



City of Rockingham  
Proposed Baldivis District Sporting Complex  
Fauna Assessment

January 2018

# Executive summary

The City of Rockingham (“the City”) proposes to develop a District Sporting Complex at Lots 4, 103, 104 and 105 Eighty Road, Baldivis (the ‘survey area’). The Baldivis District Sporting Complex is necessary to meet the current and future demand for organised sporting spaces in the locality. The project will include four large playing fields, two club rooms, 18 outdoor hard courts, and indoor recreation centre and outdoor youth space.

GHD Pty Ltd (GHD) was commissioned by the City to undertake a reconnaissance fauna survey and black cockatoo habitat assessment of the future Baldivis District Sporting Complex to delineate key fauna values within the survey area. The outcomes of the assessment will be used to inform the project design and viability and for environmental approvals process. The survey area is located on Lot 4, Lot 103, Lot 104 and Lot 105 on Eighty Road, Baldivis in the City of Rockingham. The total survey area is 19.39 hectares (ha).

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.6 and the assumptions and qualifications contained throughout the Report.

## Key findings

- The survey area comprised of three habitat types:
  - Tuart/jarrah woodland (4.22 ha)
  - *Grevillea* shrubland (0.19 ha)
  - Parkland cleared (14.98 ha)
- All habitat types present have been significantly altered from a long history of disturbances including clearing, grazing, logging, fencing and tracks for fire breaks and driveways. Two of the properties (Lots 103 and 104) had a house and sheds however these were recently demolished.
- The tuart/jarrah woodland and *Grevillea* shrubland was assessed as being in a degraded condition. The vegetation structure of these habitats have been significantly altered. The ground layer was completely dominated by weeds grasses and herbs with the occasional scattered native shrub or herb.
- A large proportion of the survey area is parkland cleared (77%) and considered to be completely degraded. This habitat type completely lacks a mid and lower understorey and consists of scattered individual or small clumps of trees and/or tall shrubs over introduced grasses and herbs. Tree species were mostly native species however planted/introduced species, including common garden shrubs, dominated the area where the houses had been situated. Lot 105 has been completely cleared with the occasional weedy shrub present.
- The survey area is surrounded by areas of remnant vegetation remaining in various condition on adjacent properties and currently links to surrounding nature reserves including Rockingham Lakes Nature Reserve (bush forever site 356) to the west and nearby wetlands Outridge Swamp to the south and Fount Swamp immediately north.
- The habitat quality for fauna varied within the survey area ranging from low quality (cleared to highly degraded areas) to areas of high quality (tuart/jarrah woodland habitat type). The trees and shrubs within the tuart/jarrah woodland habitat type provide shelter and food resources for native bird species however given the very open and degraded nature of the understorey, the survey area provides limited value habitat for ground-dwelling fauna, particularly mammals. The trees and shrubs within this habitat type provide a dense overstorey consisting of *Eucalyptus*, *Banksia* and *Allocasuarina* species which provides

high value foraging habitat as well as potential breeding and roosting habitat for black cockatoo species.

- A total of 30 fauna species, including 21 birds, five reptiles and four mammals, were recorded in the survey area. Of these, three species are introduced. All species recorded during the survey are generally common and are known to occur in the area.
- Two conservation significant fauna were recorded (or evidence of occurrence) during the survey including:
  - Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) – listed as Endangered under the EPBC Act and WC Act. Calls were heard in nearby bushland during the spring survey in October 2017.
  - Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) – listed as Vulnerable the EPBC Act and WC Act. Foraging evidence in the form of chewed jarrah and marri nuts were recorded in the survey area. Additionally this species was heard calling in nearby bushland during the cockatoo habitat assessment in August 2017.
- A Likelihood of Occurrence assessment was conducted post-field survey for all conservation significant fauna taxa identified in the desktop assessment. Five species are considered likely to occur and two were recorded within the survey area.

#### **Black cockatoo habitat assessment**

- There is 5.76 ha of potential foraging habitat within the survey area consisting of *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri), *Eucalyptus gomphocephala* (tuart), *Allocasuarina fraseriana*, *Banksia attenuata*, *B. grandis*, *B. menziesii*, *B. sessilis*, *Hakea prostrata* and planted *Pinus* sp.
- No evidence of breeding was recorded within the survey area of any species of black cockatoo during the survey.
- 177 potential breeding trees with diameter at breast height (DBH)  $\geq$  500 mm were recorded in the survey area. This consisted of tuart (157), jarrah (8) and marri (12). Nineteen (19) trees contain nest hollows that are greater than 10 cm which are considered currently suitable for black cockatoo breeding. Two tuart trees with hollows showed some signs of previous use due to the presence of chew marks.
- No night roosting sites were recorded during the survey, although the woodland provides suitable roosting habitat for the black cockatoos.

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# 1. Introduction

## 1.1 Background

The City of Rockingham (“the City”) proposes to develop a District Sporting Complex at Lots 4, 103, 104 and 105 Eighty Road, Baldivis (the ‘survey area’). The Baldivis District Sporting Complex is necessary to meet the current and future demand for organised sporting spaces in the locality. The project will include four large playing fields, two club rooms, 18 outdoor hard courts, and indoor recreation centre and outdoor youth space.

## 1.2 Purpose of this report

GHD Pty Ltd (GHD) was commissioned by the City to undertake a fauna survey and black cockatoo habitat assessment of the future Baldivis District Sporting Complex to delineate key fauna values within the survey area. The outcomes of the assessment will be used to inform the project design and viability and to support environmental approvals.

## 1.3 Location

### 1.3.1 Survey area

The survey area is located on Eighty Road, Baldivis in the City of Rockingham. The total survey area is 19.39 hectares (ha). The survey area is located on the following Lots, as shown in Figure 1, Appendix A:

- Lot 4 on Diagram 31062 – No street address
- Lot 103 on Diagram 50627 – 531 Eighty Road, Baldivis
- Lot 104 on Diagram 50627 – 541 Eighty Road, Baldivis
- Lot 105 on Diagram 50627 – 553 Eighty Road, Baldivis

### 1.3.2 Study area

The desktop assessment included a 5 km buffer of the survey area which defines the study area.

## 1.4 Scope of works

The scope of works, as detailed in the GHD proposal was to undertake a desktop assessment and Level 1 (reconnaissance) fauna survey for the future Baldivis District Sporting Complex, including a targeted black cockatoo habitat assessment.

The following actions were completed to fulfil the scope:

- A desktop assessment of the study area was completed prior to the field survey work to identify potential fauna constraints, which may be in, or nearby the survey area
- A field survey was conducted to verify/ground truth the desktop assessment findings through a targeted and reconnaissance survey, that included a targeted Black Cockatoo habitat survey
- Identification and mapping of faunal habitat types
- An inventory of vertebrate fauna species was compiled through opportunistic recording of species and/or evidence of their presence on site

- Potentially occurring significant fauna species (giving specific consideration to Black Cockatoos, Southern Brown Bandicoot/Quenda, Lined Skink and Black-striped Burrowing Snake) and their habitat were identified, where evident
- A concise technical report was produced (this document), with relevant photographs and figures included for context

## 1.5 Relevant legislation, conservation codes and background information

In Western Australia (WA) some communities, flora and fauna are protected under both Federal and State Government legislation. In addition, regulatory bodies also provide a range of guidance and information on expected standards and protocols for environmental surveys.

An overview of key legislation and guidelines, conservation codes and background information relevant to this project is provided in Appendix B.

## 1.6 Report limitations and assumptions

This report has been prepared by GHD for City and may only be used and relied on by the City for the purpose agreed between GHD and the City as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than the City arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by the City and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Site conditions may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

This report has assessed the fauna within the survey area (Figure 1, Appendix A). Should the survey area change or be refined, further assessment may be required.

## 2. Methodology

### 2.1 Desktop assessment

Prior to the commencement of the field survey, a desktop assessment was undertaken to identify relevant environmental information pertaining to the study area and to assist in survey design. This included a review of:

- The Department of the Environment and the Energy (DotEE) Protected Matters Search Tool (PMST) to identify species listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) potentially occurring within the study area (DotEE 2017a) (Appendix C)
- The Department of Biodiversity Conservation and Attractions (DBCA) *NatureMap* database for fauna species previously recorded within the study area (DBCA 2007–) (Appendix C)
- Aerial photography, regional biogeography and DBCA managed conservation estates and reserves information to provide background information with respect to fauna values.

### 2.2 Field survey

A targeted black cockatoo habitat assessment was undertaken by GHD ecologist Erin Lynch on the 2 August 2017. The purpose of the survey was to identify and record suitable foraging, breeding and roosting habitat for black cockatoos and determine their presence on site. This survey also provided preliminary site context to inform the single season reconnaissance fauna survey completed by Erin Lynch on the 11 October 2017. The purpose of the second fauna survey was to identify and describe the dominant fauna habitat types and their condition, assess habitat connectivity, identify and record fauna species within the survey area. A Likelihood of Occurrence assessment for conservation significant fauna and their habitats occurring within the survey area was also undertaken.

The fauna habitat and species survey was undertaken with reference to the EPA *Technical Guidance – Sampling methods for terrestrial vertebrate fauna* (EPA 2016a) and *Technical Guidance – Terrestrial Fauna Surveys* (EPA 2016b). The black cockatoo species habitat assessment was conducted in accordance with the 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, Populations, and Communities (DSEWPaC 2012).

