2010
15875	6957765	7431	Dampiera decurrens	2	Annual herb 3	Hillside, decay	Eutaxia myrtif	one plant only		On W side rid	GPS	1	5/10/2003
16018	8258147	7474	Dampiera sericantha	3	Erect herb .3 m	Sand rise, plain	Tall shrubland	6-20 plants.		Helms Arbore	GPS	1	7/05/2010
16022	4111338	7474	Dampiera sericantha	3	Spindly herb t		1 m understor			Helms Arbore	MAN	3	1/12/1993
16024	1017608	7474	Dampiera sericantha	3	Caespitose shr	In sand.				Shark Lake, E	MAN	3	21/05/1969
16032	6597351	7474	Dampiera sericantha	3		Topography: U	Banksia spec			On W side of	GPS	1	12/10/2000
16095	8387095	7485	Dampiera triloba	3	Perennial, spr	Dry grey soil.	Tall shrubland	2-5 plants.		Helms Forest	GPS	1	25/08/2012
16096	8438722	7485	Dampiera triloba	3	Sprawling shrub	Hillside.	Low shrubland	6-20 plants.		Helms Forest	GPS	1	1/10/2012
16620	1288784	20451	Darwinia sp. Gibson (R.D. Royce 3569)	1						3 miles N of G	MAN	0	10/08/1951

FID	Sheet	NameID	Taxon	Cons_Code	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_Me	Precision	Date
17252	8343284	12817	Daviesia pauciflora	3	Perennial shrub	Plain. White o	Low shrubland	one only.		NW corner, H	GPS	1	21/04/2011
17253	8288976	12817	Daviesia pauciflora	3	Perennial shrub	Plain. Dry whi	Tall shrubland	2-5 plants.		Helms Arbore	GPS	1	7/03/2011
17254	8438005	12817	Daviesia pauciflora	3	Shrub 60 cm h	Hillside. Dry, v	Low shrubland	one only.		Helms Forest	GPS	1	4/12/2011
17263	3340937	12817	Daviesia pauciflora	3	Spreading shr	Sandy heathla	Heathland wit	scattered sma		1.5 km SW of	MAN	2	2/12/1990
17264	5316715	12817	Daviesia pauciflora	3	Domed shrub	Slope to SE, d	Open Scrub, C			Esperance	MAN	0	28/12/1997
17265	5282268	12817	Daviesia pauciflora	3	Domed shrub	Slope to SE, d	Open Scrub, C			Esperance	MAN	0	28/12/1997
17267	5882516	12817	Daviesia pauciflora	3	Rounded or sp	In sandy soil.	With Banksia	scattered sma		Mount Meriva	MAN	3	21/10/1995
17270	7016654	12817	Daviesia pauciflora	3	Compact, per	Hill. Grey sand	Banksia wood	frequent.	Percentage of	0.9 km W alon	GPS	1	24/05/2005
21289	1161792	13517	Eucalyptus dolichorhyncha	4	Mallee 8 ft tal	Loamy sandy s				Gibson North,	MAN	3	11/06/1969
21563	8258295	16043	Eucalyptus famelica	3	Perennial mall	Plain. Dry, wh		6-20 plants.		Back sandy tr	GPS	1	7/06/2010
21564	8289034	16043	Eucalyptus famelica	3	Perennial mall	Plain. Seasona	Mixed low shr	2-5 plants.		Helms Arbore	GPS	1	30/03/2011
21584	1233335	13022	Eucalyptus foliosa	3	Dense conspic	Flat terrain bo	Chittick, Nuyt			N end of truck	MAN	3	9/10/1985
21585	1232924	13022	Eucalyptus foliosa	3	Dense clump.	Low salty plain				1.3 km S of Br	MAN	0	7/11/1986
21586	5041317	13022	Eucalyptus foliosa	3	Mallee 4 m hig	Flats, low in th	Eucalyptus inc		Abundance: fr	Ca 2.6 km N c	MAN	0	27/05/1997
21587	1232878	13022	Eucalyptus foliosa	3	Mallee 3 m tal					7 km E of high	MAN	0	17/01/1985
21590	1876163	13022	Eucalyptus foliosa	3	Mallee 3.5 m f	Salty flat at eq	Samphire. Sea		Abundance: lo	2 km N of Gib	MAN	0	7/11/1986
21597	6262376	13022	Eucalyptus foliosa	3	Mallee to 3 m	White sand lo	Associated wit	frequent.	Average heigh	Esperance - N	MAN	2	15/12/2000
21607	6447503	13022	Eucalyptus foliosa	3	Mallee.	Landform: san	Growing in lar	between 10 ar	Difficult to dis	Ca 2.7 km N c	GPS	1	9/04/2003
21613	8289107	13022	Eucalyptus foliosa	3	Perennial mall	Hillside. Dry g	Low shrubland	2-5 plants.		Helms Arbore	GPS	1	30/03/2011
21614	8341052	13022	Eucalyptus foliosa	3	Perennial 3 m	On slightly slo	Tall to medium	6-20 plants.		R 23527, Heln	GPS	1	1/05/2011
22101	8428697	12696	Eucalyptus litorea	2	Dense mallee	White sand. L	Low shrubland	scattered clum		Helms Aboret	GPS	1	4/05/2012
22121	8703388	12696	Eucalyptus litorea	2	Small mallee t	Flat, calcareou	Eucalyptus va			Saltlake, 200	GPS	1	13/08/2009
22704	1461478	15068	Eucalyptus preissiana subsp. lobata	4		Coastal sand				Ca 14 km E of	UNK	0	12/10/1968
23048	8646783	13014	Eucalyptus semiglobosa	3	Mallee to 5 m	Scattered clur	With Eucalypt			Old quarry at	GPS	1	4/05/2012
23050	5239915	13014	Eucalyptus semiglobosa	3					To August 199	Between Espe	MAN	3	//
23053	5087791	13014	Eucalyptus semiglobosa	3	Mallee 3-4 m.	More or less s	Occurs only w			14 km E on M	MAN	0	14/05/1988
23059	1388843	13014	Eucalyptus semiglobosa	3	Mallee 5 m, flo		Mallee.			9 miles E of tu	MAN	3	/11/1973
23071	1389815	13014	Eucalyptus semiglobosa	3	Erect shrub or	Growing on sh	Growing with l			Second creek	UNK	0	22/04/1972
23072	1389823	13014	Eucalyptus semiglobosa	3	Erect shrub or	Growing on sh	Growing with l			Second creek	UNK	0	22/04/1972
23592	1362194	19661	Eucalyptus x missilis	4	Shrub 2 m tall	On limestone				Lookout overlk	UNK	0	21/01/1970
25387	7409141	6163	Gonocarpus pycnostachyus	3	Annual, erect	Plain. Near sa	Low shrubland	2-5 plants.	Population str	Helms Arbore	GPS	1	26/10/2004
25921	8606668	7542	Goodenia quadrilocularis	2	Erect herb. 0.	Shallow sand,		over 50 plants	Population str	Sandy Hook Is	GPS	1	11/11/2007
25937	6772889	7542	Goodenia quadrilocularis	2	Herb. Height:	Topography: h	Associated ve	one only.		On track down	GPS	1	5/10/2003
26352	1077465	1961	Grevillea baxteri	4	Tree to 12 ft.	White sand.				13 miles S of	MAN	3	15/05/1968
30712	8387184	20036	Hibbertia turleyana	2	Perennial shrub	Hillside. Reser	Tall shrubland	6-20 plants.	The original co	Helms Forest	GPS	1	25/08/2012
30713	4387708	20036	Hibbertia turleyana	2	9-15 inches hi	Sand.	Heath.			Gibsons's Soa	AUTO	3	4/09/1962
30714	4395689	20036	Hibbertia turleyana	2						Gibson Soak	AUTO	3	10/08/1951
30715	4999312	20036	Hibbertia turleyana	2	Procumbent s	Flat, gets goo	Dense heath.		Abundance: oc	Helms Arbore	GPS	1	4/08/1996
30717	6458157	20036	Hibbertia turleyana	2	Cream flowers					Track at the b	MAN	3	//
30718	6458122	20036	Hibbertia turleyana	2	Compact cush	Sand.			With J. Wheel	Helms Arbore	GPS	1	5/09/2000
30719	6458114	20036	Hibbertia turleyana	2	Shrublet 20 cr	Gentle slope,	Banksia heath			Helms Arbore	GPS	1	20/09/2000



FID	Sheet	NameID	Taxon	Cons_Code	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Geocode_Me	Precision	Date
30720	6458106	20036	Hibbertia turleyana	2	Spreading shr	Low rise - flat	Heath, dense	occasional.		Helms Arbore	GPS	1	17/09/1999
30721	7408773	20036	Hibbertia turleyana	2	Perennial, ere	Plain. Reserve	Cleared veget	6-20 plants.		Track from W	GPS	1	10/07/2005
30722	6458092	20036	Hibbertia turleyana	2	Low multi-ste	Sand.	Disturbed shr	occasional.		Helms Arbore	GPS	1	4/09/2000
30723	2863197	20036	Hibbertia turleyana	2		Sandy soil.				Gibson, 18 mi	AUTO	3	10/08/1951
30933	1407716	13773	Hopkinsia adscendens	3	Male plant.					Esperance Dis	AUTO	3	16/10/1968
32664	6797059	38222	Kunzea salina	3	Perennial, ope	Plain. Reserve	With Melaleuc	2-5 plants.		Helms Arbore	GPS	1	9/01/2004
32665	6797067	38222	Kunzea salina	3	Perennial, ope	Plain.	With Melaleuc			Helms Arbore	GPS	1	9/01/2004
32668	6586104	38222	Kunzea salina	3	Low shrub, so	Low-lying wint	Tallest plants		Population sar	Maintenance	GPS	1	10/12/2003
32669	8437971	38222	Kunzea salina	3	Shrub 1 m hig	Winter wet low	Low shrubland	6-20 plants.		Helms Forest	GPS	1	4/12/2011
33814	3248313	3026	Lepidium fasciculatum	3						Esperance	AUTO	3	/02/1966
34503	8273952	6357	Leucopogon apiculatus	3	Erect, open sh	Granite. Brow	Hibbertia ulcif			Woody Island,	GPS	1	24/08/2010
34546	5644968	6357	Leucopogon apiculatus	3	Erect, open sh	Island, upland	Dense Thicket	occasional.		Woody Island,	GPS	1	18/11/1998
34549	6772595	6357	Leucopogon apiculatus	3	Upright shrub	Landform: slo	Forest. Chara	scattered.		Slope down to	GPS	1	3/12/2002
34660	8238693	44222	Leucopogon corymbiformis	2	9-12 inches ta	In sand depres				Esperance	TOPO	3	1/09/1962
34661	8238707	44222	Leucopogon corymbiformis	2	Shrub 2.6 ft. F					.5 miles S of C	TOPO	3	9/09/1966
34662	8236259	44222	Leucopogon corymbiformis	2	Plant 2 ft high					24 km N of Es	TOPO	3	12/09/1964
34664	8611602	44222	Leucopogon corymbiformis	2	Open shrub w	Deep white sa	Banksia heath	common on N		20 km E of Es	UNK	2	12/08/2013
34666	7424957	44222	Leucopogon corymbiformis	2	Perennial erect	Plain. Reserve	Tall shrubland			Track at end of	GPS	1	11/08/2006
34667	7424949	44222	Leucopogon corymbiformis	2	Perennial, ere	Low hillside. F	Tall shrubland	2-5 plants.		Helms Arbore	GPS	1	11/08/2006
34668	6597343	44222	Leucopogon corymbiformis	2		Topography: U	Banksia spec			On W side of I	GPS	1	12/10/2000
34815	1016156	6406	Leucopogon interruptus	3	Shrub to 1.5 m	Grey sand ove	In mixed veget			Sandy Hook Is	MAN	3	1/05/1982
34817	4852915	6406	Leucopogon interruptus	3	Bushy, erect,	Slope facing S	Si, SAi, SBi, S		Abundance: 30	Broomstick Hil	GPS	1	29/09/1997
34818	4853733	6406	Leucopogon interruptus	3	Bushy, erect,	Slope facing S	Si, SAi, SBi, S		Abundance: 30	Broomstick Hil	GPS	1	29/09/1997
34819	4896521	6406	Leucopogon interruptus	3	Shrub.	Slope. Outcro	Vegetation Cl	few.		Mount Meriva	GPS	1	/07/1997
35080	8507090	6442	Leucopogon rotundifolius	3	Medium shrub	Near hill top,	Acacia hetero	Scattered.		Woody Island,	UNK	2	24/12/2007
35106	6772587	6442	Leucopogon rotundifolius	3	Erect shrub. H	Landform: gra	Characteristic			Slope down fr	GPS	1	3/12/2002
35107	5532744	6442	Leucopogon rotundifolius	3		Shire reserve.	Associated sp			Pink Lake, Esp	MAN	0	12/05/1999
35600	8387680	36862	Lobelia archeri	1	With light blue	Growing in dex	Banksia spec	ca 50 plants.		1 km S of Mt I	UNK	1	2/01/2006
37552	6762603	6722	Myosotis australis	4	Herb. Height:	Topography: h	Associated ve	over 50 plants		E side of SW I	GPS	1	5/10/2003
38298	5995485	23499	Paracaleana parvula	2	In full flower.	In sandy open	Under pine tre	ca 20 plants in		Helms Arbore	MAN	3	7/11/1995
38365	4614399	1545	Patersonia inaequalis	2						Gibson,	AUTO	3	30/04/1996
38729	8416958	2275	Persoonia scabra	3	Perennial, ere	Plain. Grey sa	Low shrubland	2-5 plants.		Helms Forest	GPS	1	2/01/2012
39641	1066005	6804	Pityrodia chrysocalyx	3						Esperance are	MAN	0	//1972
42082	6833381	16273	Schoenus sp. Grey Rhizome (K.L. Wilson 2922)	1		Topography: U	Scattered Nuy			On S side of E	GPS	1	12/10/2000
46135	7867344	31873	Tecticornia indefessa	2		Topography: V	Sclerostegia a			Mullet Lake, 8	GPS	1	23/10/1998
46136	7867360	31873	Tecticornia indefessa	2		Topography: V	Lawrencia squ			Mullet Lake, 8	GPS	1	23/10/1998
48692	8347476	13160	Velleia exigua	2	Perennial/pro	Plain. Grey cle	Bare areas. C	over 50 - 1000		Helms Forest	GPS	1	22/10/2011