#### 2.2.1 Habitat assessment

A field data checklist was used to document the type, condition and extent of habitats within the survey area. The following information was collected:

- Habitat structure (e.g. vegetation type, presence/absence of structural layers such as ground cover and mid storey)
- Presence/absence of refuge including: density of ground covers, fallen timber, hollow-bearing trees and stags and rocks/boulder piles, and the type and extent of each refuge
- Presence/absence of waterways including type, extent and habitat quality within waterways
- Location of the habitat within the survey area in comparison to the habitat within the surrounding landscape



- Habitat connectivity and identification of wildlife corridors within and immediately adjacent to the survey area
- Current land use and disturbance history
- Identification and evaluation of key habitat features and types identified during the desktop assessment relevant to fauna of conservation significance
- Evaluation of the Likelihood of Occurrence of conservation significant fauna within the habitat (based on presence if suitable habitat and observations)
- A representative photograph of each habitat type.

#### 2.2.2 Opportunistic fauna searches

Opportunistic fauna searches were conducted across the survey area and focussed on the following:

- Searching the survey area for tracks, scats, bones, diggings and feeding areas for both native and feral fauna. For each scat found, the location, date, brief habitat description and GPS coordinates were recorded
- Searching through microhabitats including turning over rocks and ground debris (e.g. leaf litter) and examining tree hollows and hollow logs for reptile and other small vertebrate fauna
- Visual and aural surveys. This accounted for many bird species potentially utilising the survey area
- Recording GPS locations of any conservation significant fauna species.

#### 2.2.3 Fauna species identification

Fauna species were identified in the field using available field and electronic guides (e.g. Morcombe 2014). Where identification was not possible, photographs of specimens were collected to be later identified.

Nomenclature used in this report follows the WA Museum as reported on *NatureMap* (DBCA 2007–). This nomenclature is deemed the most up-to-date species information for WA groups: reptiles, amphibians, invertebrates and mammals (including bats). All Aves nomenclature follows Christidis and Boles (2008).

#### 2.2.4 Targeted habitat assessment for black cockatoos

The targeted habitat assessment for black cockatoos included:

- Mapping of suitable foraging habitat
- Recording, numbering and mapping the specific locations of all potential breeding trees: those trees of suitable species (tuart, marri, jarrah and flooded gum) which have a diameter to breast height (dbh) of >500 mm
- Records of any potential breeding trees which have potential or actual breeding hollows, including size of hollow (small <5 cm, medium 5-10 cm or larger >10 cm). For the purpose of this report a suitable hollow for black cockatoo breeding was defined as a tree hollow with an entrance diameter of 10 cm or greater
- Records and photographs of any evidence of black cockatoo feeding, night roosting or breeding use of trees, such as chew marks on nuts or edges of hollows, debris, scats and feathers in quantity below roost sites

- Co-ordinates for all relevant tree and evidence data in tabular and database (Excel and ArcGIS) form.

## 2.3 Limitations

### 2.3.1 Desktop limitations

Desktop investigations use a variety of online resources such as the WA Museum and DBCA *NatureMap* database (DBCA 2007-), and the EPBC Act PMST (DotEE 2017a). The EPBC Act PMST is based on bioclimatic modelling for the potential presence of species. As such, this does not represent actual records of the species within the area. The records from the DBCA searches of threatened fauna provide more accurate information for the general area. However, some records of collections, sightings or trappings cannot be dated and often misrepresent the current range of threatened species.

### 2.3.2 Field survey limitations

The EPA (2016b) Technical Guidelines state that fauna survey reports for environmental impact assessment in WA should contain a section describing the limitations of the survey methods used. The limitations and constraints associated with this field survey are discussed in Table 1. Based on this assessment, the present survey effort has not been subject to any constraints which affect the thoroughness of the assessment and the conclusions which have been formed.

Table 1 Field survey limitations

| Aspect  | Constraint | Comment   |
|---|------------|---|
| Sources of information and availability of contextual information                               | Nil        | Adequate information is available for the survey area.  |
| Scope (what life forms were sampled etc)  | Nil        | Terrestrial vertebrate fauna were sampled during the survey. Invertebrate and aquatic fauna were not surveyed.  |
| Proportion of fauna identified, recorded and/or collected                                       | Minor      | The reconnaissance fauna survey was undertaken in spring 2017. The fauna assessment sampled those species that can be easily seen, heard or have distinctive signs, such as tracks, scats, diggings, etc. Many cryptic species would not have been identified during a reconnaissance survey and seasonal variation within species often requires targeted surveys at a particular time of the year. Of the fauna species recorded during the survey, all were identified to species level.<br><br>The fauna assessment was aimed at identifying habitat types and terrestrial vertebrate fauna utilising the survey area. No sampling for invertebrates or aquatic species occurred. The information available on the identification, distribution and conservation status of invertebrates is generally less extensive than that of vertebrate species. |
| Completeness and further work which might be needed (e.g. was the relevant area fully surveyed) | Nil        | Access to the survey area was made by vehicle tracks/driveways which entered the site. The majority of the survey area was traversed on foot over the course of the field survey.   |
| Mapping reliability   | Minor      | The habitat types were mapped using high-resolution ESRI aerial imagery obtained from Landgate, topographical features, previous  |

| Aspect   | Constraint | Comment  |
|--|------------|--|
|  |            | <p>broad scale mapping (Beard 1979) and field data.</p> <p>Data was recorded in the field using hand-held GPS tools (e.g. Nomad Juno and Garmin GPS). Certain atmospheric factors and other sources of error can affect the accuracy of GPS receivers. The Garmin GPS units used for this survey are accurate to within <math>\pm 5</math> metres on average. Therefore the data points consisting of coordinates recorded from the GPS may contain inaccuracies.</p>  |
| Timing/weather/season/cycle                                    | Nil        | <p>The black cockatoo assessment was undertaken on the 2 August 2017 and the fauna survey was conducted during spring on the 11 October 2017.</p> <p>The closest weather recording station to the survey area is Medina Research Centre (No. 009194), located approximately 10 km from the survey area. In the three months prior to the fauna survey (July-September), the Medina weather recording station recorded a total of 426.3 mm of rainfall (Bureau of Meteorology (BoM) 2017). This total is approximately 30% higher than the long-term average for the same period (July-September; 338.6 mm) (BoM 2017). The weather conditions during the spring field survey included:</p> <ul style="list-style-type: none"> <li>• Daily maximum temperature 18.9 °C</li> <li>• Daily minimum temperature 10.1 °C</li> <li>• Daily rainfall 2.4 mm.</li> </ul> <p>The weather conditions recorded during the survey periods are considered unlikely to have impacted upon the fauna survey.</p> |
| Disturbances (e.g. fire, flood, accidental human intervention) | Nil        | <p>The entire survey area has been subject to historical disturbances with a large proportion previously cleared. Houses previously located on site had recently been demolished and machinery were on site during the survey to clean up these areas. These disturbances did not impact the survey.</p>   |
| Intensity (in retrospect, was the intensity adequate)          | Nil        | <p>The terrestrial fauna sampled in accordance to EPA (2016b). The survey area was sufficiently covered by the GHD ecologist during the survey.</p>  |
| Resources  | Nil        | <p>Adequate resources were employed during the field survey. Two person days were spent undertaking the survey using an ecologist.</p>   |
| Access restrictions  | Nil        | <p>No access problems were encountered during the survey.</p>  |
| Experience levels  | Nil        | <p>The ecologist who executed the survey is a practitioner suitably qualified and experienced in their respective fields. Erin Lynch has over 10 years' experience undertaking flora and fauna surveys within WA.</p>  |

## 3. Desktop assessment

### 3.1 Regional biogeography

The survey area is situated within the Swan Coastal Plain 2 (SWA2-Perth) subregion of the Swan Coastal Plain bioregion described by the Interim Biogeographic Regionalisation of Australia (IBRA) (DotEE 2017b).

The Swan Coastal Plain is a low lying coastal plain, mainly covered with woodlands. It is dominated by *Banksia* or Tuart on sandy soils, *Casuarina obesa* on outwash plains, and paperbark in swampy areas. In the east, the plain rises to duricrusted Mesozoic sediments dominated by Jarrah woodland. Three phases of marine sand dune development provide relief. The outwash plains, once dominated by *C. obesa* - Marri woodlands and *Melaleuca* shrublands, are extensive only in the south (Mitchell et al. 2002).

The Perth subregion is composed of colluvial and Aeolian sands, alluvial river flats, coastal limestone. Heath and/or Tuart woodlands on limestone, *Banksia* and Jarrah - *Banksia* woodlands on Quaternary marine dunes of various ages, Marri on colluvial and alluvials. Includes a complex series of seasonal wetlands. Rainfall ranges between 600 and 1000 mm annually and the climate is Mediterranean (Mitchell et al. 2002).

### 3.2 Conservation reserves

There are no reserves or conservation areas located within or immediately adjacent to the survey area. Bush Forever (bush forever) site 356 (Lake Cooloongup, Lake Walyungup and adjacent bushland, Hillman to Port Kennedy) is located approximately 1 km west of the survey area.

### 3.3 Fauna

#### 3.3.1 Fauna diversity

A search of the *NatureMap* database identified 181 fauna species previously recorded within the vicinity of the study area. This total comprised of 133 birds, 24 reptiles, 13 mammals, two amphibians, four fish and five invertebrates. Of the 181 fauna species previously recorded, 172 are native species and 9 are naturalised (introduced) species.

#### 3.3.2 Conservation significant fauna

The EPBC Act PMST, DBCA *NatureMap* database and DBCA (2017) list of Threatened and Priority Fauna occurring on the Swan Coastal Plain identified the presence/ potential presence of 44 conservation significance fauna taxa within the study area (Appendix C). This total does not include species identified by the PMST as marine and/or migratory marine. These species have been excluded from this assessment as no marine habitat was present within or immediately adjacent to the survey area.

The species listed included:

- 16 species listed as Threatened under the EPBC Act and/or as Schedule 1 (Threatened) under the WC Act (six are also listed as Migratory)
- 17 bird species listed as Migratory only (terrestrial and wetland) under the EPBC Act and/or under Schedule 3 (Migratory birds protected under an international agreement) of the WC Act
- One species listed as Schedule 7 (Specially Protected) under the WC Act

- 11 species listed as Priority by DBCA

An additional species has been identified by GHD as potentially occurring within the survey area, the Black-striped Burrowing Snake (*Neelaps calonotus*).

### 3.4 Threatened black cockatoo species

The desktop database searches identified the potential presence of three threatened black cockatoo species occurring within the study area; Carnaby's Cockatoo (*Calyptorhynchus latirostris*), Baudin's Cockatoo (*Calyptorhynchus baudinii*) and Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*). These species are endemic and reside in the south west of WA. All three species are currently seeing a significant decline in their population numbers due to a wide and varied number of threats including clearing and habitat fragmentation, invasive species and illegal poaching. As such there is increasing focus from state and federal regulators on these species during environmental impact assessments that occur from any planned disturbance to native vegetation within their distribution.

According to *NatureMap*, there are numerous records of Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo surrounding the survey area. There is however only one record of Baudin's Cockatoo occurring within 10 km of the survey area. According to the current modelled distributions of the Carnaby's Cockatoo (Commonwealth of Australia 2016), the survey area is located within the predicted breeding range for the species. The Baudin's Cockatoo is considered likely to occur (right on the boundary for its distribution) however it is not located within the known or predicted breeding range for the species nor within the known foraging areas. The survey area is located within the predicted distribution range for the Forest Red-tailed Black Cockatoo (Commonwealth of Australia 2016).

Mapping provided by the Department of Planning WA (2011) for Carnaby's Cockatoo identify five known roosting sites within 5 km of the survey area, the closest approximately 1.8 km south. There is only one known breeding site in the area which is located approximately 7 km south/south-east of the survey area, along the Forest Highway.

#### 3.4.1 Carnaby's Cockatoo

##### **Distribution**

Carnaby's Cockatoo inhabits a large area of south-west WA, occurring from the Wheatbelt, in areas that receive between 300 and 750 mm of rainfall annually, across to wetter regions in the extreme south-west, including the Swan Coastal Plain and the southern coast. Its range extends from Cape Arid in the south-east to Kalbarri in the north, and inland to Hatter Hill, Gibb Rock, Narambeen, Noongar, Wongan Hills, Nugadong, near Perenjori, Wilroy and Nabawa (DotEE 2017b). Carnaby's Cockatoo is well known in metropolitan Perth, with birds recorded foraging and roosting across Perth in every month of the year. Average numbers (in the Perth metropolitan area) are lowest from July to November and gradually increase throughout the year until peaking in March, with a rapid drop-off after May (Berry 2008). Breeding mainly occurs in the Wheatbelt, from the Stirling Ranges north-west to near Three Springs, but has also been recorded on the south-west of the Swan Coastal Plain, around Bunbury (Higgins 1999; Saunders 1974b cited in DotEE 2017a). There are several small resident populations on the northern Swan Coastal Plain at Boonanarring, Mooliabeenee and Yanchep National Park and on the southern Swan Coastal Plain at Lake Clifton, near Bunbury and probably at Baldivis. At each of these sites the birds forage in remnant bushland and in adjacent pine plantations (Johnstone et al. 2008 cited in DotEE 2017b).

### **Foraging habitat**

During the breeding season, Carnaby's Cockatoo forages in native vegetation that surrounds woodlands used for breeding. During the non-breeding season, Carnaby's Cockatoo forages extensively on banksia woodlands on the Swan Coastal Plain, including the Perth metropolitan area (Eco Logical Australia 2013 cited in DotEE 2017b), as well as in banksia heath on the southern coast. Carnaby's Cockatoo also feeds in seeding marri and jarrah. It is thought that the foraging habitat within 20 km of breeding sites is one of the key factors in ensuring successful breeding (Cale 2003 cited in DotEE 2017b), particularly within 12 km of a nest (DotEE 2017b).

It is known that Carnaby's Black-Cockatoo shows a distinct preference for native habitats dominated by proteaceous tree and shrub species, such as Banksia, Hakea, Grevillea and some Eucalypt species (Higgins 1999, Saunders 1980 cited in DotEE 2017b). Carnaby's Black-Cockatoo feed on the fruit, nuts and flowers (for nectar) of such plants (Higgins 1999 cited in DotEE 2017b). Carnaby's Black-Cockatoo's choice of food species from these genera depends on the habitat structure and location, and not all species within these genera are necessarily potential food sources. Also forages in pine plantations and seeds of other introduced species (DotEE 2017b)

### **Breeding habitat**

The Carnaby's Black Cockatoo generally breeds in woodland or forest, but also breeds in former woodland or forest now present as isolated trees. Nesting mainly occurs in hollows in smooth-barked eucalypts (salmon gum – *Eucalyptus salmonophloia* – and wandoo – *E. wandoo*) but also in tuart (*E. gomphocephala*), jarrah (*E. marginata*), flooded gum (*E. rudis*), York gum (*E. loxophleba* subsp. *loxophleba*), powderbark (*E. accedens*), karri (*E. diversicolor*) and marri (*C. calophylla*) (Commonwealth of Australia 2017). Nesting hollows may be located anywhere from 2 m to more than 10 m above the ground. Hollows range in depth from 0.1 m to more than 2.5 m (Saunders 1979b cited in DotEE 2017b) with a mean of 1.24 m (Saunders et al. 2014a cited in DotEE 2017b). Mean entrance diameter of nests is 270 mm and the mean floor diameter is 407 mm (Saunders et al. 2014a cited in DotEE 2017b).

### **Roosting habitat**

During the non-breeding season, when most of the cockatoos are on the Swan Coastal Plain, they roost in tall native or introduced eucalypts and occasionally pines (DotEE 2017b). They generally roost in or near riparian environments or natural and artificial permanent water sources. Species utilised for roosting include flat-topped yate *E. occidentalis*, salmon gum, wandoo, marri, blackbutt, tuart, introduced eucalypts (e.g. blue gum) and introduced pines. Flocks may use several different night roosts across the year, with major night roosts typically used for a period of weeks or until the local foraging resources are exhausted (DotEE 2017b 2012). Roost sites may be repeatedly used over multiple years (DotEE 2017b). Night roosts are generally located in the tallest trees in an area (DotEE 2017b).

## **3.4.2 Baudin's Cockatoo**

### **Distribution**

The Baudin's Cockatoo is found only in the extreme south-west of WA. The range of the species, which is generally bounded by the 750 mm isohyet, extending from Albany northwards to Gidgegannup and Mundaring and inland to the Stirling Ranges and near Boyup Brook (Davies 1966; Saunders 1974, 1979; Saunders et al. 1985; Storr 1991 cited in DotEE 2017b). The occurrence of the species varies throughout its range, from scarce to moderately common. The southern and northern limits of the species, from Albany to Mundaring, are for the most part connected by extensive tracts of forest (Saunders 1979 cited in DotEE 2017b). This, together

with the dispersion of recent records, suggests that overall, the distribution of Baudin's Cockatoo is not particularly fragmented (DotEE 2017b).

### **Foraging habitat**

During the non-breeding season, the range of Baudin's Cockatoo is determined by the distribution of marri (Saunders 1979 cited in DotEE 2017b). In the northern jarrah forest, marri tends to be more common in lower parts of the landscape (Biggs et al. 2011 cited in DotEE 2017b). Outside the breeding season, the species feeds on banksia and hakea species, and *Erodium botrys* (wild geranium), as well as *Dryandra* species. Baudin's Cockatoo also feeds on invertebrate larvae and in fruit orchards (mostly apple and pear, but also persimmon) (Chapman 2008 cited in 2017b).

### **Breeding habitat**

Baudin's Cockatoo breeds in the jarrah, marri and karri forests of the far south-west in areas averaging more than 750 mm of rainfall annually. Breeding generally occurs in woodland or forest, but may also occur in former woodland or forest now present as isolated trees. Areas of breeding are also known from the southern Swan Coastal Plain, the south coast region and the southern wheatbelt region around Kojonup. The northernmost breeding record is for Lowden, near Donnybrook (Johnstone & Storr 2008 cited in DotEE 2017b). Nesting occurs in hollows in live or dead trees of karri, marri, wandoo and tuart (*Eucalyptus gomphocephala*). They nest in large tree hollows, 30-40 cm in diameter and more than 30 cm deep (Saunders 1974a cited in DEC 2008). During the breeding season feeding primarily occurs in native vegetation, particularly marri (DotEE 2017b).

### **Roosting habitat**

The Baudin's Cockatoo generally roosts in or near riparian environments or other permanent water sources. Suitable roosting tree species include jarrah, marri, flooded gum, blackbutt, tuart, and introduced eucalypts including blue gum and lemon scented gum (*Corymbia citriodora*), though any large tree may be suitable (DotEE 2017b).