FID	PopId	NameId	Taxon	ConeStatus	WARank	PopNumber	SubPopCode	PopStatus	Location	District	Vesting	Purpose1	Purpose2	CountDate	Method	MatureCoun	JuvenileCo	SeedlingCo	LiveTotal	PlantTypeC	AreaOccupi	InFlower	Population
2574	92308	14503	Astroloma sp.	2		5			De Grussa Rd	ESPERANCE	LGA	VER		29/06/2006 0:00		4			4			Y	
3279	104822	32145	Banksia prolata	4		1	A		Doust Street.	ESPERANCE	LGA	VER		11/07/2001 0:00	ACT_IND	3			3			Y	
3280	104823	32145	Banksia prolata	4		1	B		Park & Recrea	ESPERANCE	LGA	PAR		15/12/2007 0:00	ESTMT	25			25			Y	
3281	96165	32145	Banksia prolata	4		2			Flora Crown R	ESPERANCE	RDL	CFL		31/01/1997 0:00	ESTMT	100			100			N	
3282	96166	32145	Banksia prolata	4		3			Flora Crown R	ESPERANCE	RDL	CFL		29/10/2000 0:00		3			3			N	
6336	89078	7431	Dampiera dec	2		7			Woody Island	ESPERANCE	CC	CFF	REC	5/10/2003 0:00		1			1			Y	
6908	90511	12817	Daviesia pauc	3		5			UCL. 0.9km W	ESPERANCE	NON	UCL		24/05/2005 0:00		0			0			Y	
9228	94988	20162	Fabronia hamy	2		3			Lake Mortijinu	ESPERANCE	CC	CFF	WAT	22/06/2005 0:00		0			0			N	
9676	88291	6163	Gonocarpus p	3		9			Crown Reserv	ESPERANCE	EXD	FOR		26/10/2004 0:00	ESTMT	5			5			Y	
9895	89170	7542	Goodenia qua	2		6			Woody Island	ESPERANCE	CC	CFF	REC	5/10/2003 0:00	ACT_IND	1			1			Y	
11570	94978	20036	Hibbertia turle	2		1			Helms Arboret	ESPERANCE	EXD	FOR		4/08/1996 0:00		0			0			Y	
11571	104262	20036	Hibbertia turle	2		2	A		Helms Arboret	ESPERANCE	EXD	FOR		17/09/1999 0:00		0			0			N	
11572	104263	20036	Hibbertia turle	2		2	B		Helms Arboret	ESPERANCE	EXD	FOR		20/09/2000 0:00		0			0			N	
11573	104264	20036	Hibbertia turle	2		2	C		Helms Arboret	ESPERANCE	EXD	FOR		10/07/2005 0:00	ESTMT	6			6			Y	
11574	94979	20036	Hibbertia turle	2		3			Helms Arboret	ESPERANCE	EXD	FOR		5/09/2000 0:00		0			0			N	
12006	98938	4035	Kennedia becl	4		9	A		5km W of Esp	ESPERANCE	NON	CFL		7/11/1986 0:00		0			0			N	
12007	98939	4035	Kennedia becl	4		9	B		5km W of Esp	ESPERANCE	LGA	VER		7/11/1986 0:00		0			0			N	
12079	96832	38222	Kunzea salina	3		9			Helms Arboret	ESPERANCE	EXD	FOR		10/12/2003 0:00		0			0			Y	
12080	96824	38222	Kunzea salina	3		10			Helms Arboret	ESPERANCE	EXD	FOR		9/01/2004 0:00	ESTMT	2			2			Y	
15241	93247	16273	Schoenus sp.	1		1			Helms Arboret	ESPERANCE	EXD	FOR		12/10/2000 0:00		0			0			N	



# 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: 09/11/18 13:41:06

## [Summary](#)

### [Details](#)

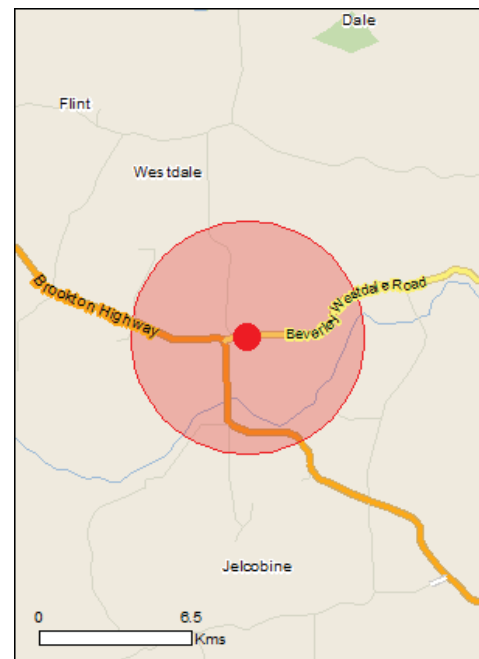
[Matters of NES](#)

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

[Extra Information](#)

### [Caveat](#)

### [Acknowledgements](#)



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

Buffer: 5.0Km



# 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](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	1
<a href="#">Listed Threatened Species:</a>	14
<a href="#">Listed Migratory Species:</a>	6

## 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.

<a href="#">Commonwealth Land:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	12
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	1
<a href="#">Regional Forest Agreements:</a>	1
<a href="#">Invasive Species:</a>	15
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">Key Ecological Features (Marine)</a>	None



# Details

## Matters of National Environmental Significance

### 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
<a href="#">Eucalypt Woodlands of the Western Australian Wheatbelt</a>	Critically Endangered	Community likely to occur within area

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

Name	Status	Type of Presence
<b>Birds</b>		

<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
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<a href="#">Calyptorhynchus banksii naso</a> Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat likely to occur within area
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<a href="#">Calyptorhynchus baudinii</a> Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Species or species habitat likely to occur within area
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<a href="#">Calyptorhynchus latirostris</a> Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
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<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
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<a href="#">Rostratula australis</a> Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
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### Mammals

<a href="#">Bettongia penicillata ogilbyi</a> Woylie [66844]	Endangered	Species or species habitat may occur within area
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<a href="#">Dasyurus geoffroii</a> Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
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<a href="#">Phascogale calura</a> Red-tailed Phascogale, Red-tailed Wambenger, Kenngoor [316]	Vulnerable	Species or species habitat likely to occur within area
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### Plants

<a href="#">Diuris micrantha</a> Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat may occur within area
--	------------	--

Name	Status	Type of Presence
<a href="#">Eleocharis keigheryi</a> Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area
<a href="#">Thelymitra dedmaniarum</a> Cinnamon Sun Orchid [65105]	Endangered	Species or species habitat likely to occur within area
<a href="#">Thomasia montana</a> Hill Thomasia [12136]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Verticordia fimbriilepis subsp. fimbriilepis</a> Shy Featherflower [24631]	Endangered	Species or species habitat may occur within area

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

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

Name	Threatened	Type of Presence
<b>Migratory Marine Birds</b>		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area

#### **Migratory Terrestrial Species**

<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
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#### **Migratory Wetlands Species**

<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area

### Other Matters Protected by the EPBC Act

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

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

Name	Threatened	Type of Presence
<b>Birds</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area
<a href="#">Chrysococcyx osculans</a> Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

## Extra Information

State and Territory Reserves	<a href="#">[ Resource Information ]</a>
Name	State
Wandoo	WA

Regional Forest Agreements	<a href="#">[ Resource Information ]</a>
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Note that all areas with completed RFAs have been included.

Name	State
<a href="#">South West WA RFA</a>	Western Australia

Invasive Species	<a href="#">[ Resource Information ]</a>
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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
<b>Birds</b>		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species

Name	Status	Type of Presence
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		habitat likely to occur within area  Species or species habitat likely to occur within area
<b>Mammals</b>		
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
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
<b>Plants</b>		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Genista sp. X Genista monspessulana Broom [67538]		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
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area



# 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

-32.30806 116.62278

# 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.

# NatureMap Species Report

Created By 360 Enviro on 10/12/2018

**Kingdom** Animalia  
**Current Names Only** Yes  
**Core Datasets Only** Yes  
**Method** 'By Circle'  
**Centre** 116° 37' 22" E, 32° 18' 29" S  
**Buffer** 15km  
**Group By** Family

Family	Species	Records
Acanthizidae	6	388
Accipitridae	6	67
Aegothelidae	1	2
Aeshnidae	2	2
Agamidae	3	19
Ameiridae	1	1
Amphisopodidae	1	2
Anatidae	4	76
Araneidae	1	1
Ardeidae	1	7
Artamidae	2	125
Baetidae	1	1
Barychelidae	1	1
Bothriuridae	2	23
Burhinidae	1	1
Burramyidae	1	7
Cacatuidae	1	3
Campephagidae	1	38
Casuariidae	1	6
Ceinidae	1	3
Ceratopogonidae	3	7
Charadriidae	1	1
Chiltoniidae	1	1
Chironomidae	10	27
Coenagrionidae	4	8
Columbidae	4	49
Corduliidae	2	3
Corixidae	1	3
Corvidae	1	124
Cracticidae	4	157
Cuculidae	3	20
Culicidae	3	7
Cyclopidae	2	2
Cypridae	3	3
Cypridopsidae	1	1
Dasyuridae	4	28
Dicaeidae	1	3
Dicruridae	4	294
Diplodactylidae	5	16
Dolichopodidae	1	1
Dugesiiidae	1	4
Dytiscidae	4	11
Elapidae	2	2
Enchytraeidae	1	1
Ephyridae	1	1
Falconidae	4	17
Gekkonidae	3	16
Gyrinidae	1	1
Halcyonidae	2	62
Haliplidae	1	1
Hemicorduliidae	1	2
Hirundinidae	3	93
Hydraenidae	1	1
Hydrophilidae	3	6
Idiopidae	1	3
Lamponidae	1	1
Leptoceridae	2	6
Lestidae	1	2
Libellulidae	2	4
Limnocytheridae	3	3
Limnodynastidae	5	33
Lycosidae	3	10
Macropodidae	1	14
Maluridae	3	148
Meliphagidae	9	273
Meropidae	1	59
Mesamphisopodidae	1	2
Mesostigmata	1	1
Muridae	1	1
Myobatrachidae	4	30
Myrmecobiidae	1	5
Naididae	2	2
Nemesiidae	1	4
Neosittidae	1	17
Notonectidae	1	1

Oligochaeta	1	3
Oniscidae	1	1
Pachycephalidae	3	213
Palaemonidae	2	3
Parastacidae	2	2
Pardalotidae	2	150
Petroicidae	5	83
Phalacrocoracidae	1	2
Phasianidae	1	4
Philodinae	1	1
Planorbidae	1	2
Podargidae	2	4
Podicipedidae	2	3
Pomatostomidae	1	46
Potoroidae	1	1
Prodidomidae	1	2
Psittacidae	13	353
Pygopodidae	5	7
Scincidae	9	51
Scirtidae	1	4
Simuliidae	2	3
Sparassidae	1	2
Stratiomyidae	1	1
Tabanidae	1	1
Tachyglossidae	1	2
Tenebrionidae	1	1
Threskiornithidae	1	1
Thylacomyidae	1	1
Tipulidae	1	1
Trombidiformes	3	6
Turnicidae	1	34
Unionicolidae	1	1
Urodacidae	1	10
Varanidae	1	1
Vespertilionidae	2	2
Zodariidae	1	1
Zosteropidae	1	54
<b>TOTAL</b>	<b>245</b>	<b>3422</b>



Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Acanthizidae</b>				
1.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
2.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
3.	24262 <i>Acanthiza inornata</i> (Western Thornbill)			
4.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
5.	25534 <i>Sericornis frontalis</i> (White-browed Scrubwren)			
6.	30948 <i>Smicromis brevirostris</i> (Weebill)			
<b>Accipitridae</b>				
7.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
8.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
9.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
10.	<i>Elanus axillaris</i>			
11.	47965 <i>Hieraaetus morphnoides</i> (Little Eagle)			
12.	<i>Lophoictinia isura</i>			
<b>Aegothelidae</b>				
13.	25544 <i>Aegotheles cristatus</i> (Australian Owlet-nightjar)			
<b>Aeshnidae</b>				
14.	<i>Aeshnidae</i> sp.			
15.	<i>Anax papuensis</i>			
<b>Agamidae</b>				
16.	24883 <i>Ctenophorus ornatus</i> (Ornate Crevice-Dragon)			
17.	25510 <i>Pogona minor</i> (Dwarf Bearded Dragon)			
18.	24907 <i>Pogona minor</i> subsp. <i>minor</i> (Dwarf Bearded Dragon)			
<b>Ameiridae</b>				
19.	<i>Nitocra</i> sp. 5 ( <i>nr reducta</i> ) (SAP)			
<b>Amphisopodidae</b>				
20.	<i>Amphisopodidae</i> sp.			
<b>Anatidae</b>				
21.	24312 <i>Anas gracilis</i> (Grey Teal)			
22.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
23.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
24.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
<b>Araneidae</b>				
25.	<i>Austracantha minax</i>			
<b>Ardeidae</b>				
26.	<i>Egretta novaehollandiae</i>			
<b>Artamidae</b>				
27.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
28.	24353 <i>Artamus cyanopterus</i> (Dusky Woodswallow)			
<b>Baetidae</b>				
29.	<i>Baetidae</i> sp.			
<b>Barychelidae</b>				
30.	<i>Idiommata blackwalli</i>			
<b>Bothriuridae</b>				
31.	<i>Cercophonius granulosus</i>			
32.	<i>Cercophonius sulcatus</i>			
<b>Burhinidae</b>				
33.	24359 <i>Burhinus grallarius</i> (Bush Stone-curlew)			
<b>Burramyidae</b>				
34.	24086 <i>Cercartetus concinnus</i> (Western Pygmy-possum, Mundarda)			
<b>Cacatuidae</b>				
35.	<i>Eolophus roseicapillus</i>			
<b>Campephagidae</b>				
36.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
<b>Casuariidae</b>				
37.	24470 <i>Dromaius novaehollandiae</i> (Emu)			
<b>Ceinidae</b>				
38.	<i>Ceinidae</i> sp.			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Ceratopogonidae</b>				
39.	<i>Bezzia</i> sp. 1 (SAP)			
40.	<i>Ceratopogonidae</i> sp.			
41.	<i>Culicoides</i> sp.			
<b>Charadriidae</b>				
42.	47937 <i>Euseyornis melanops</i> (Black-fronted Dotterel)			
<b>Chiltoniidae</b>				
43.	<i>Austrochiltonia subtenuis</i>			
<b>Chironomidae</b>				
44.	<i>Chironominae</i> sp.			
45.	<i>Chironomus</i> aff. <i>alternans</i> (V24) (CB)			
46.	<i>Dicrotendipes conjunctus</i>			
47.	<i>Dicrotendipes</i> sp. A (V47) (SAP)			
48.	<i>Kiefferulus intertinctus</i>			
49.	<i>Orthocladiinae</i> sp.			
50.	<i>Paramerina levidensis</i>			
51.	<i>Procladius paludicola</i>			
52.	<i>Tanypodinae</i> sp.			
53.	<i>Tanytarsus fuscithorax/semibarbitarsus</i>			
<b>Coenagrionidae</b>				
54.	<i>Austroagrion cyane</i>			
55.	<i>Coenagrionidae</i> sp.			
56.	<i>Ischnura aurora aurora</i>			
57.	<i>Ischnura heterosticta heterosticta</i>			
<b>Columbidae</b>				
58.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
59.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
60.	25587 <i>Phaps elegans</i> (Brush Bronzewing)			
61.	25590 <i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)	Y		
<b>Corduliidae</b>				
62.	<i>Corduliidae</i> sp.			
63.	<i>Hemicordulia tau</i>			
<b>Corixidae</b>				
64.	<i>Corixidae</i> sp.			
<b>Corvidae</b>				
65.	25592 <i>Corvus coronoides</i> (Australian Raven)			
<b>Cracticidae</b>				
66.	24420 <i>Cracticus nigrogularis</i> (Pied Butcherbird)			
67.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
68.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
69.	25597 <i>Strepera versicolor</i> (Grey Currawong)			
<b>Cuculidae</b>				
70.	25598 <i>Cacomantis flabelliformis</i> (Fan-tailed Cuckoo)			
71.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
72.	24431 <i>Chrysococcyx basalis</i> (Horsfield's Bronze Cuckoo)			
<b>Culicidae</b>				
73.	<i>Anopheles annulipes</i> s.l.			
74.	<i>Culex</i> sp.			
75.	<i>Culicidae</i> sp.			
<b>Cyclopidae</b>				
76.	<i>Australoeucyclops darwini</i> (ex <i>Paracyclops</i> sp 1 nr <i>timmsi</i> )			
77.	<i>Mesocyclops brooksi</i>			
<b>Cyprididae</b>				
78.	<i>Bennelongia australis</i> lineage			
79.	<i>Cabonocypris nunkeri</i>			
80.	<i>Candonocypris novaezelandiae</i>			
<b>Cypridopsidae</b>				
81.	<i>Sarscypridopsis aculeata</i>			
<b>Dasyuridae</b>				
82.	24088 <i>Antechinus flavipes</i> subsp. <i>leucogaster</i> (Yellow-footed Antechinus, Mardo)			
83.	24092 <i>Dasyurus geoffroyi</i> (Chuditch, Western Quoll)		T	
84.	24111 <i>Sminthopsis gilberti</i> (Gilbert's Dunnart)			