## 3.4.3 Forest red-tailed Black Cockatoo

### **Distribution**

The Forest Red-tailed Black Cockatoo is endemic to south-west Western Australia (WA) in an area bounded by Gingin, Mt Helena, Christmas Tree Well, West Dale (rarely to Brookton), North Bannister (rarely to Wandering), Mt Saddleback, Kojonup, Rocky Gully, upper King River and Green Range (east of Albany) (Garnett et al. 2011; Johnstone & Storr 1998 cited in DotEE 2017b). The subspecies is now absent from north of Yanchep and Gingin to Dandaragan (Johnstone 1997 cited in DotEE 2017b), some inland areas (e.g. Toodyay) (Johnstone & Storr 1998 cited in DotEE 2017b) and only occurs as tiny breeding populations on the Swan Coastal Plain (Baldivis, Stakehill, Lake Mclarty and Capel, and increasingly, in the Perth metropolitan area) (Garnett et al. 2011 cited in DotEE 2017b). Although rare on the Swan Coastal Plain since the early 1900s (Alexander 1921 cited in DotEE 2017b), the subspecies' movements are irregular and they can now be found on the Swan Coastal Plain at any time of the year in search of food, mainly the exotic white cedar, also known as cape lilac (*Melia azedarach*) (Chapman 2008 cited DotEE 2017b). There is also several small isolated populations of the birds in the eastern parts of its range (WA CALM 2006 cited in DotEE 2017b).

### **Foraging habitat**

While the Forest Red-tailed Black Cockatoo feeds on the seeds of other species, around 90 per cent of its diet is made up of seeds from marri and jarrah fruits/nuts (Johnstone and Kirkby 1999

cited in DotEE 2017b). Other species used for feeding include *Eucalyptus patens* (Blackbutt), *E. staeri*, *Allocasuarina fraseriana*, *Persoonia longifolia* and the non-native species *E. maculata* (Spotted Gum) and *Melia azedarach* (Cape Lilac) (DotEE 2017b).

#### **Breeding habitat**

The Forest red-tailed Black Cockatoo generally breeds in woodland or forest, but may also breed in former woodland or forest now present as isolated trees. They nest in hollows in live or dead trees of marri, karri, wandoo, bullich (*E. megacarpa*), blackbutt (*E. patens*), tuart and jarrah (DotEE 2017b). Nest hollows in marri range from 8-14 m above ground, size of entrance 12-41 cm and depth of hollows 1-5 m (Johnstone and Storr 1998).

#### **Roosting habitat**

The Forest Red-tailed Black Cockatoo roosts in tall jarrah, marri, blackbutt, tuart and introduced eucalypt trees within or on the edges of forests (Commonwealth of Australia 2017).



## 4. Field assessment



### 4.1 Fauna habitat


Three habitat types were identified within the survey area based on the predominant landforms, soil and vegetation structure in the area:

- Tuart/Jarraah woodland
- *Grevillea* shrubland
- Parkland cleared

A description of each habitat type, including the amount present within the survey area is provided in Table 2 and mapped in Figure 2, Appendix A.

Table 2 Habitat types within the survey area

| Habitat Type           | Description   | Total area (ha) | Site photo   |
|------------------------|---|-----------------|--|
| Tuart/Jarraah woodland | <p><i>Eucalyptus gomphocephala</i> (tuart), <i>E. marginata</i> (jarrah) and <i>Banksia</i> spp. woodland over <i>Macrozamia riedlei</i> and <i>Xanthorrhoea gracilis</i> isolated shrubs over Iridaceae sp. and <i>*Lupinus</i> spp. open herbland over <i>*Ehrharta calycina</i>, <i>*Briza maxima</i> and <i>*Bromus diandrus</i> grassland on sandy slope/rise.</p> <p>This habitat remained in degraded to completely degraded condition with very limited native understorey species present. The vegetation structure of this habitat has been largely altered by clearing, logging and grazing. The large tuart and jarrah trees with hollows provide suitable nesting habitat for birds and arboreal mammal species such as the brushtail possum. This habitat provides potential foraging, roosting and breeding habitat for black cockatoos.</p> | 4.22 ha         |   |
| Grevillea shrubland    | <p><i>Banksia sessilis</i> isolated shrubs over <i>Grevillea crithmifolia</i>, <i>Macrozamia riedlei</i> and <i>Acacia lasiocarpa</i> shrubland over <i>Conostylis candicans</i>, <i>*Ursinia anthemoides</i> and <i>*Trifolium campestre</i> herbland over <i>*Ehrharta calycina</i>, <i>*Briza maxima</i> and <i>*Avena barbata</i> grassland on sandy plain.</p> <p>Only a very small, isolated area of this habitat type remains and is in degraded condition.</p> <p>The proteaceous species provides potential foraging habitat for black cockatoos.</p>  | 0.19 ha         |  |

| Habitat Type     | Description  | Total area (ha) | Site photo  |
|------------------|--|-----------------|---|
| Parkland cleared | <p>Cleared paddocks where the understorey has been completely cleared of native vegetation. Consists of scattered individual or clumps of trees and/or tall shrubs over introduced grasses and herbs. The natural structure of the vegetation is no longer intact.</p> <p>This vegetation type is considered to be completely degraded and has low habitat value. However the majority of remaining trees provide suitable foraging habitat for black cockatoos (including jarrah, marri, tuart, <i>Allocasuarina fraseriana</i>, <i>Pinus</i> sp.).</p> | 14.98 ha        |  |

## 4.2 Habitat connectivity and linkages

The fauna habitats within the survey area have been significantly altered from a long history of disturbances, including clearing. Lot 105 has been completely cleared whilst Lots 103 and 104 have been parkland cleared, with no remaining understorey species present. Lot 4, the largest property has been partially cleared with small pockets of degraded remnant vegetation. The survey area is surrounded by areas of remnant vegetation remaining in various condition on adjacent properties and currently link to surrounding nature reserves including Rockingham Lakes Nature Reserve (bush forever site 356) to the west and nearby wetlands, including Outridge Swamp to the south and Fount Swamp immediately north. The Rockingham Lakes Regional Park is known to consist of a diverse array of habitats that support and cater for local and migratory birds as well as terrestrial fauna (Tingay and Associates 1996). Housing development is situated on the eastern side of Eighty Road (directly east of the survey area) where no remnant vegetation remains except on small parks and reserves.

The habitat quality for fauna varied within the survey area ranging from low quality (cleared to highly degraded areas) to areas of high quality (Figure 2, Appendix A). The trees and shrubs within the survey area provide shelter and food resources for native bird species however given the very open and degraded nature of the understorey, the survey area provides very low value habitat for ground-dwelling fauna, except for the Western Grey Kangaroo which were present in large numbers on Lot 4. Individuals were able to retreat to surrounding properties once disturbed. Although the remnant patch of tuart/jarrah woodland is in degraded condition with isolated patches of native understorey remaining, the dense overstorey consisting of *Eucalyptus*, *Banksia* and *Allocasuarina* species provides high value foraging habitat as well as potential breeding and roosting habitat for black cockatoo species.

## 4.3 Fauna diversity

A total of 30 fauna species, including 21 birds, five reptiles and four mammals, were recorded in the survey area. Of these, three species are introduced. All species recorded during the survey are generally common and are known to occur in the area.

A full list of fauna recorded during the survey is provided in Appendix D.

Based on the desktop assessment, the *Naturemap* database identified 181 fauna species as potentially occurring within 5 km of the survey area. These records are species that have previously been identified in the area and likely to occur within the habitat types identified in the survey area.

## 4.4 Conservation Significant fauna

Two conservation significant fauna were recorded (or evidence of occurrence) during the survey including:

- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) – listed as Endangered under the EPBC Act and WC Act.
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) – listed as Vulnerable the EPBC Act and WC Act.

### 4.4.1 Significant fauna likelihood of occurrence

A Likelihood of Occurrence assessment was conducted post-field survey for all conservation significant fauna taxa identified in the desktop assessment (Appendix D). This assessment is based on species biology, habitat requirements, the quality and availability of suitable habitat as determined during the field survey and records of the species in the survey area and locality.

Thirty-eight (38) conservation significant fauna species were identified during the desktop assessment as potentially occurring in the survey area and/or surrounding region. Of these, 31 were deemed unlikely or highly unlikely to be present or do not have significant habitat in the survey area. Five species are considered likely to occur and two were recorded within the survey area. The likely and recorded (present) species are summarised in Table 3.

Table 3 Summary of fauna species considered likely to occur within the survey area

| Taxon  | Status                     | Likelihood of occurrence justification   |
|--|----------------------------|--|
| <i>Calyptorhynchus banksii</i> subsp. <i>naso</i> (Forest Red-tailed Black Cockatoo) | EPBC Act: V<br>WC Act: V   | Present – suitable foraging and potential roosting and breeding habitat present. Feeding evidence present within the survey area and individuals heard calling in nearby bushland during the survey.   |
| <i>Calyptorhynchus latirostris</i> (Carnaby's Black Cockatoo)                        | EPBC Act: En<br>WC Act: En | Present – suitable foraging and potential breeding and roosting habitat present. This species was heard calling in nearby bushland during the survey.  |
| <i>Calyptorhynchus baudinii</i> (Baudin's Black Cockatoo)                            | EPBC Act: V<br>WC Act: V   | Likely – The survey area provides suitable foraging and potential roosting and breeding habitat for this species. The survey area is located just outside of the currently documented range for the Baudin's Black Cockatoo however there is potential for this species to utilise the area in the future. |
| <i>Falco peregrinus</i> (Peregrine Falcon)   | WC Act: OS                 | Likely – suitable habitat present. Species known to occur in the local area.   |
| <i>Merops ornatus</i> (Rainbow Bee-eater)  | EPBC Act: Ma<br>WC Act: Mi | Likely – suitable habitat present. There are known records in close proximity to the survey area. A common and widespread species with known records in or close to the survey area.   |
| <i>Lerista lineata</i> (Perth Slider, Lined Skink)                                   | DBCA: P3                   | Likely – suitable habitat is present. There are multiple records within 5 km of the survey area. Has been recorded at the nearby Port Kennedy Scientific Park, Cape Peron and Garden Island.   |
| <i>Neelaps calonotos</i> (Black-striped Snake)                                       | DBCA: P3                   | Likely – suitable habitat within the survey area. Nearby records include Port Kennedy Scientific Park, Peron, Lake Coo loongup Flora and Fauna Reserve.  |

#### 4.5 Targeted black cockatoo habitat assessment

During the black cockatoo habitat assessment in August 2017, Forest Red-tailed Black Cockatoos were heard calling in the distance from the survey area. During the spring fauna survey undertaken in October 2017, Carnaby's Black Cockatoo were briefly heard calling nearby. No black cockatoo species were directly seen feeding or observed flying over the survey area during the assessment. However evidence of foraging was observed during the

survey in the form of chewed marri and jarrah nuts, with bite marks typical of the Forest Red-tailed Black Cockatoo.