	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
85.	25515	<i>Sminthopsis griseoventer</i> (Grey-bellied Dunnart)			
<b>Dicaeidae</b>					
86.	25607	<i>Dicaeum hirundinaceum</i> (Mistletoebird)			
<b>Dicruridae</b>					
87.	24443	<i>Grallina cyanoleuca</i> (Magpie-lark)			
88.	25610	<i>Myiagra inquieta</i> (Restless Flycatcher)			
89.	48096	<i>Rhipidura albiscapa</i> (Grey Fantail)			
90.	25614	<i>Rhipidura leucophrys</i> (Willie Wagtail)			
<b>Diplodactylidae</b>					
91.	25456	<i>Crenadactylus ocellatus</i> (Clawless Gecko)			
92.	24918	<i>Crenadactylus ocellatus</i> subsp. <i>ocellatus</i> (Clawless Gecko)			
93.	25469	<i>Diplodactylus granariensis</i>			
94.	24939	<i>Diplodactylus polyophthalmus</i>			
95.	24940	<i>Diplodactylus pulcher</i>			
<b>Dolichopodidae</b>					
96.		<i>Dolichopodidae</i> sp.			
<b>Dugesidae</b>					
97.		<i>Dugesidae</i> sp.			
<b>Dytiscidae</b>					
98.		<i>Dytiscidae</i> sp.			
99.		<i>Limbodessus inornatus</i>			
100.		<i>Necterosoma regulare</i>			
101.		<i>Platynectes decempunctatus</i> var <i>polygrammus</i>			
<b>Elapidae</b>					
102.	25252	<i>Notechis scutatus</i> (Tiger Snake)			
103.	25253	<i>Parasuta gouldii</i>			
<b>Enchytraeidae</b>					
104.		<i>Enchytraeidae</i> sp.			
<b>Ephydriidae</b>					
105.		<i>Ephydriidae</i> sp. 3 (SAP)			
<b>Falconidae</b>					
106.	25621	<i>Falco berigora</i> (Brown Falcon)			
107.	25622	<i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
108.	25623	<i>Falco longipennis</i> (Australian Hobby)			
109.	25624	<i>Falco peregrinus</i> (Peregrine Falcon)		S	
<b>Gekkonidae</b>					
110.	24980	<i>Christinus marmoratus</i> (Marbled Gecko)			
111.	24959	<i>Gehyra variegata</i>			
112.	24983	<i>Underwoodisaurus milii</i> (Barking Gecko)			
<b>Gyrinidae</b>					
113.		<i>Macrogyrus angustatus</i>			
<b>Halcyonidae</b>					
114.	30901	<i>Dacelo novaeguineae</i> (Laughing Kookaburra)	Y		
115.	25549	<i>Todiramphus sanctus</i> (Sacred Kingfisher)			
<b>Haliplidae</b>					
116.		<i>Haliplidae</i> sp.			
<b>Hemicorduliidae</b>					
117.		<i>Hemicorduliidae</i> sp.			
<b>Hirundinidae</b>					
118.	24491	<i>Hirundo neoxena</i> (Welcome Swallow)			
119.	48060	<i>Petrochelidon ariel</i> (Fairy Martin)			
120.	48061	<i>Petrochelidon nigricans</i> (Tree Martin)			
<b>Hydraenidae</b>					
121.		<i>Hydraenidae</i> sp.			
<b>Hydrophilidae</b>					
122.		<i>Berosus</i> sp.			
123.		<i>Hydrophilidae</i> sp.			
124.		<i>Limnoxenus zelandicus</i>			
<b>Idiopidae</b>					
125.	33917	<i>Idiosoma nigrum</i> (Shield-backed Trapdoor Spider)		T	

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Lamponidae</b>				
126.	<i>Lampona cylindrata</i>			
<b>Leptoceridae</b>				
127.	<i>Leptoceridae sp.</i>			
128.	<i>Oecetis sp.</i>			
<b>Lestidae</b>				
129.	<i>Lestidae sp.</i>			
<b>Libellulidae</b>				
130.	<i>Libellulidae sp.</i>			
131.	<i>Orthetrum caledonicum</i>			
<b>Limnocytheridae</b>				
132.	<i>Gomphodella aff. maia (SAP)</i>			
133.	<i>Limnocythere dorsosicula</i>			
134.	<i>Paralimnocythere sp. 275 (south-west, CB)</i>			
<b>Limnodynastidae</b>				
135.	25408 <i>Heleioporus albopunctatus (Western Spotted Frog)</i>			
136.	25410 <i>Heleioporus eyrei (Moaning Frog)</i>			
137.	25411 <i>Heleioporus inornatus (Whooping Frog)</i>			
138.	25412 <i>Heleioporus psammophilus (Sand Frog)</i>			
139.	25426 <i>Neobatrachus pelobatoides (Humming Frog)</i>			
<b>Lycosidae</b>				
140.	<i>Tasmanicosa leuckartii</i>			
141.	<i>Venator immansueta</i>			
142.	<i>Venatrix pullastra</i>			
<b>Macropodidae</b>				
143.	48022 <i>Notamacropus irma (Western Brush Wallaby)</i>		P4	
<b>Maluridae</b>				
144.	25651 <i>Malurus lamberti (Variegated Fairy-wren)</i>			
145.	24551 <i>Malurus pulcherrimus (Blue-breasted Fairy-wren)</i>			
146.	25654 <i>Malurus splendens (Splendid Fairy-wren)</i>			
<b>Meliphagidae</b>				
147.	24560 <i>Acanthorhynchus superciliosus (Western Spinebill)</i>			
148.	24561 <i>Anthochaera carunculata (Red Wattlebird)</i>			
149.	24562 <i>Anthochaera lunulata (Western Little Wattlebird)</i>			
150.	47962 <i>Glyciphila melanops (Tawny-crowned Honeyeater)</i>			
151.	25659 <i>Lichenostomus leucotis (White-eared Honeyeater)</i>			
152.	25661 <i>Lichmera indistincta (Brown Honeyeater)</i>			
153.	25663 <i>Melithreptus brevirostris (Brown-headed Honeyeater)</i>			
154.	48071 <i>Phylidonyris niger (White-cheeked Honeyeater)</i>			
155.	24596 <i>Phylidonyris novaehollandiae (New Holland Honeyeater)</i>			
<b>Meropidae</b>				
156.	24598 <i>Merops ornatus (Rainbow Bee-eater)</i>			
<b>Mesamphisopodidae</b>				
157.	<i>Mesamphisopodidae sp.</i>			
<b>Mesostigmata</b>				
158.	<i>Mesostigmata sp. 2</i>			
<b>Muridae</b>				
159.	24223 <i>Mus musculus (House Mouse)</i>	Y		
<b>Myobatrachidae</b>				
160.	25398 <i>Crinia georgiana (Quacking Frog)</i>			
161.	25401 <i>Crinia pseudinsignifera (Bleating Froglet)</i>			
162.	25420 <i>Myobatrachus gouldii (Turtle Frog)</i>			
163.	25433 <i>Pseudophryne guentheri (Crawling Toadlet)</i>			
<b>Myrmecobiidae</b>				
164.	24146 <i>Myrmecobius fasciatus (Numbat, Walpurti)</i>		T	
<b>Naididae</b>				
165.	<i>Ainudrilus nharna</i>			
166.	<i>Paranaïs littoralis</i>			
<b>Nemesiidae</b>				
167.	<i>Aname mainae</i>			
<b>Neosittidae</b>				



	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
168.	25673	<i>Daphoenositta chrysoptera</i> (Varied Sittella)			
<b>Notonectidae</b>					
169.		<i>Notonectidae</i> sp.			
<b>Oligochaeta</b>					
170.		<i>Oligochaeta</i> sp.			
<b>Oniscidae</b>					
171.		<i>Oniscidae</i> sp.			
<b>Pachycephalidae</b>					
172.	25675	<i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
173.	25677	<i>Falcunculus frontatus</i> (Crested Shrike-tit)			
174.	25680	<i>Pachycephala rufiventris</i> (Rufous Whistler)			
<b>Palaemonidae</b>					
175.		<i>Palaemonetes australis</i>			
176.		<i>Palaemonidae</i> sp.			
<b>Parastacidae</b>					
177.		<i>Cherax quinquecarinatus</i>			
178.		<i>Parastacidae</i> sp.			
<b>Pardalotidae</b>					
179.	25681	<i>Pardalotus punctatus</i> (Spotted Pardalote)			
180.	25682	<i>Pardalotus striatus</i> (Striated Pardalote)			
<b>Petroicidae</b>					
181.	24651	<i>Eopsaltria australis</i> subsp. <i>griseogularis</i> (Western Yellow Robin)			
182.	47997	<i>Melanodryas cucullata</i> (Hooded Robin)			
183.	25693	<i>Microeca fascians</i> (Jacky Winter)			
184.	48066	<i>Petroica boodang</i> (Scarlet Robin)			
185.	24659	<i>Petroica goodenovii</i> (Red-capped Robin)			
<b>Phalacrocoracidae</b>					
186.		<i>Microcarbo melanoleucos</i>			
<b>Phasianidae</b>					
187.	24671	<i>Coturnix pectoralis</i> (Stubble Quail)			
<b>Philodidae</b>					
188.		<i>Mniobia cf. scarlatina</i> (SAP)			Y
<b>Planorbidae</b>					
189.		<i>Planorbidae</i> sp.			
<b>Podargidae</b>					
190.	25703	<i>Podargus strigoides</i> (Tawny Frogmouth)			
191.	24679	<i>Podargus strigoides</i> subsp. <i>brachypterus</i> (Tawny Frogmouth)			
<b>Podicipedidae</b>					
192.	24681	<i>Poliocephalus poliocephalus</i> (Hoary-headed Grebe)			
193.	25705	<i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
<b>Pomatostomidae</b>					
194.	24683	<i>Pomatostomus superciliosus</i> (White-browed Babbler)			
<b>Potoroidae</b>					
195.	24162	<i>Bettongia penicillata</i> subsp. <i>ogilbyi</i> (Woylie, Brush-tailed Bettong)		T	
<b>Prodidomidae</b>					
196.		<i>Molycris quadricauda</i>			
<b>Psittacidae</b>					
197.		<i>Barnardius zonarius</i>			
198.	25717	<i>Calyptorhynchus banksii</i> (Red-tailed Black-Cockatoo)			
199.	24731	<i>Calyptorhynchus banksii</i> subsp. <i>naso</i> (Forest Red-tailed Black Cockatoo)		T	
200.	24733	<i>Calyptorhynchus baudinii</i> (Baudin's Cockatoo, White-tailed Long-billed Black Cockatoo)		T	
201.	24734	<i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)		T	
202.	48400	<i>Calyptorhynchus</i> sp. (white-tailed black cockatoo)		T	
203.	24736	<i>Melopsittacus undulatus</i> (Budgerigar)			
204.	24738	<i>Neophema elegans</i> (Elegant Parrot)			
205.	25720	<i>Platycercus icterotis</i> (Western Rosella)			
206.	24747	<i>Platycercus spurius</i> (Red-capped Parrot)			
207.	24750	<i>Platycercus zonarius</i> subsp. <i>semitorquatus</i> (Twenty-eight Parrot)			
208.	25722	<i>Polytelis anthopeplus</i> (Regent Parrot)			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
209.	<i>Purpureicephalus spurius</i>			
<b>Pygopodidae</b>				
210.	24990 <i>Aprasia pulchella</i> (Granite Worm-lizard)			
211.	24991 <i>Aprasia repens</i> (Sand-plain Worm-lizard)			
212.	25766 <i>Delma fraseri</i> (Fraser's Legless Lizard)			
213.	24999 <i>Delma grayii</i>			
214.	25005 <i>Lialis burtonis</i>			
<b>Scincidae</b>				
215.	30893 <i>Cryptoblepharus buechananii</i>			
216.	25020 <i>Cryptoblepharus plagiocephalus</i>			
217.	25047 <i>Ctenotus impar</i>			
218.	25100 <i>Egernia napoleonis</i>			
219.	25109 <i>Eremiascincus richardsonii</i> (Broad-banded Sand Swimmer)			
220.	25131 <i>Lerista distinguenda</i>			
221.	25184 <i>Menetia greyii</i>			
222.	25191 <i>Morethia lineocellata</i>			
223.	25192 <i>Morethia obscura</i>			
<b>Scirtidae</b>				
224.	<i>Scirtidae</i> sp.			
<b>Simuliidae</b>				
225.	<i>Simuliidae</i> sp.			
226.	<i>Simulium ornatipes</i>			
<b>Sparassidae</b>				
227.	<i>Isopedella cana</i>			
<b>Stratiomyidae</b>				
228.	<i>Stratiomyidae</i> sp.			
<b>Tabanidae</b>				
229.	<i>Tabanidae</i> sp.			
<b>Tachyglossidae</b>				
230.	24207 <i>Tachyglossus aculeatus</i> (Short-beaked Echidna)			
<b>Tenebrionidae</b>				
231.	<i>Tenebrionidae</i> sp.			
<b>Threskiornithidae</b>				
232.	24841 <i>Platalea flavipes</i> (Yellow-billed Spoonbill)			
<b>Thylacomyidae</b>				
233.	24168 <i>Macrotis lagotis</i> (Bilby, Dalgyte, Ninu)		T	
<b>Tipulidae</b>				
234.	<i>Tipulidae</i> sp.			
<b>Trombidiformes</b>				
235.	<i>Acariformes</i> sp.			
236.	<i>Trombidioidea</i> sp. (SAP)			
237.	<i>Trombidioidea</i> sp. 4 (SAP)			
<b>Turnicidae</b>				
238.	48147 <i>Turnix varius</i> (Painted Button-quail)			
<b>Unionicolidae</b>				
239.	<i>Koenikea nr australica</i> (=verrucosa)			
<b>Urodacidae</b>				
240.	<i>Urodacus novaehollandiae</i>			
<b>Varanidae</b>				
241.	25218 <i>Varanus gouldii</i> (Bungarra or Sand Monitor)			
<b>Vespertilionidae</b>				
242.	24194 <i>Nyctophilus geoffroyi</i> (Lesser Long-eared Bat)			
243.	24206 <i>Vespadelus regulus</i> (Southern Forest Bat)			
<b>Zodariidae</b>				
244.	<i>Habronestes bradleyi</i>			
<b>Zosteropidae</b>				
245.	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	<sup>1</sup> Endemic To Query Area
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					

<sup>1</sup> 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.

# NatureMap Species Report

Created By 360 Enviro on 09/11/2018

Current Names Only Yes  
Core Datasets Only Yes  
Method 'By Circle'  
Centre 116° 37' 22" E, 32° 18' 29" S  
Buffer 5km  
Group By Family

Family	Species	Records
Acanthizidae	6	23
Accipitridae	3	3
Agamidae	1	1
Anatidae	3	17
Artamidae	1	5
Asparagaceae	2	2
Boraginaceae	1	1
Burhinidae	1	1
Campephagidae	1	2
Charadriidae	1	1
Columbidae	3	3
Corvidae	1	9
Cracticidae	2	7
Cuculidae	1	1
Cyperaceae	3	4
Dasyuridae	1	2
Dicruridae	2	15
Dilleniaceae	1	1
Dipodactylidae	1	1
Elaeocarpaceae	1	1
Ericaceae	3	5
Fabaceae	5	7
Goodeniaceae	3	3
Haemodoraceae	1	1
Halcyonidae	1	5
Hirundinidae	1	3
Idiopidae	1	1
Limnodynastidae	2	2
Maluridae	1	5
Meliphagidae	6	11
Myobatrachidae	2	10
Myrtaceae	5	7
Orchidaceae	16	26
Pachycephalidae	2	5
Pardalotidae	2	5
Petroicidae	2	7
Phalacrocoracidae	1	2
Poaceae	1	1
Pomatostomidae	1	1
Proteaceae	7	13
Psittacidae	3	16
Restionaceae	2	2
Scincidae	1	2
Stylidiaceae	1	1
Tachyglossidae	1	1
Turnicidae	1	1
Zosteropidae	1	2
<b>TOTAL</b>	<b>109</b>	<b>245</b>

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Acanthizidae</b>				
1.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
2.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
3.	24262 <i>Acanthiza inornata</i> (Western Thornbill)			
4.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
5.	25534 <i>Sericornis frontalis</i> (White-browed Scrubwren)			
6.	30948 <i>Smicrornis brevirostris</i> (Weebill)			
<b>Accipitridae</b>				
7.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
8.	<i>Elanus axillaris</i>			
9.	47965 <i>Hieraaetus morphnoides</i> (Little Eagle)			
<b>Agamidae</b>				
10.	25510 <i>Pogona minor</i> (Dwarf Bearded Dragon)			

NatureMap is a collaborative project of the Department of Parks and Wildlife and the Western Australian Museum.



Department of  
Parks and Wildlife





	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Anatidae</b>					
11.	24312	<i>Anas gracilis</i> (Grey Teal)			
12.	24316	<i>Anas superciliosa</i> (Pacific Black Duck)			
13.	24321	<i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
<b>Artamidae</b>					
14.	24353	<i>Artamus cyanopterus</i> (Dusky Woodswallow)			
<b>Asparagaceae</b>					
15.	1245	<i>Lomandra spartea</i>			
16.	1354	<i>Thysanotus tenellus</i>			
<b>Boraginaceae</b>					
17.	6707	<i>Heliotropium curassavicum</i> (Smooth Heliotrope)			
<b>Burhinidae</b>					
18.	24359	<i>Burhinus grallarius</i> (Bush Stone-curlew)			
<b>Campephagidae</b>					
19.	25568	<i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
<b>Charadriidae</b>					
20.	47937	<i>Elseymoris melanops</i> (Black-fronted Dotterel)			
<b>Columbidae</b>					
21.	24407	<i>Ocyphaps lophotes</i> (Crested Pigeon)			
22.	24409	<i>Phaps chalcoptera</i> (Common Bronzewing)			
23.	25590	<i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)	Y		
<b>Corvidae</b>					
24.	25592	<i>Corvus coronoides</i> (Australian Raven)			
<b>Cracticidae</b>					
25.	24420	<i>Cracticus nigrogularis</i> (Pied Butcherbird)			
26.	25595	<i>Cracticus tibicen</i> (Australian Magpie)			
<b>Cuculidae</b>					
27.	42307	<i>Cacomantis pallidus</i> (Pallid Cuckoo)			
<b>Cyperaceae</b>					
28.	912	<i>Isolepis cyperoides</i>			
29.	937	<i>Lepidosperma longitudinale</i> (Pithy Sword-sedge)			
30.	17614	<i>Schoenus plumosus</i>			
<b>Dasyuridae</b>					
31.	25515	<i>Sminthopsis griseoventer</i> (Grey-bellied Dunnart)			
<b>Dicruridae</b>					
32.	48096	<i>Rhipidura albiscapa</i> (Grey Fantail)			
33.	25614	<i>Rhipidura leucophrys</i> (Willie Wagtail)			
<b>Dilleniaceae</b>					
34.	19932	<i>Hibbertia glomerata</i> subsp. <i>wandoo</i>		P3	
<b>Diplodactylidae</b>					
35.	25469	<i>Diplodactylus granariensis</i>			
<b>Elaeocarpaceae</b>					
36.	48342	<i>Tetratheca hirsuta</i> subsp. <i>hirsuta</i>			
<b>Ericaceae</b>					
37.	6334	<i>Astroloma pallidum</i> (Kick Bush)			
38.	6438	<i>Leucopogon pubescens</i>			
39.	6454	<i>Leucopogon verticillatus</i> (Tassel Flower)			
<b>Fabaceae</b>					
40.	3200	<i>Acacia acuminata</i> (Jam, Mangard)			
41.	3207	<i>Acacia alata</i> (Winged Wattle)			
42.	3710	<i>Bossiaea eriocarpa</i> (Common Brown Pea)			
43.	3913	<i>Gastrolobium parvifolium</i> (Berry Poison)			
44.	3933	<i>Gastrolobium villosum</i> (Crinkle-leaved Poison)			
<b>Goodeniaceae</b>					
45.	7420	<i>Dampiera alata</i> (Winged-stem Dampiera)			
46.	7451	<i>Dampiera lavandulacea</i>			
47.	19051	<i>Goodenia scapigera</i> subsp. <i>scapigera</i>			
<b>Haemodoraceae</b>					
48.	1453	<i>Conostylis serrulata</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Halcyonidae</b>				
49.	30901 <i>Dacelo novaeguineae</i> (Laughing Kookaburra)	Y		
<b>Hirundinidae</b>				
50.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
<b>Idiopidae</b>				
51.	33917 <i>Idiosoma nigrum</i> (Shield-backed Trapdoor Spider)		T	
<b>Limnodynastidae</b>				
52.	25410 <i>Heleioporus eyrei</i> (Moaning Frog)			
53.	25426 <i>Neobatrachus pelobatoides</i> (Humming Frog)			
<b>Maluridae</b>				
54.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
<b>Meliphagidae</b>				
55.	24560 <i>Acanthorhynchus superciliosus</i> (Western Spinebill)			
56.	24562 <i>Anthochaera lunulata</i> (Western Little Wattlebird)			
57.	47962 <i>Glyciphila melanops</i> (Tawny-crowned Honeyeater)			
58.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
59.	48071 <i>Phylidonyris niger</i> (White-cheeked Honeyeater)			
60.	24596 <i>Phylidonyris novaehollandiae</i> (New Holland Honeyeater)			
<b>Myobatrachidae</b>				
61.	25420 <i>Myobatrachus gouldii</i> (Turtle Frog)			
62.	25433 <i>Pseudophryne guentheri</i> (Crawling Toadlet)			
<b>Myrtaceae</b>				
63.	5487 <i>Calytrix violacea</i>			
64.	5545 <i>Eucalyptus accedens</i> (Powderbark Wandoo)			
65.	13534 <i>Eucalyptus aspersa</i>			
66.	5628 <i>Eucalyptus drummondii</i> (Drummond's Gum)			
67.	5987 <i>Melaleuca viminea</i> (Mohan)			
<b>Orchidaceae</b>				
68.	11136 <i>Caladenia denticulata</i>			
69.	11165 <i>Caladenia falcata</i>			
70.	11106 <i>Caladenia filifera</i>			
71.	15348 <i>Caladenia flava</i> subsp. <i>flava</i>			
72.	15502 <i>Caladenia footeana</i>			
73.	15355 <i>Caladenia hirta</i> subsp. <i>rosea</i>			
74.	1603 <i>Caladenia longiclavata</i> (Clubbed Spider Orchid)			
75.	20430 <i>Caladenia</i> sp. Wandoo (G. Brockman GBB 671)			
76.	15398 <i>Caladenia xantha</i>			
77.	48255 <i>Diuris brachyscapa</i>			
78.	11049 <i>Diuris corymbosa</i>			
79.	1679 <i>Prasophyllum ovale</i> (Little Leek Orchid)			
80.	11054 <i>Pterostylis hamiltonii</i> (Red-veined Shell Orchid)			
81.	1693 <i>Pterostylis recurva</i> (Jug Orchid)			
82.	1701 <i>Thelymitra antennifera</i> (Vanilla Orchid)			
83.	1718 <i>Thelymitra villosa</i> (Custard Orchid)			
<b>Pachycephalidae</b>				
84.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
85.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
<b>Pardalotidae</b>				
86.	25681 <i>Pardalotus punctatus</i> (Spotted Pardalote)			
87.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
<b>Petroicidae</b>				
88.	48066 <i>Petroica boodang</i> (Scarlet Robin)			
89.	24659 <i>Petroica goodenovii</i> (Red-capped Robin)			
<b>Phalacrocoracidae</b>				
90.	<i>Microcarbo melanoleucos</i>			
<b>Poaceae</b>				
91.	222 <i>Aristida ramosa</i> (Purple Wiregrass)	Y		
<b>Pomatostomidae</b>				
92.	24683 <i>Pomatostomus superciliosus</i> (White-browed Babbler)			
<b>Proteaceae</b>				
93.	32045 <i>Banksia squarrosa</i> subsp. <i>squarrosa</i>			
94.	2042 <i>Grevillea monticola</i>			
95.	2080 <i>Grevillea quercifolia</i> (Oak-leaf Grevillea)			

	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
96.	2215	<i>Hakea undulata</i> (Wavy-leaved Hakea)			
97.	8844	<i>Isopogon crithmifolius</i>			
98.	2286	<i>Petrophile brevifolia</i>			
99.	2297	<i>Petrophile heterophylla</i> (Variable-leaved Cone Bush)			
<b>Psittacidae</b>					
100.		<i>Barnardius zonarius</i>			
101.	24738	<i>Neophema elegans</i> (Elegant Parrot)			
102.		<i>Purpureicephalus spurius</i>			
<b>Restionaceae</b>					
103.	16595	<i>Desmocladus flexuosus</i>			
104.	1088	<i>Lepyrodia macra</i> (Large Scale Rush)			
<b>Scincidae</b>					
105.	25020	<i>Cryptoblepharus plagiocephalus</i>			
<b>Stylidiaceae</b>					
106.	45393	<i>Stylidium uniflorum</i> subsp. <i>uniflorum</i> (Pincushion Triggerplant)			
<b>Tachyglossidae</b>					
107.	24207	<i>Tachyglossus aculeatus</i> (Short-beaked Echidna)			
<b>Turnicidae</b>					
108.	48147	<i>Turnix varius</i> (Painted Button-quail)			
<b>Zosteropidae</b>					
109.	25765	<i>Zosterops lateralis</i> (Grey-breasted White-eye, Silveryeye)			

**Conservation Codes**

T - Rare or likely to become extinct  
X - Presumed extinct  
IA - Protected under international agreement  
S - Other specially protected fauna  
1 - Priority 1  
2 - Priority 2  
3 - Priority 3  
4 - Priority 4  
5 - Priority 5

<sup>1</sup> 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 F

## Vegetation Condition Scale



**Vegetation Condition Scale (Environmental Protection Authority, 2016a)**

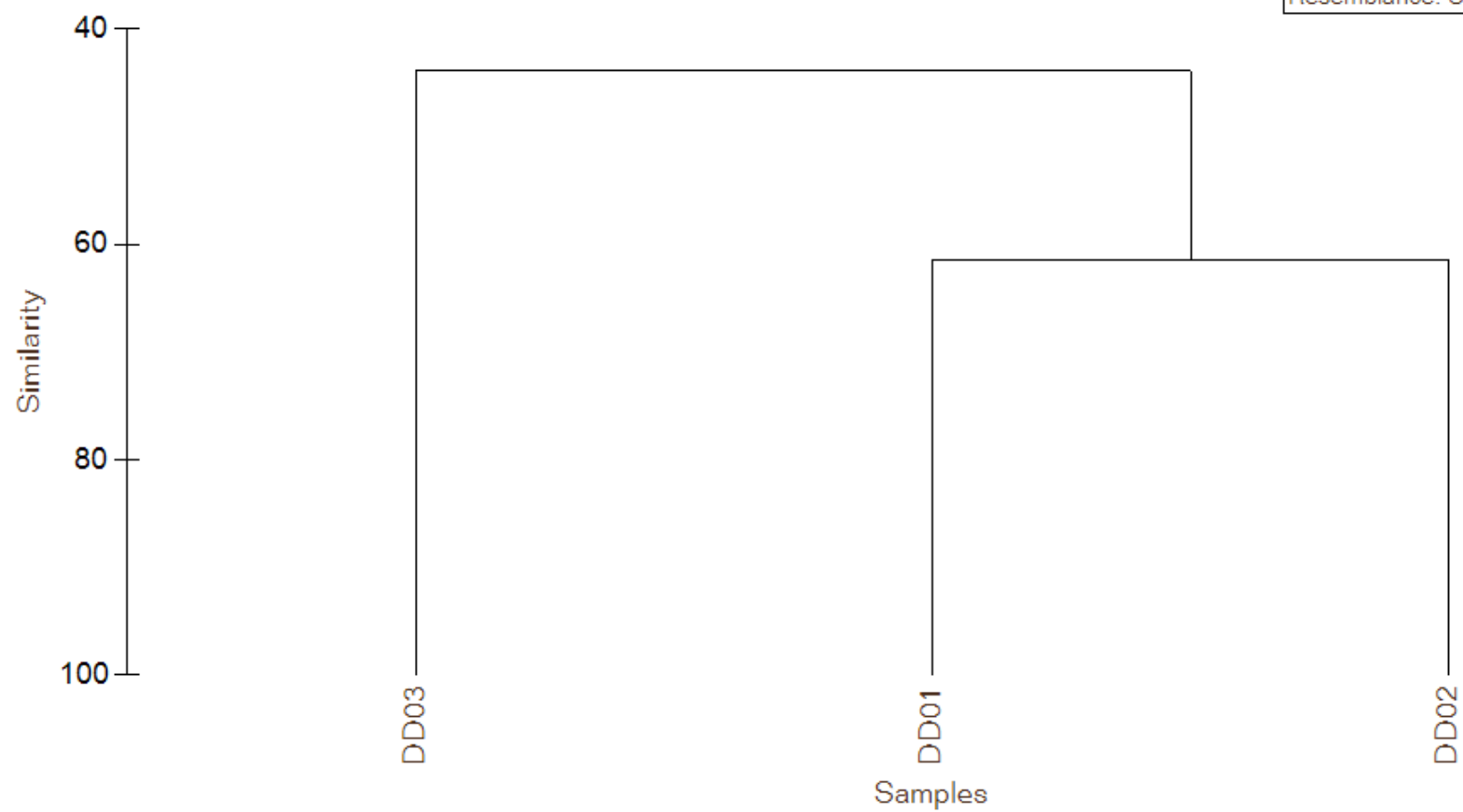
<b>VEGETATION CONDITION SOUTH WEST AND INTERZONE BOTANICAL PROVINCES</b>	
<b>Pristine</b>	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
<b>Excellent</b>	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
<b>Very Good</b>	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
<b>Good</b>	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
<b>Poor</b>	
<b>Degraded</b>	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
<b>Completely Degraded</b>	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.