#### 4.5.1 Foraging habitat

During the assessment of the survey area a total of 5.76 ha of suitable foraging habitat was identified (Figure 3, Appendix A).

Suitable foraging species identified within the survey area include *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri), *Eucalyptus gomphocephala* (tuart), *Allocasuarina fraseriana*, *Banksia attenuata*, *B. grandis*, *B. menziesii*, *B. sessilis*, *Hakea prostrata* and planted *Pinus* sp. Feeding evidence (Plates 1 and 2) on marri and jarrah nuts were recorded on Lots 103 and 104.



Plate 1 Chew marks on marri nuts attributed to the Forest Red-tailed Black Cockatoo



Plate 2 Chew marks on jarrah nuts attributed to the Forest Red-tailed Black Cockatoo

#### 4.5.2 Potential breeding habitat

No breeding activity was recorded during the field survey. The field survey identified 177 potential breeding trees with DBH of > 500 mm within the survey area (Figure 3, Appendix A). Of these, 157 are tuart (*Eucalyptus gomphocephala*), 12 marri (*Corymbia calophylla*) and 8 jarrah (*Eucalyptus marginata*).

Of the 177 trees recorded within the survey area, 26 contained one or more hollows of various sizes (recorded as small, medium or large) (Plates 3 and 4) of which 19 have suitable nest hollows (>10 cm). Two tuart trees had a large hollow that showed some signs of previous use (chew marks) (tree ID number 45 and 86 as shown on Figure 3, Appendix A). A number of bee hives were present within hollows of trees.

Results of the black cockatoo habitat survey are provided in Appendix D.

Breeding success is dependent on both the nesting and foraging areas being relatively close together and sufficient to support the population (DSEWPaC 2012). The trees identified in the survey area were scattered throughout the survey area and have the potential to be utilised by black cockatoos in the future. The closest known breeding tree has been recorded approximately 8 km south east of the survey area along the Kwinana freeway in Karnup (Department of Planning 2011).



Plate 3 Suitable black cockatoo hollow in *Eucalyptus gomphocephala* (tuart) (Tree ID number 110)



Plate 4 Suitable black cockatoo hollow in *Eucalyptus gomphocephala* (tuart) (Tree ID number 170)

#### 4.5.3 Roosting habitat

A roost is an area or site with a roost tree or a number of roost trees where black cockatoos congregate at dusk to rest overnight. A night roost can include tall trees (>8 m height) within 1 km of the central roosting area of larger roost sites (>150 cockatoos) and within 500 m for

smaller roost sites (<150 cockatoos) (Glossop *et al.* 2011). Typically, night roost sites have a standing water source nearby for drinking which may be a natural waterway or lake but constructed lakes, farm dams and stock water troughs are also used (Glossop *et al.* 2011). No evidence of roosting by black cockatoos was identified within the survey area during the field assessment. There are five known roosting sites of the Carnaby's Black Cockatoo within 5 km of the survey area, with the closest sites recorded approximately 1.8 km south and 2.2 km south-east of the survey area (Department of Planning WA 2011).

The survey area provides suitable roosting habitat based on the presence of suitable roosting trees, close proximity of known roosting sites (Department of Planning WA 2011) and presence of suitable foraging habitat. Although there is no permanent standing water within the survey area, there are a number of lake systems in the nearby area.

A summary of the results of the black cockatoo habitat assessment is provided in Table 4.

Table 4 Black cockatoo habitat within the survey area

| Habitat type     | Survey area   |
|------------------|---|
| Foraging habitat | <p>Feeding evidence was recorded within the survey area in the form of chewed marri and jarrah nuts with bite marks typical of the Forest Red-tailed Black Cockatoo.</p> <p>There is 5.76 ha of potential foraging habitat within the survey area consisting of <i>Eucalyptus marginata</i> (jarrah), <i>Corymbia calophylla</i> (marri), <i>Eucalyptus gomphocephala</i> (tuart), <i>Allocasuarina fraseriana</i>, <i>Banksia attenuata</i>, <i>B. grandis</i>, <i>B. menziesii</i>, <i>B. sessilis</i>, <i>Hakea prostrata</i> and planted <i>Pinus</i> sp.</p> |
| Breeding habitat | <p>No breeding events were recorded within the survey area of any species of black cockatoo during the survey.</p> <p>177 potential breeding trees with DBH <math>\geq</math> 500 mm were recorded in the survey area. Recorded trees included tuart (157), jarrah (8) and marri (12). 19 trees have suitable nest hollows (greater than 10 cm). Two tuart trees with hollows showed some signs of previous use (chew marks).</p>   |
| Roosting habitat | <p>No roosting sites were recorded as being used by black cockatoos within the survey area. The tuart/jarrah woodland within the survey area provide suitable roosting habitat.</p>   |



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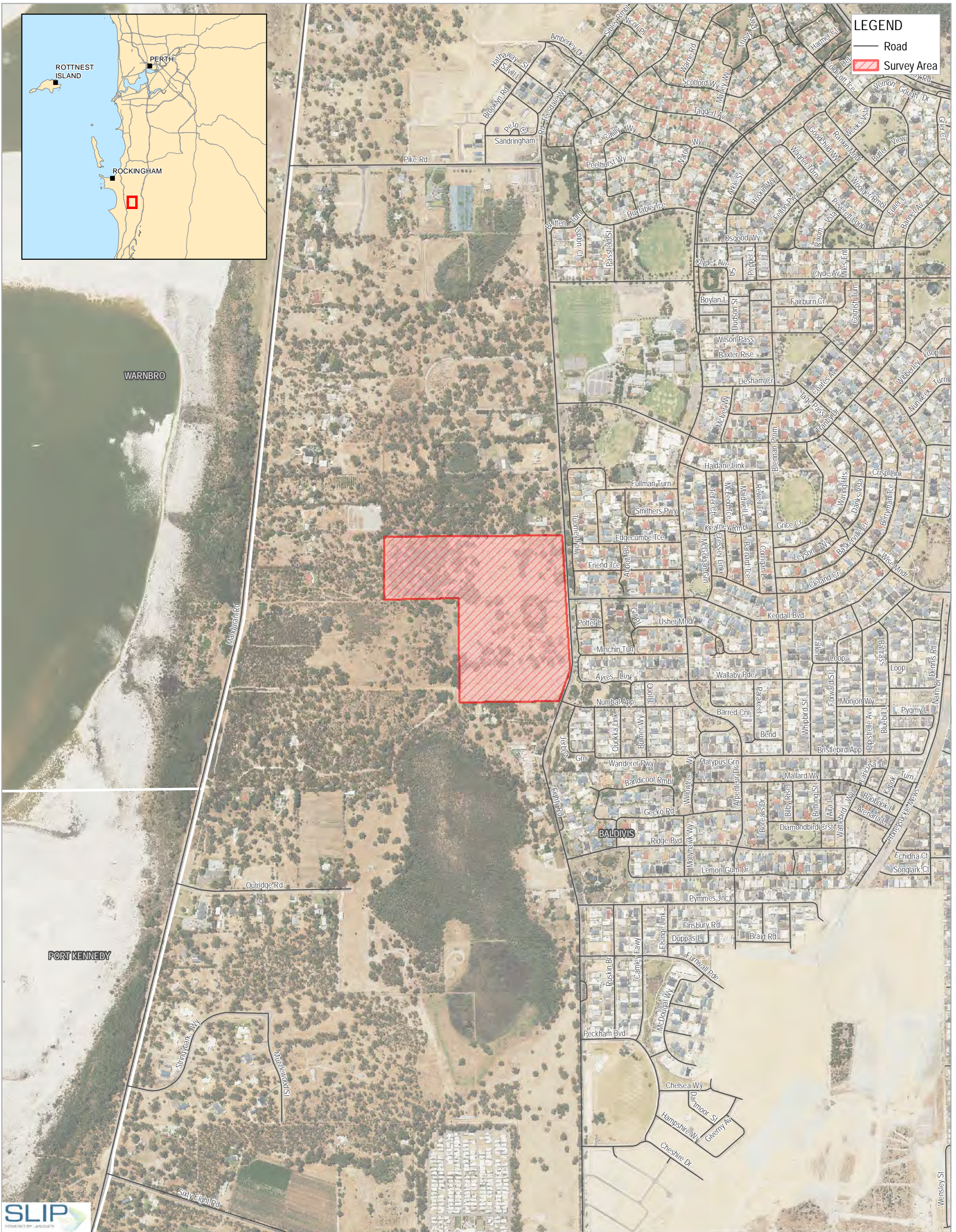
# Appendices

# Appendix A – Figures

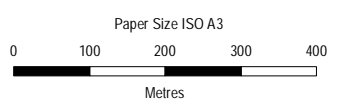
Figure 1 Project location

Figure 2 Fauna habitat types

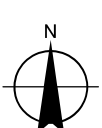
Figure 3 Black cockatoo habitat



**LEGEND**  
 — Road  
 Survey Area



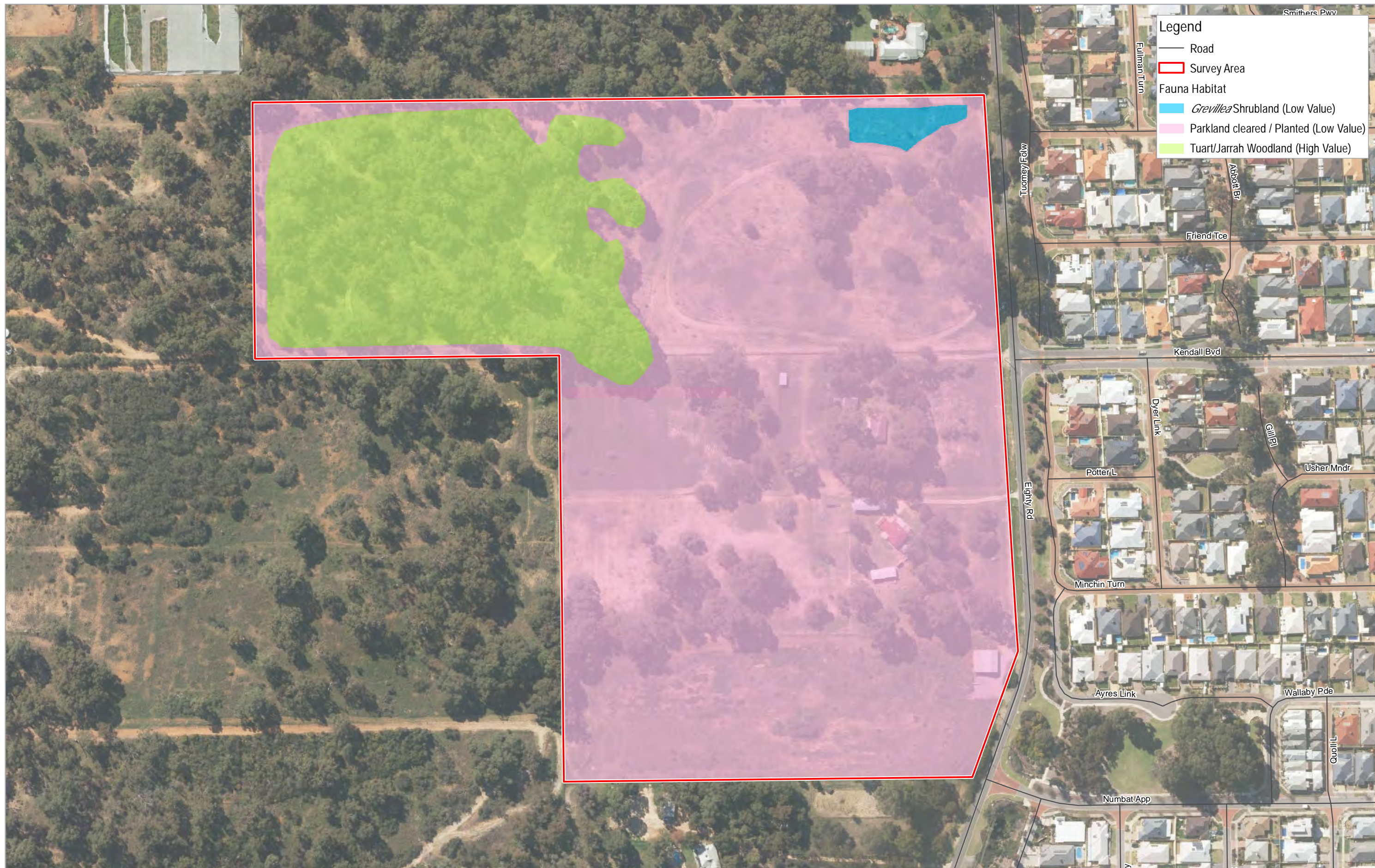
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 Grid: GDA 1994 MGA Zone 50



City of Rockingham  
 Proposed Baldvis District  
 Sporting Complex  
 Fauna Assessment  
 Site Location

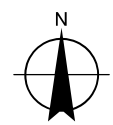
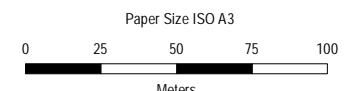
Project No. 61-36223  
 Revision No. 0  
 Date 17/11/2017

**FIGURE 1**



**Legend**

- Road
- ▭ Survey Area
- Fauna Habitat**
  - ▭ *Grevillea* Shrubland (Low Value)
  - ▭ Parkland cleared / Planted (Low Value)
  - ▭ Tuart/Jarrahd Woodland (High Value)



Map Projection: Transverse Mercator  
 Horizontal Datum: GDA 1994  
 Grid: GDA 1994 MGA Zone 50

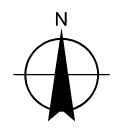
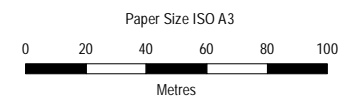
City of Rockingham  
 Proposed Baldivis District  
 Sporting Complex  
 Fauna Assessment  
**Fauna Habitat Types**

Project No. 61-36223  
 Revision No. 0  
 Date 16/11/2017



**FIGURE 2**

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 Data source: GHD; Site Boundary, Habitat Assessment - 20171116; Landgate; Imagery, Roads - 20171116. Created by: agency



City of Rockingham  
Proposed Baldvis District  
Sporting Complex  
Fauna Assessment

Project No. 61-36223  
Revision No. 0  
Date 16/11/2017

Black Cockatoo Habitat

FIGURE 3

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Data source: GHD: Survey Area, Habitat Assessment - 20171116; Landgate: Imagery, Roads - 20171116. Created by: alency

## Appendix B – Relevant legislation, conservation codes and background information



## Relevant legislation

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

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Federal Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as Matters of National Environmental Significance (MNES).

The biological aspects listed as MNES include:

- Nationally threatened flora and fauna species and ecological communities
- Migratory species

A person must not undertake an action that has, will have, or is likely to have a significant impact (direct or indirect) on MNES, without approval from the Federal Minister for the Environment.

The EPBC Act is administered by the Department of the Environment and Energy (DoEE).

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

The *Environmental Protection Act 1986* (EP Act) is the primary legislative Act dealing with the protection of the environment in Western Australia. The Act allows the Environmental Protection Authority (EPA), to prevent, control and abate pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with the foregoing. Part IV of the EP Act is administered by the EPA and makes provisions for the EPA to undertake environmental impact assessment of significant proposals, strategic proposals and land use planning schemes.

The Department of Water and Environment Regulation (DoWER) is responsible for administering the clearing provisions of the EP Act (Part V). Clearing of native vegetation in Western Australia requires a permit from the DoWER, unless exemptions apply. Applications for clearing permits are assessed by the Department and decisions are made to grant or refuse the application in accordance with the Act. When making a decision the assessment considers clearing against the ten clearing principles as specified in Schedule 5 of the EP Act:

- a) Native vegetation should not be cleared if it comprises a high level of biodiversity.
- b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significance habitat for fauna indigenous to Western Australia.
- c) Native vegetation should not be cleared if it includes, or is necessary, for the continued existence of rare flora.
- d) Native vegetation should not be cleared if it comprises the whole or part of native vegetation in an area that has been extensively cleared.
- e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.
- f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.
- g) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.
- h) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

- i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.
- j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.

Exemptions for clearing include clearing that is a requirement of a written law or authorised under certain statutory processes (listed in Schedule 6 of the EP Act) and exemptions for prescribed low impact day-to-day activities (prescribed in the Environmental Protection (Clearing of Native Vegetation) Regulations 2004); these exemptions do not apply in environmentally sensitive areas (ESAs).

### **State Biodiversity and Conservation Act 2016**

The Biodiversity Conservation Bill 2015 was introduced to State Parliament in November 2015, and passed in September 2016. The Bill became the *Biodiversity Conservation Act 2016* (BC Act) upon receiving Assent on 21 September 2016. The BC Act will eventually fully replace both the *Wildlife Conservation Act 1950* (WC Act) and the *Sandalwood Act 1929* (Sandalwood Act).

Several parts of the BC Act were proclaimed by the State Governor in the Government Gazette and came into effect on 3 December 2016. However, provisions that replace those existing under the WC Act and Sandalwood Act (including threatened species listings and controls over the taking and keeping of native species) and their associated Regulations cannot be brought into effect until the necessary Biodiversity Conservation Regulations have been made. It is hoped the new Regulations will be completed and ready to commence by late 2017.

### **State Wildlife Conservation Act 1950**

The WC Act provides for the conservation and protection of wildlife. It is administered by the Department of Biodiversity, Conservation and Attractions (DBCA) and applies to both flora and fauna. Any person wanting to capture, collect, disturb or study fauna requires a permit to do so. A permit is required under the WC Act if removal of threatened species is required.