# APPENDIX G

## Vegetation Community Dendrogram

*Group average*

Transform: Square root  
Resemblance: S17 Bray Curtis similarity



# APPENDIX H

## Flora and Fauna Likelihood Assessments



**Table 8: Conservation Significant Fauna Likelihood of Occurrence**

Key: STATE = Wildlife Conservation Act 1950 or Department of Biodiversity, Conservation and Attractions Conservation Code, EPBC = Environmental Protection and Biodiversity Conservation Act 1999, A = Listed in Naturemap Search, B = EPBC Protected Matters Search, C = DBCA Threatened and Priority Fauna Search, D = Current Survey, # = Number of DBCA Records in Past 15 years

CR = Critically Endangered, EN = Listed as Endangered, VU = Listed as Vulnerable, IA = International Agreement, MI = Listed as Migratory, CD = Conservation dependent fauna, OS = Other specially protected fauna under the WC Act, Ma = Listed as Marine under the EBPC Act, P = Listed as Priority by the DBCA.

FAMILY	SCIENTIFIC NAME	COMMON NAME	CONSERVATION CODES							#	HABITAT PREFERENCE	LIKELIHOOD OF OCCURRENCE
			STATE	EPBC	A	B	C	D				
AVIAN												
Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle		MA			X		0	Usually coastal over islands, reefs, headlands, beaches, bays, estuaries, mangroves, seasonally flooded inland swamps, lagoons and floodplains; often far inland on large pools of major rivers <sup>2</sup>	Low	
Apodidae	<i>Apus pacificus</i>	Pacific Swift (Fork-tailed Swift)	IA	MI & MA			X		0	Low to very high airspace over varied habitat, rainforest to semi-desert <sup>2</sup>	Low	
Ardeidae	<i>Ardea ibis</i>	Cattle Egret		MA			X		0	Moist pastures with tall grass; shallow open wetlands and margins, mudflats <sup>2</sup>	Low	
Ardeidae	<i>Ardea modesta</i>	Eastern Great Egret		MA			X		0	Widespread in Aus wetlands, both freshwater and tidal, provided there is open shallow water in which they can wade; also use flooded grasslands <sup>1</sup>	Low	
Cuculidae	<i>Cacomantis pallidus</i>	Pallid Cuckoo		MA				X	0	Prefers timbered country with trees or shrubs and a sparse understorey <sup>1</sup>	Recorded	
Cacatuidae	<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo	VU	VU	X	X	X		13	Tall eucalypt forest, woodland, feeds on seeds of large-fruited eucalypts <sup>1</sup>	High	
Cacatuidae	<i>Calyptorhynchus baudinii</i>	Baudin's Cockatoo	EN	EN	X	X	X		5	Forests, farm trees; feed primarily on seed from large woody capsules of marri, a common SW eucalypt; also strips bark from dead trees in search of wood-boring insects <sup>2</sup>	High	
Cacatuidae	<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	EN	EN	X	X	X		17	Forests, woodlands, heathlands, farms; feeds on banksias hakeas, dryandras - often on ground; also exploits pine plantations <sup>2</sup>	High	
Cuculidae	<i>Chrysococcyx osculans</i>	Black-eared Cuckoo		MA			X		0	Usually solitary. In open woodlands including stunted mallee, mulga and riverine vegetation in open settings; also uses shrublands, especially saltbush and bluebush <sup>1</sup>	Low	
Falconidae	<i>Falco peregrinus</i>	Peregrine Falcon	OS		X	X			6	Most environments with suitable nest sites: cliff faces preferred, including man-made ones, commonly uses stick nests built by other species <sup>1</sup>	High	

<sup>1</sup> = (Menkhorst et al., 2017), <sup>2</sup> = (Morcombe, 2003), <sup>3</sup> = (Wilson and Swan, 2017), <sup>4</sup> = (Van Dyck and Strahan, 2008)

Key: STATE = Wildlife Conservation Act 1950 or Department of Biodiversity, Conservation and Attractions Conservation Code, EPBC = Environmental Protection and Biodiversity Conservation Act 1999, A = Listed in Naturemap Search, B = EPBC Protected Matters Search, C = DBCA Threatened and Priority Fauna Search, D = Current Survey, # = Number of DBCA Records in Past 15 years

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<b>Megapodiidae</b>	<i>Leipoa ocellata</i>	Malleefowl	VU	VU			X		0	Unburned mallee and woodland with abundant litter and low scrub <sup>2</sup>	Medium
<b>Meropidae</b>	<i>Merops ornatus</i>	Rainbow Bee-eater		MA			X	X	0	Open country of woodlands, open forest, semi-arid scrub, grasslands, clearings in heavier forests, farmlands; avoids heavy forests that would hinder its aerial pursuit of insects. Breeding – requires open clearing or paddock with loamy soil soft enough for nest tunnelling <sup>2</sup>	Recorded
<b>Motacillidae</b>	<i>Motacilla cinerea</i>	Grey Wagtail	IA	MI & MA			X		0	Usually near fresh sandy or rocky streams, but also on mown grass, ploughed land, sewage ponds <sup>2</sup>	Low
<b>Rostratulidae</b>	<i>Rostratula benghalensis australis</i>	Australian Painted Snipe	EN	EN & MA			X		0	Surrounds and shallows of wetlands that are well vegetated with dense low cover <sup>2</sup>	Low
<b>Scolopacidae</b>	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	IA	MI & MA			X		0	Fresh or salt wetlands – muddy edges of lagoons, swaps, lakes, dams, soaks, sewage farms, temporary floodwaters <sup>2</sup>	Low
<b>Scolopacidae</b>	<i>Calidris ferruginea</i>	Curlew Sandpiper	VU & IA	CR, MI & MA			X		0	Inter-tidal mudflats of estuaries, lagoons, mangrove channels; around lakes, dams, floodwaters, flooded saltbush surrounds of inland lakes <sup>2</sup>	Low
<b>Scolopacidae</b>	<i>Calidris melanotos</i>	Pectoral Sandpiper	IA	MI & MA			X		0	Usually coastal wetlands, both fresh and saline, but also inland on permanent and temporary wetlands. Uses sites with mudflats, fringing vegetation, swamps with heavy overgrowth of vegetation <sup>2</sup>	Low
<b>Scolopacidae</b>	<i>Tringa hypoleucos</i>	Common Sandpiper	IA	MI & MA			X		0	Varied coastal and interior wetlands – narrow muddy edges of billabongs, river pools, mangroves, among rocks and snags, reefs or rocky beaches; avoids wide open mudflats. Perches on branches, posts, boats <sup>2</sup>	Low
<b>MAMMALIAN</b>											
<b>Dasyuridae</b>	<i>Dasyurus geoffroyi fortis</i>	Western Quoll, Chuditch	VU	VU	X	X	X		2	Areas dominated by sclerophyll forest or drier woodland, heath and mallee shrubland <sup>4</sup>	High
<b>Dasyuridae</b>	<i>Phascogale calura</i>	Red-tailed Phascogale	CD	VU			X		0	Denser and taller climax vegetation communities within Wandoo and Rock Sheoak alliances <sup>4</sup>	Medium

<sup>1</sup> = (Menkhorst et al., 2017), <sup>2</sup> = (Morcombe, 2003), <sup>3</sup> = (Wilson and Swan, 2017), <sup>4</sup> = (Van Dyck and Strahan, 2008)

Key: STATE = Wildlife Conservation Act 1950 or Department of Biodiversity, Conservation and Attractions Conservation Code, EPBC = Environmental Protection and Biodiversity Conservation Act 1999, A = Listed in Naturemap Search, B = EPBC Protected Matters Search, C = DBCA Threatened and Priority Fauna Search, D = Current Survey, # = Number of DBCA Records in Past 15 years

CR = Critically Endangered, EN = Listed as Endangered, VU = Listed as Vulnerable, IA = International Agreement, Mi = Listed as Migratory, CD = Conservation dependent fauna, OS = Other specially protected fauna under the WC Act, Ma = Listed as Marine under the EBPC Act, P = Listed as Priority by the DBCA.

<b>Dasyuridae</b>	<i>Phascogale tapoatafa wambenger</i>	Wambenger Brush-tailed Phascogale	CD		X				0	Arboreal, forages on mature rough-barked trees, large logs and dead standing trees <sup>4</sup>	Medium
<b>Macropodidae</b>	<i>Notamacropus irma</i>	Western Brush Wallaby	P4		X	X			7	Open forest or woodland, open seasonally wet flats <sup>4</sup>	High
<b>Myrmecobiidae</b>	<i>Myrmecobius fasciatus fasciatus</i>	Numbat, Walpurti	EN	EN	X	X			0	Dominated by eucalypts that provide hollow logs and branches for shelter and termites for food - Jarrah forest and Wandoo woodland <sup>4</sup>	Low
<b>Potoroidae</b>	<i>Bettongia penicillata ogilbyi</i>	Brush-tailed Bettong, Woylie	CR	EN	X	X	X		0	Restricted to three small wheatbelt reserves, all characterised by the presence thickets of the plant genus <i>Gastrolobium</i> <sup>4</sup>	Low
<b>Thylacomyidae</b>	<i>Macrotis lagotis</i>	Bilby, Dalgyte	VU	VU	X	X			0	Variety of inland habitats including Mitchell Grass and stony downs country of cracking clays, desert sandplains and dune fields sometimes containing laterite, with hummock grassland and massive red earths with <i>Acacia</i> shrubland <sup>4</sup>	Low

<sup>1</sup> = (Menkhorst et al., 2017), <sup>2</sup> = (Morcombe, 2003), <sup>3</sup> = (Wilson and Swan, 2017), <sup>4</sup> = (Van Dyck and Strahan, 2008)

**Appendix x: Assessment of the Likely Occurrence of DRF and Priority Flora (as per DBCA and EPBC Database Searches) in the Survey Area**

Closest record to Survey Area based on DBCA 2018. High Likelihood = Suitable habitat present and records less than 5 km from the Survey Area, Medium Likelihood = Suitable habitat present and records between 5 km and 10 km from the Survey Area, and Low Likelihood = No suitable habitat present and/or records greater than 10 km from the Survey Area. En = Listed as Endangered under the EBPC Act, Vu = based on knowledge of the Survey Area post field-survey, and flowering period of flora taxa. Post-survey Likelihood of Occurrence; based on knowledge of habitat within the Survey Area and knowledge gained from the survey effort during ground truthing.

Species	Conservation Status		Source		Distance to Nearest Record (km)	Flowering Period	Preferred Habitat	Habitat occurs within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	NatureMap	EPBC						
<i>Synaphea</i> sp. Fairbridge Farm (D. Papenfus 696)	T	CE		x	11.5	Oct	Sandy with lateritic pebbles, near winter-wet flats, in low woodland with weedy grasses.	No	Low	Low
<i>Synaphea</i> sp. Serpentine (G.R. Brand 103)	T	CE		x	24	Sep - Oct	Yellow-brown sand/clay, Grey loamy sand. Wetlands, winter-wet sites.	No	Low	Low
<i>Andersonia gracilis</i>	T	EN		x	62	Sep - Nov	White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.	Yes	Low	Low
<i>Caladenia huegelii</i>	T	EN	x	x	2	Sep - Oct	Grey or brown sand, clay loam.	No	Low	Low
<i>Diuris purdiei</i>	T	EN		x	7	Sep - Oct	Grey-black moist sand. Winter-wet swamps.	No	Low	Low
<i>Drakaea elastica</i>	T	EN	x	x	1.9	Oct - Nov	White or grey sand. Low-lying situations adjoining winter-wet swamps.	Yes	High	Low
<i>Eucalyptus x balanites</i>	T	EN		x	48	Oct - Feb	Sandy soils with lateritic gravel.	No	Low	Low
<i>Lepidosperma rostratum</i>	T	EN		x	34	-	Peaty sand, clay	No	Low	Low
<i>Synaphea stenoloba</i>	T	EN		x	4.8	Aug - Oct	Sandy or sandy clay soils. Winter-wet flats, granite.	No	Low	Low
<i>Diuris micrantha</i>	T	VU	x	x	1	Sep - Oct	Brown loamy clay. Winter-wet swamps, in shallow water.	No	Low	Low
<i>Drakaea micrantha</i>	T	VU		x	8.9	Sep - Oct	White-grey sand.	Yes	Medium	Medium
<i>Diuris drummondii</i>	T		x		0.9	Nov - Jan	Low-lying depressions, swamps.	Yes	High	Low
<i>Grevillea manglesii</i> subsp. <i>ornithopoda</i>	P2		x		1.7	Sep - Nov	White sand or red-brown loam over clay. Dunes. Creek edges.	No	Low	Low
<i>Phyllangium palustre</i>	P2		x		2.5	Oct - Nov	Clay. Winter-wet claypans, low-lying seasonal wetlands.	No	Low	Low
<i>Amanita drummondii</i>	P3		x		0.9	June	Grey-white sandy clay with laterite. Eucalypt woodland.	No	Low	Low
<i>Blennospora doliiformis</i>	P3		x		2.7	Oct - Nov	Grey or red clay soils over ironstone. Seasonally-wet flats.	No	Low	Low
<i>Chamaescilla gibsonii</i>	P3		x		1	Sep	Clay to sandy clay. Winter-wet flats, shallow water-filled claypans.	No	Low	Low
<i>Cyathochaeta teretifolia</i>	P3		x		4.8	-	Grey sand, sandy clay. Swamps, creek edges.	No	Low	Low
<i>Dillwynia dillwynioides</i>	P3		x		1	Aug - Dec	Sandy soils. Winter-wet depressions.	Yes	High	Low
<i>Eryngium</i> sp. <i>Ferox</i> (G.J. Keighery 16034)	P3		x		2	Nov - Jan	Brown/grey moist sandy loam or clay. Granite derived soil over limestone. Seasonally wet.	No	Low	Low
<i>Jacksonia gracillima</i>	P3		x		1	Oct - Nov	Coastal plains, dry grey sand, near seasonal wetlands and winter-wet areas.	Yes	High	Low



Species	Conservation Status		Source		Distance to Nearest Record (km)	Flowering Period	Preferred Habitat	Habitat occurs within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	NatureMap	EPBC						
<i>Myriophyllum echinatum</i>	P3		x		2.8	Nov	Winter-wet flats	Yes	High	Low
<i>Stylidium periscelanthum</i>	P3		x		2.7	Sep - Oct	Loamy clay, moist soil pockets, wet flats, low granitic hills.	No	Low	Low
<i>Centrolepis caespitosa</i>	P4		x		2.7	Oct - Dec	White sand, clay, salt flats, wet areas.	Yes	High	Low
<i>Drosera occidentalis</i>	P4		x		4.7	Oct - Jan	White/black sand. Swampy areas.	Yes	High	Low
<i>Eucalyptus rudis subsp. cratyantha</i>	P4		x		1.8	Jul - Sep	Loam, flats, hillsides.	No	Low	Low
<i>Jacksonia sericea</i>	P4		x		1	Dec - Feb	Calcareous and sandy soils	Yes	High	Low
<i>Parsonsia diaphanophleba</i>	P4		x		4	Jan - Feb or Apr - Jun or Sep	Alluvial soils, along rivers	No	Low	Low
<i>Rumex drummondii</i>	P4		x		1.8	Aug - Nov	Winter-wet disturbed areas.	Yes	High	Low
<i>Stylidium longitubum</i>	P4		x		2.3	Oct - Dec	Sandy clay, seasonal wetlands.	No	Low	Low
<i>Trithuria australis</i>	P4		x		2.6	Nov - Dec	Aquatic.	No	Low	Low