### **State Biosecurity and Agriculture Management Act 2007**

The *Biosecurity and Agriculture Management Act 2007* (BAM Act) and associated regulations are administered by the Department of Primary Industries and Regional Development (DPIRD) and replace the repealed *Agriculture and Related Resources Protection Act 1976*. The main purposes of the BAM Act and its regulations are to:

- Prevent new animal and plant pests (vermin and weeds) and diseases from entering WA
- Manage the impact and spread of those pests already present in the state
- Safely manage the use of agricultural and veterinary chemicals
- Increased control over the sale of agricultural products that contain violative chemical residues

The Western Australian Organism List (WAOL) provides the status of organisms which have been categorised under the BAM Act. A Declared Pest is a prohibited organism or an organism for which a declaration under Section 22(2) of the Act is in force. Declared Pests may be assigned a control category including: C1 (exclusion), C2 (eradication) and C3 (management). The category may apply to the whole of the State, LGAs, districts, individual properties or even paddocks, and all landholders are obliged to comply with the specific category of control. Categories of control are defined below.

## DPIRD Categories for Declared Pests under the BAM Act

| Control class code | Description   |
|--------------------|---|
| C1 (Exclusion)     | Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.  |
| C2 (Eradication)   | Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.  |
| C3 (Management)    | Pests will be assigned to this category if they are established in Western Australia 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. |

## Conservation codes

Species of significant flora, fauna and communities are protected under both Federal and State Acts. The Federal EPBC Act provides a legal framework to protect and manage nationally important flora and communities. The State WC Act is the primary wildlife conservation legislation in Western Australia. Information on the conservation codes is summarised in the following sections.

### Ecological communities

#### Conservation significant communities

Ecological communities are defined as naturally occurring biological assemblages that occur in a particular type of habitat (English and Blyth 1997). Federally listed Threatened Ecological Communities (TECs) are protected under the EPBC Act. The DBCA also maintains a list of TECs for Western Australia; some of which are also protected under the EPBC Act. TECs are ecological communities that have been assessed and assigned to one of four categories related to the status of the threat to the community, i.e. Presumed Totally Destroyed, Critically Endangered, Endangered and Vulnerable.

Possible TECs that do not meet survey criteria are added to the DBCA Priority Ecological Community (PEC) List under Priorities 1, 2 and 3. These are ecological communities that are adequately known; are rare but not threatened, or meet criteria for Near Threatened. PECs 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. PECs are not listed under any formal Federal or State legislation, however, may be listed as TECs under the EPBC Act.

#### Conservation codes and definitions for TECs listed under the EPBC Act or endorsed by the WA Minister for the Environment

| Categories   | Definition  |
|--|---|
| <b>Federal Government Conservation Categories (EPBC Act)</b> |   |
| Critically Endangered (CR)                                   | An ecological community if, at that time, is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000)   |
| Endangered (EN)  | An ecological community if, at that time:<br>A) is not critically endangered; and<br>B) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000)                                    |
| Vulnerable (VU)  | An ecological community if, at that time:<br>A) is not critically endangered or endangered; and<br>B) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000)                    |
| <b>Western Australia Conservation Categories</b>             |   |
| Presumed Totally Destroyed (PD)                              | An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future. |

| Categories                 | Definition   |
|----------------------------|--|
| Critically Endangered (CR) | An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.               |
| Endangered (EN)            | An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.   |
| Vulnerable (VU)            | An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range. |

## Flora and fauna

### Conservation significant flora and fauna

Species of significant flora are protected under both Federal and State legislation. Any activities that are deemed to have a significant impact on species that are recognised by the EPBC Act, and/or the WC Act can warrant referral to the DoEE and/or the EPA.

The Federal conservation level of flora and fauna species and their significance status is assessed under the EPBC Act. The significance levels for fauna used in the EPBC Act are those recommended by the International Union for Conservation of Nature (IUCN).

The EPBC Act also protects land and migratory species that are listed under International Agreements. The list of migratory species established under section 209 of the EPBC Act comprises:

- Migratory species which are native to Australia and are included in the appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals Appendices I and II)
- Migratory species included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China–Australia Migratory Bird Agreement (CAMBA)
- Native, migratory species identified in a list established under, or an instrument made under, an international agreement approved by the Minister, such as the republic of Korea–Australia Migratory Bird Agreement (ROKAMBA)

The State conservation level of Threatened flora and fauna has been published as Specially Protected under the WC Act, and listed under Schedules 1 to 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2015 for Threatened Fauna and under Schedules 1 to 4 of the Wildlife Conservation (Rare Flora) Notice 2015 for Threatened (Declared Rare) Flora. The schedules align with the categories of the EPBC Act Threatened Fauna and Threatened Flora Lists. Threatened species are those are species which have been adequately searched for and are deemed to be, in the wild, either rare, under identifiable threat of extinction, or otherwise in need of special protection, and have been gazetted as such.

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are

ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

For the purposes of this assessment, all species listed under the EPBC Act, WC Act and DBCA Priority species are considered conservation significant.

### Conservation categories and definitions for EPBC Act listed flora and fauna species

| Conservation category  | Definition  |
|------------------------|---|
| Extinct                | There is no reasonable doubt that the last member of the species has died.  |
| Extinct in the Wild    | A) A species known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or<br>B) A species that 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.  |
| Critically Endangered  | A species facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000).   |
| Endangered             | A) A species not critically endangered; and<br>B) A species facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.   |
| Vulnerable             | A) A species not critically endangered or endangered; and<br>B) A species facing a high risk of extinction in the wild in the medium-term, as determined in accordance with the prescribed criteria.  |
| Conservation Dependent | A) The species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or<br>B) The following subparagraphs are satisfied:<br>(i) the species is a species of fish;<br>(ii) the species is the focus of a plan of management that Section 180 provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised;<br>(iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory;<br>(iv) cessation of the plan of management would adversely affect the conservation status of the species. |

### Conservation codes and descriptions for WC Act listed flora and fauna species

| Conservation category  | Schedule and definition  |
|------------------------|--|
| Threatened species (T) | Published as Specially Protected under the WC Act, and listed under Schedules 1 to 4 of the Wildlife Conservation (Specially |

| Conservation category          | Schedule and definition  |
|--------------------------------|--|
|                                | Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.<br><b>Threatened fauna</b> is that subset of 'Specially Protected Fauna' declared to be 'likely to become extinct' pursuant to section 14(4) of the WC Act.<br><b>Threatened flora</b> is flora that has been declared to be 'likely to become extinct or is rare, or otherwise in need of special protection', pursuant to section 23F(2) of the WC Act. |
| Critically Endangered (CR)     | Schedule 1: Threatened species considered to be facing an extremely high risk of extinction in the wild.   |
| Endangered (EN)                | Schedule 2: Threatened species considered to be facing a very high risk of extinction in the wild.   |
| Vulnerable (VU)                | Schedule 3: Threatened species considered to be facing a high risk of extinction in the wild.  |
| Presumed Extinct (EX)          | Schedule 4: Species which have been adequately searched for and there is no reasonable doubt that the last individual has died.  |
| International Agreement (IA)   | Schedule 5: Migratory birds protected under an international agreement   |
| Conservation Dependent (CD)    | Schedule 6: Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.   |
| Other Specially Protected (OS) | Schedule 7: Fauna otherwise in need of special protection to ensure their conservation.  |

### Conservation codes for DBCA listed Priority flora and fauna

| Priority category | Definition   |
|-------------------|--|
| Priority 1        | Poorly-known taxa<br>Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey. |
| Priority 2        | Poorly-known taxa<br>Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.   |
| Priority 3        | Poorly-known taxa  |

| Priority category | Definition   |
|-------------------|--|
|                   | Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.  |
| Priority 4        | <p>Rare, Near Threatened and other taxa in need of monitoring</p> <p>A. Rare: Taxa 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 taxa are usually represented on conservation lands.</p> <p>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.</p> <p>C. Taxa that have been removed from the list of threatened taxa during the past five years for reasons other than taxonomy.</p> |

### Other significant fauna

Fauna species may be significant for a range of reasons other than those protected by international agreement or treaty, Specially Protected or Priority Fauna. Significant fauna may include short-range endemic species, species that have declining populations or declining distributions, species at the extremes of their range, or isolated outlying populations, or species which may be undescribed (EPA 2010).



# Appendix C – Desktop searches

EPBC Act PMST Report (5 km buffer)

Naturemap Fauna Report (5 km buffer)