# APPENDIX I

## Flora Site Species Matrix

Species	DD01	DD02	DD03
<i>Acacia lasiocarpa</i> var. <i>sedifolia</i>	1		1
<i>Aira cupaniana</i>		1	1
<i>Astroloma compactum</i>	1		
<i>Austrostipa elegantissima</i>			1
<i>Avena barbata</i>			1
<i>Banksia dallanneyi</i> var. <i>dallanneyi</i>	1	1	
<i>Banksia sessilis</i>	1		
<i>Bossiaea eriocarpa</i>	1	1	
<i>Briza maxima</i>			1
<i>Briza minor</i>			1
<i>Corymbia calophylla</i>	1		1
<i>Desmocladius flexuosus</i>	1	1	1
<i>Ehrharta calycina</i>	1		
<i>Eucalyptus wandoo</i>	1	1	1
<i>Gastrolobium spinosum</i>		1	
<i>Goodenia convexa</i>		1	
<i>Hakea lissocarpa</i>	1	1	
<i>Hakea prostrata</i>		1	
<i>Helichrysum leucopsidium</i>	1	1	1
<i>Hibbertia hibbertioides</i> var. <i>hibbertioides</i>		1	
<i>Lechenaultia biloba</i>	1	1	
<i>Lepidobolus preissianus</i>		1	
<i>Lepidosperma leptostachyum</i>	1	1	1
<i>Macrozamia riedlei</i>	1	1	1
<i>Opercularia vaginata</i>		1	
<i>Ptilotus drummondii</i>		1	
<i>Ptilotus manglesii</i>			1
<i>Rytidosperma caespitosum</i>	1	1	1
<i>Stackhousia pubescens</i>			1
<i>Stylidium piliferum</i>	1	1	
<i>Ursinia anthemoides</i>		1	
<i>Xanthorrhoea preissii</i>	1	1	
<i>Xanthosia singuliflora</i>		1	

# APPENDIX J

## Systematic Flora Species List

Family	Species
Amaranthaceae	<i>Ptilotus drummondii</i>
	<i>Ptilotus manglesii</i>
Apiaceae	<i>Xanthosia singuliflora</i>
Asparagaceae	<i>Dichopogon capillipes</i>
Asteraceae	<i>Helichrysum leucopsidium</i>
	<i>Olearia rudis</i>
	<i>Rhodanthe polycephala</i>
	<i>Ursinia anthemoides</i> *
Casuarinaceae	<i>Allocasuarina huegeliana</i>
Celastraceae	<i>Stackhousia pubescens</i>
Cyperaceae	<i>Lepidosperma leptostachyum</i>
Dilleniaceae	<i>Hibbertia hibbertioides</i> var. <i>hibbertioides</i>
	<i>Hibbertia montana</i> (P4)
Ericaceae	<i>Astroloma compactum</i>
Fabaceae	<i>Acacia acuminata</i>
	<i>Acacia lasiocarpa</i> var. <i>sedifolia</i>
	<i>Acacia saligna</i>
	<i>Bossiaea eriocarpa</i>
	<i>Gastrolobium spinosum</i>
Goodeniaceae	<i>Goodenia convexa</i>
	<i>Lechenaultia biloba</i>
Myrtaceae	<i>Corymbia calophylla</i>
	<i>Eucalyptus wandoo</i>
Poaceae	<i>Aira cupaniana</i> *
	<i>Austrostipa elegantissima</i>
	<i>Austrostipa flavescens</i>
	<i>Avena barbata</i> *
	<i>Briza maxima</i> *
	<i>Briza minor</i> *
	<i>Bromus diandrus</i> *
	<i>Ehrharta calycina</i> *
	<i>Rytidosperma caespitosum</i>
Proteaceae	<i>Banksia dallanneyi</i> var. <i>dallanneyi</i>
	<i>Banksia grandis</i>
	<i>Banksia sessilis</i>
	<i>Hakea lissocarpha</i>
	<i>Hakea prostrata</i>
Restionaceae	<i>Desmocladus flexuosus</i>
	<i>Lepidobolus preissianus</i>
Rubiaceae	<i>Opercularia vaginata</i>
Stylidiaceae	<i>Stylidium piliferum</i>
Xanthorrhoeaceae	<i>Xanthorrhoea preissii</i>
Zamiaceae	<i>Macrozamia riedlei</i>



# APPENDIX K

## Flora Site Data Sheets

## FLORA SITE SHEET - Dale Development

**Project Name** 3004 CBH Dale Development  
**Site:** DD01 **MGA** 50H **464814 mE** **6425346 mN**

**Described by:** SF, AH  
**Date:** 2018-11-16  
**Type:** Quadrat 20 x 20  
**Soil Colour:** Light Brown  
**Soil Type:** Loam, Sand  
**Habitat:** Undulating plain  
**Vegetation:** Wandoo

*Eucalyptus wandoo* mid open forest over *Corymbia calophylla* low isolated trees over *Xanthorrhoea preissii*, *Macrozamia reidleyi* isolated clumps of shrubs over *Acacia lasiocarpa* var. *sedifolia*, *Lepidosperma leptostachyus* low isolated clumps of shrubs and sedges



**Veg Condition:** South West and Interzone Botanical Province (Keighery)

**Fire Age:** Unknown

**Fire Evidence:**

**Notes**

**Rock Type** Laterite

**Rock Cover:** 1-5 %

**Outcropping:** <2 %

**Total PFC:** 70 %

**Bareground:** 5 %

**Leaf Litter:** 80 %

**Logs:** 10 %

**Disturbance Type:**

### SPECIES LIST

Name	Height	Cover	Notes
<i>Eucalyptus wandoo</i>	20	55	0
<i>Corymbia calophylla</i>	10	1	0
<i>Banksia sessilis</i>	3	6	0
<i>Xanthorrhoea preissii</i>	1.5	4	0
<i>Macrozamia reidleyi</i>	1.1	1	0
<i>Ehrharta calycina</i>	1	0.1	0
<i>Austrostipa flavescens</i>	1	0.1	0
<i>Acacia lasiocarpa</i> var. <i>sedifolia</i>	0.6	3	0
<i>Acacia alata</i> var. <i>alata</i>	0.5	2	0
<i>Lepidosperma leptostachyum</i>	0.5	1	0
<i>Bossiaea eriocarpa</i>	0.4	1	0
<i>Rytidosperma caespitosum</i>	0.4	0.1	0
<i>Hakea lissocarpa</i>	0.3	0.5	0
<i>Helichrysum leucopsidium</i>	0.2	0.1	0
<i>Lechenaultia biloba</i>	0.2	0.1	0
<i>Aira cupaniana</i>	0.1	0.1	0
<i>Banksia dallanneyi</i> var. <i>dallanneyi</i>	0.1	0.1	0
<i>Astroloma compactum</i>	0.05	1	0
<i>Rhodanthe polycephala</i>	0.05	0.5	0
<i>Desmocladius flexuosus</i>	0.05	0.1	0
<i>Stylidium piliferum</i>	0	0	0

## FLORA SITE SHEET - Dale Development

**Project Name** 3004 CBH Dale Development  
**Site:** DD02 **MGA** 50H **464832 mE** **6425272 mN**

**Described by:** SF, AH  
**Date:** 2018-11-16  
**Type:** Quadrat 20 x 20  
**Soil Colour:** Dark Brown, Orange  
**Soil Type:** Gravel, Loam, Sand  
**Habitat:** Undulating plain  
**Vegetation:** Wandoo

*Eucalyptus wandoo* mid open forest over *Corymbia calophylla* low isolated trees over *Xanthorrhoea preissii*, *Macrozamia reidleyi* isolated clumps of shrubs over *Acacia lasiocarpa* var. *sedifolia*, *Lepidosperma leptostachyus* low isolated clumps of shrubs and sedges



**Veg Condition:** South West and Interzone Botanical Province (Keighery)

**Fire Age:** Unknown

**Fire Evidence:**

**Notes**

**Rock Type** Laterite **Rock Cover:** 6-20% % **Outcropping:** <2% %  
**Total PFC:** 70 % **Bareground:** 10 % **Leaf Litter:** 70 % **Logs:** 20 %

**Disturbance Type:**

### SPECIES LIST

Name	Height	Cover	Notes
<i>Eucalyptus wandoo</i>	20	50	0
<i>Gastrolobium spinosum</i>	1.7	2	0
<i>Hakea prostrata</i>	1.7	1	0
<i>Xanthorrhoea preissii</i>	1.5	1	0
<i>Macrozamia reidleyi</i>	1.3	1	0
<i>Rytidosperma caespitosum</i>	1	1	0
<i>Lepidosperma leptostachyum</i>	0.6	10	0
<i>Hakea lissocarpha</i>	0.5	1	0
<i>Hibbertia hibbertioides</i> var. <i>hibbertioides</i>	0.5	0.1	0
<i>Olearia rudis</i>	0.4	0.1	0
<i>Bossiaea eriocarpa</i>	0.3	2	0
<i>Lechenaultia biloba</i>	0.3	1	0
<i>Stylidium piliferum</i>	0.2	0.1	0
<i>Ptilotus drummondii</i>	0.2	0.1	0
* <i>Ursinia anthemoides</i>	0.1	0.1	0
<i>Lepidosperma leptostachyum</i>	0.1	0.1	0
<i>Helichrysum leucopsidium</i>	0.1	0.1	0
<i>Goodenia convexa</i>	0.1	0.1	0
<i>Banksia dallanneyi</i> var. <i>dallanneyi</i>	0.1	0.1	0
<i>Opercularia vaginata</i>	0.1	0.1	0
<i>Lepidobolus preissianus</i>	0.1	0.1	0
<i>Desmocladius flexuosus</i>	0.05	5	0
<i>Banksia dallanneyi</i> var. <i>dallanneyi</i>	0.05	5	0
<i>Aira cupaniana</i>	0.05	0.1	0
<i>Conostylis pusilla</i>	0.05	0.1	0
<i>Xanthosia singuliflora</i>	0.05	0.1	0

## FLORA SITE SHEET - Dale Development

**Project Name** 3004 CBH Dale Development  
**Site:** DD03 **MGA** 50H **464659 mE** **6425251 mN**

**Described by:** SF, AH  
**Date:** 2018-11-16  
**Type:** Quadrat 20 x 20  
**Soil Colour:** Dark Brown  
**Soil Type:** Loam  
**Habitat:** Undulating plain  
**Vegetation:** Wandoo

*Eucalyptus wandoo* mid open forest over *Corymbia calophylla* low isolated trees over *Xanthorrhoea preissii*, *Macrozamia reidleyi* isolated clumps of shrubs over *Acacia lasiocarpa* var. *sedifolia*, *Lepidosperma leptostachyus* low isolated clumps of shrubs and sedges



**Veg Condition:** South West and Interzone Botanical Province (Keighery)

**Fire Age:** Unknown

**Fire Evidence:**

**Notes**

**Rock Type** Laterite

**Rock Cover:** 1-5% %

**Outcropping:** 10-20% %

**Total PFC:** 75 %

**Bareground:** 5 %

**Leaf Litter:** 70 %

**Logs:** 5 %

**Disturbance Type:**

### SPECIES LIST

Name	Height	Cover	Notes
<i>Eucalyptus wandoo</i>	20	50	0
<i>Corymbia calophylla</i>	8	1	0
<i>Macrozamia reidleyi</i>	1.2	3	0
<i>Hibbertia montana</i>	1	0.1	0
<i>Acacia lasiocarpa</i>	0.6	2	0
<i>Avena barbata</i>	0.6	0.1	0
<i>Lepidosperma leptostachyum</i>	0.5	1	0
<i>Austrostipa elegantissima</i>	0.5	0.1	0
<i>Austrostipa flavescens</i>	0.5	0.1	0
<i>Rytidosperma caespitosum</i>	0.5	0.1	0
<i>Bossiaea eriocarpa</i>	0.3	1	0
<i>Stackhousia pubescens</i>	0.3	0.1	0
<i>Helichrysum leucopsidium</i>	0.1	3	0
<i>Briza minor</i>	0.1	0.1	0
<i>Briza maxima</i>	0.1	0.1	0
<i>Desmodium flexuosum</i>	0.05	10	0
<i>Aira cupaniana</i>	0.05	0.1	0
<i>Ptilotus manglesii</i>	0.05	0.1	0
<i>Dichopogon capillipes</i>	0.05	0.1	0

# APPENDIX L

## Threatened and Priority Flora Report Form





# Threatened and Priority Flora Report Form

Version 1.3 August 2017

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at <http://dpaw.wa.gov.au/> under Standard Report Forms

TAXON: <u>Hibbertia montana</u>		TPFL Pop. No: _____
OBSERVATION DATE: <u>16 / 11 / 18</u>	CONSERVATION STATUS: <u>P4</u>	New population <input type="checkbox"/>
OBSERVER/S: <u>Sophie Fox</u>	PHONE: <u>9388 8360</u>	
ROLE: <u>Botanist</u>	ORGANISATION: <u>360 Environmental</u>	

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):  
Westdale, WA, near Brookton Hwy - Beverley Westdale Rd

DBCA DISTRICT: _____		LGA: _____	Land manager present: <input type="checkbox"/>
DATUM:	COORDINATES: (If UTM coords provided, Zone is also required)	METHOD USED:	
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input type="checkbox"/>	GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>	
AGD84 / AMG84 <input type="checkbox"/>	Lat / Northing: <u>6425251</u>	No. satellites: _____	Map used: _____
WGS84 <input type="checkbox"/>	Long / Easting: <u>464 659</u>	Boundary polygon captured: <input type="checkbox"/>	Map scale: _____
Unknown <input type="checkbox"/>	ZONE: <u>50H</u>		
LAND TENURE:			
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input checked="" type="checkbox"/>	Rail reserve <input type="checkbox"/> Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/> Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/> SLK/Pole _____ to _____	Specify other: _____

AREA ASSESSMENT:	Edge survey <input type="checkbox"/>	Partial survey <input type="checkbox"/>	Full survey <input checked="" type="checkbox"/>	Area observed (m <sup>2</sup> ): <u>400 m<sup>2</sup></u>
EFFORT:	Time spent surveying (minutes): _____		No. of minutes spent / 100 m <sup>2</sup> : _____	
POP'N COUNT ACCURACY:	Actual <input type="checkbox"/>	Extrapolation <input type="checkbox"/>	Estimate <input type="checkbox"/>	Count method: _____ (Refer to field manual for list)
WHAT COUNTED:	Plants <input checked="" type="checkbox"/>	Clumps <input type="checkbox"/>	Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	<u>1</u>			
Dead				
QUADRATS PRESENT:	No. <u>1</u>	Size <u>20x20m</u>	Data attached <input type="checkbox"/>	Total area of quadrats (m <sup>2</sup> ): _____
Summary Quad. Totals: Alive				
REPRODUCTIVE STATE:	Clonal <input type="checkbox"/>	Vegetative <input type="checkbox"/>	Flowerbud <input type="checkbox"/>	Flower <input type="checkbox"/>
	Immature fruit <input type="checkbox"/>	Fruit <input type="checkbox"/>	Dehiscent fruit <input type="checkbox"/>	Percentage in flower: _____ %

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT: \_\_\_\_\_

THREATS - type, agent and supporting information: Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• <u>Clearing of land</u>	_____	_____	_____
• <u>Weeds</u>	_____	_____	_____
• _____	_____	_____	_____

Please return completed form to **Species And Communities Branch DBCA**,  
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 OR email to: [flora.data@dbca.wa.gov.au](mailto:flora.data@dbca.wa.gov.au)

RECORDS: Please forward to Flora Administrative Officer, Species and Communities Branch.

Record entered by: \_\_\_\_\_

Sheet No: \_\_\_\_\_

Record Entered in Database ☐



# Threatened and Priority Flora Report Form

Version 1.3 August 2017

## HABITAT INFORMATION:

<b>LANDFORM:</b>	<b>ROCK TYPE:</b>	<b>LOOSE ROCK:</b>	<b>SOIL TYPE:</b>	<b>SOIL COLOUR:</b>	<b>DRAINAGE:</b>
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input type="checkbox"/>	Well drained <input checked="" type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input type="checkbox"/>	Brown <input checked="" type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input checked="" type="checkbox"/>	0-10% <input checked="" type="checkbox"/>	Loam <input checked="" type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
	<b>Specific Landform Element:</b> (Refer to field manual for additional values)				
<b>CONDITION OF SOIL:</b>	Dry <input type="checkbox"/>	Moist <input checked="" type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

## VEGETATION CLASSIFICATION\*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);  
2. Open shrubland (Hibbertia sp., Acacia spp.);  
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. *Eucalyptus wandoo woodland*

2.

3.

4.

## ASSOCIATED SPECIES:

Other (non-dominant) spp

*Corymbia calophylla, Acacia lasiocarpa var. sedifolia, Bossiaea eriocarpa, Desmodium flexuosum*

\* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

**CONDITION OF HABITAT:** Pristine ☐ Excellent ☐ Very good ☐ Good ☒ Degraded ☐ Completely degraded ☐

## COMMENT:

**FIRE HISTORY:** Last Fire: Season/Month: \_\_\_\_\_ Year: \_\_\_\_\_ Fire Intensity: High ☐ Medium ☐ Low ☐ No signs of fire ☒

**FENCING:** Not required ☐ Present ☐ Replace / repair ☐ Required ☐ Length req'd: \_\_\_\_\_

**ROADSIDE MARKERS:** Not required ☐ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: \_\_\_\_\_

**OTHER COMMENTS:** (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

## DRF PERMIT/ LICENCE No:

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licensing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

**SPECIMEN:** Collectors No: DD03-02 WA Herb. ☐ Regional Herb. ☐ District Herb. ☐ Other: \_\_\_\_\_

**ATTACHED:** Map ☐ Mudmap ☐ Photo ☒ GIS data ☒ Field notes ☒ Other: \_\_\_\_\_

**COPY SENT TO:** Regional Office ☐ District Office ☐ Other: \_\_\_\_\_

Submitter of Record: \_\_\_\_\_ Role: \_\_\_\_\_ Signed: \_\_\_\_\_ Date: / /

Please return completed form to **Species And Communities Branch DBCA,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 OR email to: flora.data@dbca.wa.gov.au

**RECORDS:** Please forward to **Flora Administrative Officer, Species and Communities Branch.**

Record entered by:

Sheet No:

Record Entered in Database ☐



Family	Taxon name	From	Collectors unique collecting #	Collectors name 1	Collectors licence 1	Collectors name 2	Collectors licence 2	Reason for lodgement
Dilleniaceae	<i>Hibbertia montana</i>	Westdale, WA	DD03-02	Sophie Fox	SL012479 / DRF59-1819	n/a	n/a	Priority 4 specimen and Threatened flora form, lodged as a requirement of a field survey for CBH
				Sophie Fox	SL012479 / DRF59-1819			Threatened and Priority Ecological Community (TEC/PEC) occurrence report form for the Eucalyptus Woodland of the Avon Wheatbelt

# APPENDIX M

## Systematic Fauna Species List

## Fauna Species Recorded During the Field Survey

Family	Scientific Name	Common Name	Conservation Status		Count	Fauna Habitat Observed Within
			State	Federal		
<b>Bird</b>						
Cuculidae	<i>Cacomantis pallidus</i>	Pallid Cuckoo		MA	1	Wandoo Woodland
Cracticidae	<i>Cracticus tibicen</i>	Australian Magpie			8	Wandoo Woodland
Corvidae	<i>Corvus coronoides</i>	Australian Raven			1	Wandoo Woodland
Psittacidae	<i>Platycercus zonarius</i>	Australian Ringneck			7	Wandoo Woodland
Meliphagidae	<i>Lichmera indistincta</i>	Brown Honeyeater			6	Wandoo Woodland
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail			1	Wandoo Woodland
Alcedinidae	<i>Dacelo novaeguineae</i> *	Laughing Kookaburra			3	Wandoo Woodland
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater		MA	3	Wandoo Woodland
Climacteridae	<i>Climacteris rufus</i>	Rufous Treecreeper			1	Wandoo Woodland
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler			4	Wandoo Woodland
Petroicidae	<i>Petroica boodang</i>	Scarlet Robin			3	Wandoo Woodland
Meliphagidae	<i>Gavicalis virescens</i>	Singing Honeyeater			1	Wandoo Woodland
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote			8	Wandoo Woodland
Acanthizidae	<i>Smicromis brevirostris</i>	Weebill			1	Wandoo Woodland
Acanthizidae	<i>Gerygone fusca</i>	Western Gerygone			7	Wandoo Woodland
Acanthizidae	<i>Acanthiza inornata</i>	Western Thornbill			3	Wandoo Woodland
<b>Mammal</b>						
Tachyglossidae	<i>Tachyglossus aculeatus acanthion</i>	Short-beaked Echidna			4	Wandoo Woodland
Macropodidae	<i>Macropus fuliginosus melanops</i>	Western Grey Kangaroo			4	Wandoo Woodland
<b>Reptile</b>						
Scincidae	<i>Tiliqua rugosa rugosa</i>	Bobtail			1	Wandoo Woodland
Varanidae	<i>Varanus gouldii</i>	Bungarra or Sand Goanna			1	Wandoo Woodland

\* Introduced species

MA = Marine



# APPENDIX N

## Fauna Habitat Assessments

## Fauna Habitat Assessment - Wandoo Woodland 1

Project: 3004 Dale Developments Flora and Fauna Survey

Date: 2018-11-16

Quadrat Size: 100x100

Latitude: -32.308014

Longitude: 116.626562



## Vegetation

Vegetation Description: Wandoo Woodland

Botanical Province: South West and Interzone  
Vegetation Condition: Very Good

Stratum	Vegetation Species	Height (m)	% Cover	Description
Overstorey	Wandoo	25	0	Sparse
Midstorey	Allocasuarina, Acacia	2	0	Sparse
Understorey	Macrozamia, mixed shrubs, annual grasses and herbs	0.4	0	Sparse

## Soil

Soil Texture	Sandy-loam	Soil Colour	Light brown	Water Presence	None	Water Distance	> 5 km
--------------	------------	-------------	-------------	----------------	------	----------------	--------

## Water

## Ground Cover

Pebbles (<0.6cm)	2-10%	Rocks (20-60cm)	0%	Bare Ground	10-20%	Hummock Grass	0%
Small Stones (0.6-2cm)	2-10%	Big Rocks (60cm-2m)	0%	Leaf Litter	20-50%	Tussock Grass	<2%
Stones (2-6cm)	2-10%	Boulders (>2m)	0%	Logs >10cm	2-10%	Herbs	<2%
Small Rocks (6-20cm)	<2%	Outcrop	0%	Woody Debris	2-10%	Other:	0

## Microhabitats

## Disturbance

Exfoliating Slabs	None	Caves	None	Last Fire	>5 years	Fire Intensity	No damage
Rock Crevices	Rare	Tree Hollows	Common	Cattle Disturbance	None	Other Disturbance	
Peeling Bark	Moderate	Termite Mounds	Moderate				

## Fauna Habitat Assessment - Wandoo Woodland 2

Project: 3004 Dale Developments Flora and Fauna Survey

Date: 2018-11-16

Quadrat Size: 100x100

Latitude: -32.308888

Longitude: 116.625526



## Vegetation

Vegetation Description: Wandoo Woodland

Botanical Province: South West and Interzone  
Vegetation Condition:

Stratum	Vegetation Species	Height (m)	% Cover	Description
Overstorey	Wandoo	25	0	Sparse
Midstorey	Allocasuarina, Acacia	2	0	Sparse
Understorey	Macrozamia, mixed shrubs, annual grasses and herbs	0.4	0	Sparse

## Soil

Soil Texture	0	Soil Colour	0	Water Presence	None	Water Distance	> 5 km
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## Water

## Ground Cover

Pebbles (<0.6cm)	2-10%	Rocks (20-60cm)	0%	Bare Ground	2-10%	Hummock Grass	0%
Small Stones (0.6-2cm)	2-10%	Big Rocks (60cm-2m)	0%	Leaf Litter	50-90%	Tussock Grass	2-10%
Stones (2-6cm)	2-10%	Boulders (>2m)	0%	Logs >10cm	<2%	Herbs	<2%
Small Rocks (6-20cm)	<2%	Outcrop	0%	Woody Debris	2-10%	Other:	0

## Microhabitats

## Disturbance

Exfoliating Slabs	None	Caves	None	Last Fire	>5 years	Fire Intensity	No damage
Rock Crevices	None	Tree Hollows	Common	Cattle Disturbance	None	Other Disturbance	
Peeling Bark	Rare	Termite Mounds	Rare				



## Fauna Habitat Assessment - Wandoo Woodland 3

Project: 3004 Dale Developments Flora and Fauna Survey

Date: 2018-11-16

Quadrat Size: 100x100

Latitude: -32.309007

Longitude: 116.624202



### Vegetation

Vegetation Description: Wandoo Woodland

Botanical Province: South West and Interzone  
Vegetation Condition: Good

Stratum	Vegetation Species	Height (m)	% Cover	Description
Overstorey	Wandoo	25	40	Moderate
Midstorey	Gastrolobium, Allocasuarina, Acacia, Macrozamia	2	5	Sparse
Understorey	Annual Grass and herbs	0.15	2	Sparse

### Soil

Soil Texture	Soil Colour
Sand	Medium Grey

### Water

Water Presence	Water Distance
None	> 5 km

### Ground Cover

Pebbles (<0.6cm)	2-10%	Rocks (20-60cm)	0%	Bare Ground	2-10%	Hummock Grass	0%
Small Stones (0.6-2cm)	2-10%	Big Rocks (60cm-2m)	0%	Leaf Litter	50-90%	Tussock Grass	2-10%
Stones (2-6cm)	2-10%	Boulders (>2m)	0%	Logs >10cm	<2%	Herbs	<2%
Small Rocks (6-20cm)	<2%	Outcrop	0%	Woody Debris	2-10%	Other:	

### Microhabitats

Exfoliating Slabs	None	Caves	None	Last Fire	> 5 years	Fire Intensity	No damage
Rock Crevices	None	Tree Hollows	Common	Cattle Disturbance	None	Other Disturbance	Weed and Kangaroo grazing
Peeling Bark	Rare	Termite Mounds	Rare				

# APPENDIX O

## Black Cockatoo Potential Breeding Trees

DATE	TAXA	LAT	LONG	DBH (mm)	HEIGHT (m)	# HOLLOWES	# HOLLOWES >12CM	COMMENTS	TREE PHOTO REF	HOLLOW PHOTO REF
2018-11-21 10:19:51 AWST	Marri ( <i>Corymbia calophylla</i> )	-32.30813	116.62127	1274	28				1	
2018-11-21 09:39:52 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30926	116.62343	1232	28	10		Leaning over survey area	2	
2018-11-16 15:13:22 AWST	Stag	-32.30870	116.62569	1191	28	6	3		3	A
2018-11-21 09:58:05 AWST	Marri ( <i>Corymbia calophylla</i> )	-32.30851	116.62118	1013	30				4	
2018-11-21 09:26:52 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30898	116.62431	1003	28	1	1		5	B
2018-11-21 09:41:18 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30935	116.62325	936	28	10		Adjacent property	6	
2018-11-16 14:38:18 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30798	116.62633	927	22	10	2		7	C
2018-11-16 14:09:29 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30786	116.62689	885	22	10	3	Great habitat tree, but outside fenced area	8	
2018-11-16 14:26:43 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30786	116.62617	860	20	7	4	Photos taken of potential BC hollows. No evidence of chew marks, but contains appropriate hollows.	9	D
2018-11-16 13:38:04 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30825	116.62591	844	20	2			10	
2018-11-16 13:39:12 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30825	116.62588	825	50	10	2		11	E
2018-11-16 15:34:14 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30918	116.62554	809	24				12	
2018-11-16 15:51:42 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30842	116.62464	803	22	8			13	
2018-11-21 09:43:01 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30909	116.62332	790	28	5	1	Photo taken of hollow	14	F
2018-11-21 09:46:17 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30918	116.62322	780	16	6			15	
2018-11-16 14:43:03 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30807	116.62652	752	24	5			16	
2018-11-16 15:30:05 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30894	116.62597	745	24	6	1		17	
2018-11-16 13:58:08 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30833	116.62674	732	20	6	1	No sign of chewing. Photos taken	18	G
2018-11-16 13:48:29 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30832	116.62636	723	20	9			19	
2018-11-16 14:49:45 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30903	116.62681	723	22				20	
2018-11-16 15:53:39 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30861	116.62487	710	22	4			21	
2018-11-16 15:49:57 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30858	116.62469	704	24	2			22	
2018-11-16 13:47:13 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30835	116.62614	701	20	8			23	
2018-11-16 15:15:57 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30846	116.62568	701	22				24	
2018-11-16 15:22:22 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30865	116.62539	701	24				25	
2018-11-16 15:31:00 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30894	116.62590	701	6			Tree snapped 2m up from base		
2018-11-16 14:40:48 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30818	116.62621	694	20	2			26	
2018-11-16 15:23:46 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30884	116.62549	694	22	3			27	
2018-11-16 15:08:49 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30883	116.62613	685	22	2			28	
2018-11-16 13:42:57 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30839	116.62594	682	16	4	2	Difficult to determine if two spouts hollow out appropriately.	29	H
2018-11-16 14:48:16 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30871	116.62683	678	12				30	
2018-11-16 16:14:37 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30884	116.62521	678	22	2			31	
2018-11-21 09:35:43 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30895	116.62378	675	28				32	
2018-11-16 15:42:58 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30906	116.62489	662	20	4			33	
2018-11-16 15:04:36 AWST	Stag	-32.30904	116.62640	659	20	7	1	Wandoo stag	34	
2018-11-16 15:32:56 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30914	116.62580	659	22				35	
2018-11-16 15:47:48 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30882	116.62463	653	22	1			36	
2018-11-16 15:36:31 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30915	116.62527	643	16	6	1		37	
2018-11-21 10:00:33 AWST	Marri ( <i>Corymbia calophylla</i> )	-32.30863	116.62122	643	28				38	
2018-11-16 13:36:35 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30819	116.62606	637	20	3			39	
2018-11-16 14:23:43 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30786	116.62646	637	14	1			40	
2018-11-21 09:37:21 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30908	116.62372	637	28	1			41	
2018-11-16 14:04:06 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30805	116.62674	624	22	7	1	Photos taken of main hollow	42	I
2018-11-16 14:58:18 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30848	116.62639	618	22	2				
2018-11-16 15:19:12 AWST	Marri ( <i>Corymbia calophylla</i> )	-32.30848	116.62540	618	24					
2018-11-16 13:50:15 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30835	116.62650	605	20	6				
2018-11-16 14:30:11 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30792	116.62598	605	6	1				
2018-11-16 15:20:13 AWST	Marri ( <i>Corymbia calophylla</i> )	-32.30842	116.62530	605	28					
2018-11-21 09:30:44 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30901	116.62410	605	24	5				
2018-11-16 15:46:03 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30895	116.62462	599	20					
2018-11-16 16:03:55 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30918	116.62449	599	22	4	1			J
2018-11-16 14:45:42 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30852	116.62673	596	22					
2018-11-16 15:50:49 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30850	116.62465	596	22	1	1	Hole likely to small for BC		
2018-11-16 16:19:51 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30858	116.62448	592	22	5				
2018-11-16 16:21:04 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30856	116.62440	586	20					



DATE	TAXA	LAT	LONG	DBH (mm)	HEIGHT (m)	# HOLLOWES	# HOLLOWES >12CM	COMMENTS	TREE PHOTO REF	HOLLOW PHOTO REF
2018-11-16 14:06:05 AWST	Stag	-32.30803	116.62674	583	22	8		Wandoo stag. Photos taken of hollows. One may be suitable for BC, but is unlikely		
2018-11-16 14:59:14 AWST	Wandoo (Eucalyptus wandoo)	-32.30856	116.62629	573	22	6				
2018-11-16 15:58:03 AWST	Wandoo (Eucalyptus wandoo)	-32.30855	116.62516	573	22	1	1			K
2018-11-16 16:05:19 AWST	Wandoo (Eucalyptus wandoo)	-32.30909	116.62459	573	24	2				
2018-11-16 16:15:39 AWST	Wandoo (Eucalyptus wandoo)	-32.30891	116.62520	564	22	4				
2018-11-16 15:01:28 AWST	Wandoo (Eucalyptus wandoo)	-32.30868	116.62627	561	22	2				
2018-11-16 15:34:51 AWST	Wandoo (Eucalyptus wandoo)	-32.30911	116.62545	561	22	2				
2018-11-16 14:55:43 AWST	Wandoo (Eucalyptus wandoo)	-32.30879	116.62644	554	18	3				
2018-11-16 15:29:32 AWST	Wandoo (Eucalyptus wandoo)	-32.30885	116.62590	541	22					
2018-11-21 09:21:21 AWST	Wandoo (Eucalyptus wandoo)	-32.30866	116.62431	541	24	1				
2018-11-16 14:35:43 AWST	Stag	-32.30798	116.62607	529	10	5	1			L
2018-11-16 15:21:27 AWST	Wandoo (Eucalyptus wandoo)	-32.30855	116.62541	516	24					
2018-11-21 09:34:00 AWST	Wandoo (Eucalyptus wandoo)	-32.30901	116.62396	516	24					
2018-11-16 14:54:50 AWST	Wandoo (Eucalyptus wandoo)	-32.30889	116.62654	510	18					
2018-11-16 15:18:21 AWST	Wandoo (Eucalyptus wandoo)	-32.30845	116.62545	510	22					
2018-11-16 15:28:25 AWST	Wandoo (Eucalyptus wandoo)	-32.30901	116.62574	510	24					
2018-11-21 09:35:00 AWST	Wandoo (Eucalyptus wandoo)	-32.30903	116.62386	510	24					
2018-11-16 14:33:02 AWST	Wandoo (Eucalyptus wandoo)	-32.30792	116.62579	503	20	1				
2018-11-16 15:26:58 AWST	Wandoo (Eucalyptus wandoo)	-32.30902	116.62567	500	22					
2018-11-16 16:07:49 AWST	Stag	-32.30879	116.62507	500	18	6				
2018-11-16 14:56:46 AWST	Wandoo (Eucalyptus wandoo)	-32.30867	116.62651	497	20					
2018-11-16 15:56:29 AWST	Wandoo (Eucalyptus wandoo)	-32.30841	116.62522	497	16			Main trunk hollow doesn't go anywhere		
2018-11-16 15:07:36 AWST	Wandoo (Eucalyptus wandoo)	-32.30884	116.62617	490	20	2				
2018-11-16 15:10:31 AWST	Wandoo (Eucalyptus wandoo)	-32.30872	116.62596	490	22					
2018-11-16 14:31:40 AWST	Stag	-32.30782	116.62575	475	16	4				
2018-11-16 14:52:28 AWST	Wandoo (Eucalyptus wandoo)	-32.30896	116.62664	475	14					
2018-11-16 15:11:15 AWST	Wandoo (Eucalyptus wandoo)	-32.30868	116.62593	468	18					
2018-11-21 09:23:22 AWST	Wandoo (Eucalyptus wandoo)	-32.30880	116.62412	468	24	2				
2018-11-16 14:49:09 AWST	Wandoo (Eucalyptus wandoo)	-32.30879	116.62683	465	14	2				
2018-11-21 09:49:04 AWST	Wandoo (Eucalyptus wandoo)	-32.30893	116.62312	465	18					
2018-11-21 09:24:22 AWST	Wandoo (Eucalyptus wandoo)	-32.30870	116.62390	462	24					
2018-11-16 14:08:20 AWST	Wandoo (Eucalyptus wandoo)	-32.30802	116.62671	459	18	6				
2018-11-16 14:12:05 AWST	Wandoo (Eucalyptus wandoo)	-32.30781	116.62683	455	10	1				
2018-11-21 09:38:20 AWST	Wandoo (Eucalyptus wandoo)	-32.30924	116.62375	455	22					
2018-11-16 14:37:24 AWST	Wandoo (Eucalyptus wandoo)	-32.30803	116.62610	452	18					
2018-11-21 09:52:15 AWST	Wandoo (Eucalyptus wandoo)	-32.30884	116.62266	452	16					
2018-11-16 15:00:20 AWST	Wandoo (Eucalyptus wandoo)	-32.30857	116.62619	449	18					
2018-11-16 15:37:52 AWST	Wandoo (Eucalyptus wandoo)	-32.30906	116.62518	446	18					
2018-11-16 15:48:35 AWST	Wandoo (Eucalyptus wandoo)	-32.30874	116.62460	446	22					
2018-11-16 15:55:27 AWST	Wandoo (Eucalyptus wandoo)	-32.30843	116.62499	446	18					
2018-11-16 16:13:56 AWST	Wandoo (Eucalyptus wandoo)	-32.30877	116.62527	446	20					
2018-11-16 13:55:46 AWST	Wandoo (Eucalyptus wandoo)	-32.30837	116.62668	443	20	2				
2018-11-16 15:03:11 AWST	Wandoo (Eucalyptus wandoo)	-32.30879	116.62630	439	20	5				
2018-11-16 15:17:34 AWST	Wandoo (Eucalyptus wandoo)	-32.30844	116.62560	433	18					
2018-11-16 14:34:04 AWST	Wandoo (Eucalyptus wandoo)	-32.30790	116.62584	430	18					
2018-11-21 10:12:29 AWST	Wandoo (Eucalyptus wandoo)	-32.30833	116.62065	430	18					
2018-11-21 10:16:16 AWST	Wandoo (Eucalyptus wandoo)	-32.30823	116.62090	430	14					
2018-11-16 15:12:07 AWST	Wandoo (Eucalyptus wandoo)	-32.30875	116.62573	427	14					
2018-11-21 09:28:53 AWST	Wandoo (Eucalyptus wandoo)	-32.30909	116.62427	427	24					
2018-11-21 09:36:37 AWST	Wandoo (Eucalyptus wandoo)	-32.30897	116.62368	427	24					
2018-11-16 14:44:33 AWST	Wandoo (Eucalyptus wandoo)	-32.30811	116.62655	424	14					
2018-11-21 09:19:12 AWST	Wandoo (Eucalyptus wandoo)	-32.30865	116.62422	424	18					
2018-11-16 15:26:21 AWST	Wandoo (Eucalyptus wandoo)	-32.30892	116.62553	417	22					
2018-11-16 15:38:53 AWST	Wandoo (Eucalyptus wandoo)	-32.30921	116.62511	417	18					
2018-11-16 13:54:24 AWST	Wandoo (Eucalyptus wandoo)	-32.30838	116.62658	414	18					

DATE	TAXA	LAT	LONG	DBH (mm)	HEIGHT (m)	# HOLLOWES	# HOLLOWES >12CM	COMMENTS	TREE PHOTO REF	HOLLOW PHOTO REF
2018-11-21 09:24:56 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30871	116.62390	414	24					
2018-11-21 09:25:24 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30873	116.62385	414	24					
2018-11-16 14:13:37 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30789	116.62667	411	14					
2018-11-16 15:55:02 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30853	116.62495	408	22					
2018-11-21 09:17:58 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30847	116.62416	408	20					
2018-11-21 09:48:00 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30906	116.62301	408	12					
2018-11-21 10:06:13 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30897	116.62082	408	18					
2018-11-16 15:12:51 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30876	116.62570	404	18					
2018-11-21 09:30:08 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30914	116.62417	404	24					
2018-11-16 14:24:48 AWST	Stag	-32.30785	116.62633	401	10	4	1	Wandoo stag. Photo taken of potential BC Hollow		
2018-11-16 15:25:54 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30892	116.62549	401	20					
2018-11-21 09:22:17 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30876	116.62440	401	24					
2018-11-21 09:33:12 AWST	Stag	-32.30895	116.62414	401	14	2		Too low		
2018-11-21 09:48:27 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30902	116.62302	401	20					
2018-11-16 14:51:48 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30917	116.62669	395	14					
2018-11-16 16:07:13 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30883	116.62499	392	22					
2018-11-16 14:42:16 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30819	116.62634	382	14					
2018-11-16 15:35:47 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30909	116.62532	382	10					
2018-11-16 13:57:16 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30832	116.62676	376	18	2				
2018-11-16 14:14:29 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30785	116.62661	376	14					
2018-11-16 15:02:30 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30875	116.62629	376	18					
2018-11-21 09:45:35 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30895	116.62345	376	18					
2018-11-16 15:32:09 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30912	116.62597	373	16					
2018-11-16 14:15:16 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30786	116.62655	366	18					
2018-11-16 15:04:09 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30897	116.62642	366	18					
2018-11-16 15:53:13 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30849	116.62469	366	18					
2018-11-16 15:49:27 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30857	116.62456	363	18					
2018-11-21 10:02:03 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30876	116.62119	363	18					
2018-11-16 13:42:26 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30838	116.62599	360	16					
2018-11-16 16:08:53 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30869	116.62512	344	22					
2018-11-16 15:41:32 AWST	Stag	-32.30908	116.62491	341	8	2				
2018-11-21 09:54:20 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30889	116.62188	334	14					
2018-11-16 14:02:17 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30836	116.62688	331	16					
2018-11-16 13:51:30 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30831	116.62652	328	10					
2018-11-21 10:05:01 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30894	116.62108	325	14					
2018-11-16 15:27:44 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30902	116.62572	322	18					
2018-11-16 14:46:23 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30845	116.62670	318	10					
2018-11-16 14:54:27 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30884	116.62659	318	14					
2018-11-16 14:54:38 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30885	116.62656	318	14					
2018-11-16 14:57:34 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30859	116.62657	318	18					
2018-11-16 14:58:03 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30848	116.62641	318	18					
2018-11-16 15:00:59 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30861	116.62625	318	18					
2018-11-16 15:01:17 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30869	116.62628	318	18					
2018-11-16 15:15:27 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30861	116.62567	318	18					
2018-11-16 15:17:07 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30845	116.62564	318	20					
2018-11-16 15:23:23 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30868	116.62537	318	18					
2018-11-16 16:12:58 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30864	116.62511	318	15					
2018-11-21 09:50:24 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30886	116.62279	318	14					
2018-11-21 09:53:42 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30889	116.62214	318	14					
2018-11-16 14:47:20 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30857	116.62685	315	12					
2018-11-16 14:51:03 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30917	116.62681	315	12					
2018-11-16 14:53:48 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30886	116.62660	312	14					
2018-11-16 13:53:29 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30836	116.62657	309	14	1				
2018-11-16 14:03:09 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30821	116.62677	309	16					
2018-11-21 09:50:57 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30878	116.62287	309	14					

DATE	TAXA	LAT	LONG	DBH (mm)	HEIGHT (m)	# HOLLOW	# HOLLOW >12CM	COMMENTS	TREE PHOTO REF	HOLLOW PHOTO REF
2018-11-21 09:49:34 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30888	116.62313	306	14					
2018-11-16 15:55:58 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30848	116.62504	303	18					
2018-11-21 09:54:54 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30889	116.62176	303	14					
2018-11-16 13:52:14 AWST	Wandoo ( <i>Eucalyptus wandoo</i> )	-32.30837	116.62651	290	18					

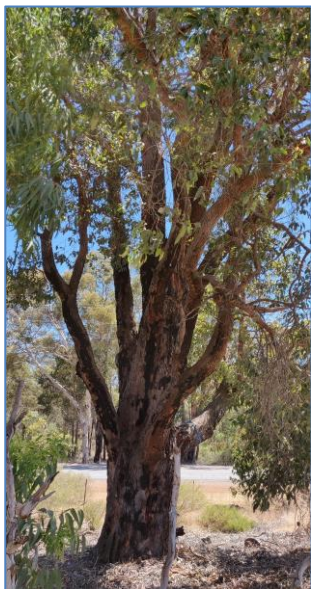


Photo Reference: 1



Photo Reference: 2



Photo Reference: 3



Photo Reference: 4



Photo Reference: 5



Photo Reference: 6





Photo Reference: 7



Photo Reference: 8



Photo Reference: 9



Photo Reference: 10



Photo Reference: 11



Photo Reference: 12





Photo Reference: 13



Photo Reference: 14



Photo Reference: 15



Photo Reference: 16



Photo Reference: 17



Photo Reference: 18





Photo Reference: 19



Photo Reference: 20



Photo Reference: 21



Photo Reference: 22



Photo Reference: 23



Photo Reference: 24





Photo Reference: 25



Photo Reference: 26



Photo Reference: 27



Photo Reference: 28



Photo Reference: 29

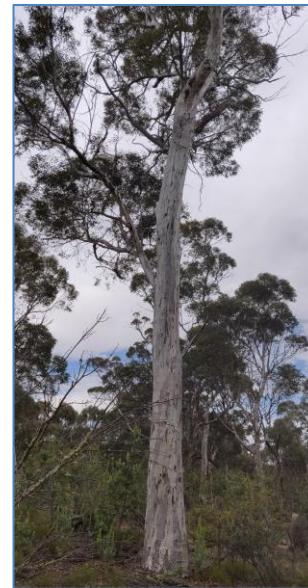


Photo Reference: 30





Photo Reference: 31



Photo Reference: 32



Photo Reference: 33



Photo Reference: 34



Photo Reference: 35



Photo Reference: 36





Photo Reference: 37



Photo Reference: 38



Photo Reference: 39



Photo Reference: 40



Photo Reference: 41



Photo Reference: 42





Photo Reference: A



Photo Reference: B

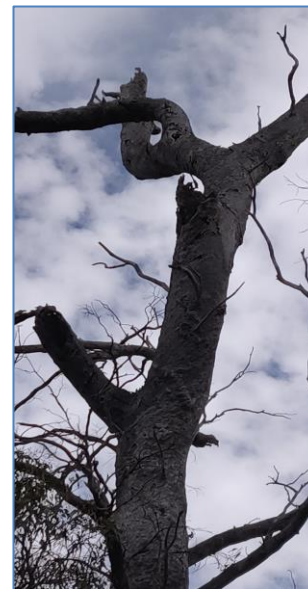


Photo Reference: C



Photo Reference: D



Photo Reference: E



Photo Reference: F





Photo Reference: G



Photo Reference: H



Photo Reference: I



Photo Reference: J



Photo Reference: K



Photo Reference: L

# 360

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10 Bermondsey Street West Leederville WA 6007 **t** (+618) 9388 8360 **f** (+618) 9381 2360  
PO BOX 14, West Perth WA 6872  
**w** 360environmental.com.au **e** admin@360environmental.com.au

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