# 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: 30/08/17 16:40:39

## [Summary](#)

## [Details](#)

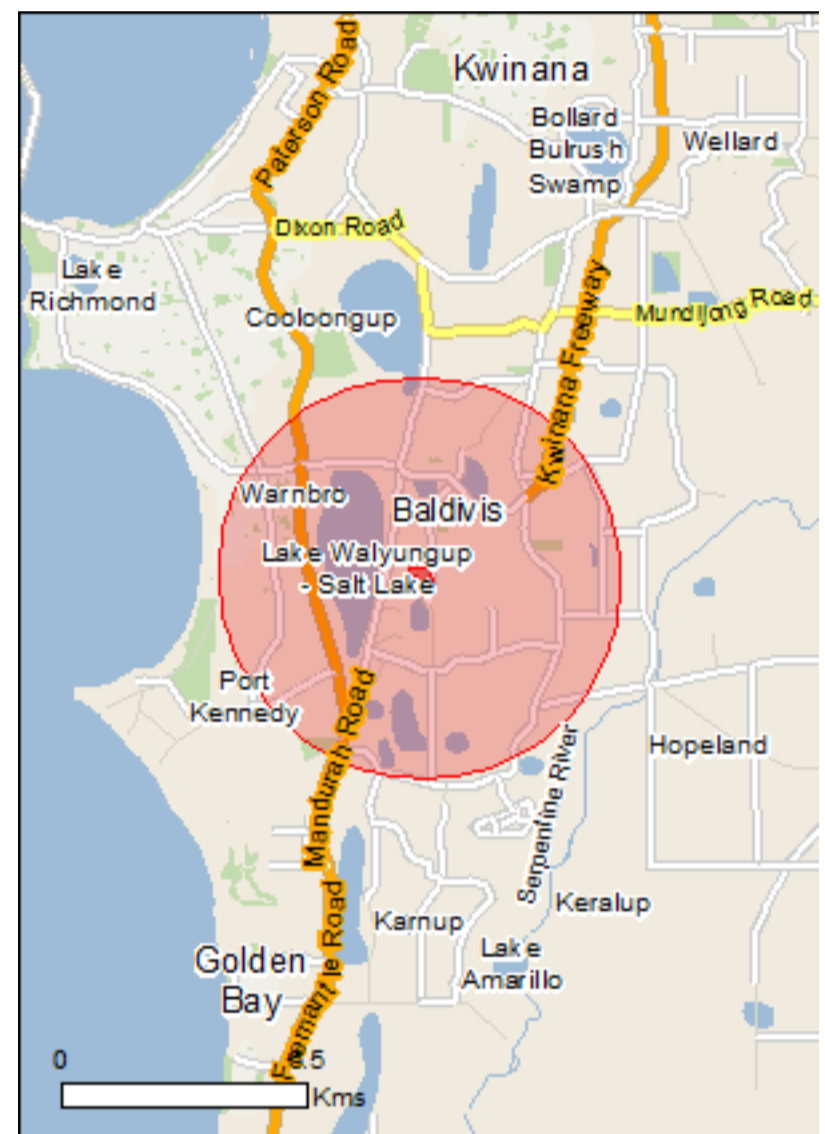
[Matters of NES](#)

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

[Extra Information](#)

## [Caveat](#)

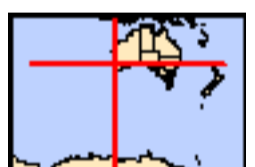
## [Acknowledgements](#)



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

[Coordinates](#)

Buffer: 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>     | 2    |
| <a href="#">Great Barrier Reef Marine Park:</a>           | None |
| <a href="#">Commonwealth Marine Area:</a>                 | None |
| <a href="#">Listed Threatened Ecological Communities:</a> | 2    |
| <a href="#">Listed Threatened Species:</a>                | 26   |
| <a href="#">Listed Migratory Species:</a>                 | 20   |

## 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>                 | 1    |
| <a href="#">Commonwealth Heritage Places:</a>      | None |
| <a href="#">Listed Marine Species:</a>             | 30   |
| <a href="#">Whales and Other Cetaceans:</a>        | None |
| <a href="#">Critical Habitats:</a>                 | None |
| <a href="#">Commonwealth Reserves Terrestrial:</a> | None |
| <a href="#">Commonwealth Reserves Marine:</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>    | None |
| <a href="#">Regional Forest Agreements:</a>      | None |
| <a href="#">Invasive Species:</a>                | 36   |
| <a href="#">Nationally Important Wetlands:</a>   | None |
| <a href="#">Key Ecological Features (Marine)</a> | None |

# Details

## Matters of National Environmental Significance

### Wetlands of International Importance (Ramsar)

[\[ Resource Information \]](#)

| Name                                  | Proximity             |
|---------------------------------------|-----------------------|
| <a href="#">Becher point wetlands</a> | Within 10km of Ramsar |
| <a href="#">Peel-yalgorup system</a>  | 10 - 20km upstream    |

### 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="#">Banksia Woodlands of the Swan Coastal Plain ecological community</a>     | Endangered | Community likely to occur within area |
| <a href="#">Sedgeland in Holocene dune swales of the southern Swan Coastal Plain</a> | Endangered | Community known to occur within area  |

### Listed Threatened Species

[\[ Resource Information \]](#)

| Name   | Status                | Type of Presence                                       |
|--|-----------------------|--|
| <b>Birds</b>   |                       |  |
| <a href="#">Botaurus poiciloptilus</a><br>Australasian Bittern [1001]  | Endangered            | Species or species habitat may occur within area       |
| <a href="#">Calidris canutus</a><br>Red Knot, Knot [855]   | Endangered            | Species or species habitat known to occur within area  |
| <a href="#">Calidris ferruginea</a><br>Curlew Sandpiper [856]  | Critically Endangered | Species or species habitat known to occur within area  |
| <a href="#">Calyptorhynchus banksii naso</a><br>Forest Red-tailed Black-Cockatoo, Karrak [67034]                         | Vulnerable            | Species or species habitat known to occur within area  |
| <a href="#">Calyptorhynchus baudinii</a><br>Baudin's Cockatoo, Long-billed Black-Cockatoo [769]                          | Vulnerable            | Species or species habitat likely to occur within area |
| <a href="#">Calyptorhynchus latirostris</a><br>Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]                   | Endangered            | Species or species habitat known to occur within area  |
| <a href="#">Leipoa ocellata</a><br>Malleefowl [934]  | Vulnerable            | Species or species habitat likely to occur within area |
| <a href="#">Limosa lapponica baueri</a><br>Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]         | Vulnerable            | Species or species habitat known to occur within area  |
| <a href="#">Limosa lapponica menzbieri</a><br>Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432] | Critically Endangered | Species or species habitat may occur within area       |

| Name  | Status                | Type of Presence                                       |
|---|-----------------------|--|
| <a href="#">Numenius madagascariensis</a><br>Eastern Curlew, Far Eastern Curlew [847]                                     | Critically Endangered | Species or species habitat likely to occur within area |
| <a href="#">Pachyptila turtur subantarctica</a><br>Fairy Prion (southern) [64445]   | Vulnerable            | Species or species habitat likely to occur within area |
| <a href="#">Rostratula australis</a><br>Australian Painted Snipe [77037]  | Endangered            | Species or species habitat likely to occur within area |
| <a href="#">Sternula nereis nereis</a><br>Australian Fairy Tern [82950]   | Vulnerable            | Breeding likely to occur within area                   |
| <b>Mammals</b>  |                       |  |
| <a href="#">Bettongia penicillata</a><br>Brush-tailed Bettong, Woylie [213]   | Endangered            | Species or species habitat likely to occur within area |
| <a href="#">Dasyurus geoffroi</a><br>Chuditch, Western Quoll [330]  | Vulnerable            | Species or species habitat likely to occur within area |
| <a href="#">Pseudocheirus occidentalis</a><br>Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]    | Vulnerable            | Species or species habitat likely to occur within area |
| <b>Plants</b>   |                       |  |
| <a href="#">Andersonia gracilis</a><br>Slender Andersonia [14470]   | Endangered            | Species or species habitat may occur within area       |
| <a href="#">Caladenia huegelii</a><br>King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]                 | Endangered            | Species or species habitat likely to occur within area |
| <a href="#">Diuris micrantha</a><br>Dwarf Bee-orchid [55082]  | Vulnerable            | Species or species habitat likely to occur within area |
| <a href="#">Diuris purdiei</a><br>Purdie's Donkey-orchid [12950]  | Endangered            | Species or species habitat may occur within area       |
| <a href="#">Drakaea elastica</a><br>Glossy-leaved Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753] | Endangered            | Species or species habitat likely to occur within area |
| <a href="#">Drakaea micrantha</a><br>Dwarf Hammer-orchid [56755]  | Vulnerable            | Species or species habitat likely to occur within area |
| <a href="#">Eucalyptus x balanites</a><br>Cadda Road Mallee, Cadda Mallee [87816]   | Endangered            | Species or species habitat likely to occur within area |
| <a href="#">Lepidosperma rostratum</a><br>Beaked Lepidosperma [14152]   | Endangered            | Species or species habitat likely to occur within area |
| <a href="#">Synaphea sp. Fairbridge Farm (D. Papenfus 696)</a><br>Selena's Synaphea [82881]                               | Critically Endangered | Species or species habitat likely to occur within area |
| <a href="#">Synaphea stenoloba</a><br>Dwellingup Synaphea [66311]   | 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 |
|------|------------|------------------|
|------|------------|------------------|

| Name   | Threatened            | Type of Presence   |
|--|-----------------------|--|
| <b>Migratory Marine Birds</b>  |                       |  |
| <a href="#">Apus pacificus</a><br>Fork-tailed Swift [678]                                      |                       | Species or species habitat likely to occur within area             |
| <a href="#">Ardenna carneipes</a><br>Flesh-footed Shearwater, Fleshy-footed Shearwater [82404] |                       | Species or species habitat likely to occur within area             |
| <a href="#">Sterna dougallii</a><br>Roseate Tern [817]   |                       | Foraging, feeding or related behaviour likely to occur within area |
| <b>Migratory Terrestrial Species</b>   |                       |  |
| <a href="#">Motacilla cinerea</a><br>Grey Wagtail [642]  |                       | Species or species habitat may occur within area                   |
| <b>Migratory Wetlands Species</b>  |                       |  |
| <a href="#">Actitis hypoleucos</a><br>Common Sandpiper [59309]                                 |                       | Species or species habitat known to occur within area              |
| <a href="#">Calidris acuminata</a><br>Sharp-tailed Sandpiper [874]                             |                       | Species or species habitat known to occur within area              |
| <a href="#">Calidris canutus</a><br>Red Knot, Knot [855]                                       | Endangered            | Species or species habitat known to occur within area              |
| <a href="#">Calidris ferruginea</a><br>Curlew Sandpiper [856]                                  | Critically Endangered | Species or species habitat known to occur within area              |
| <a href="#">Calidris melanotos</a><br>Pectoral Sandpiper [858]                                 |                       | Species or species habitat known to occur within area              |
| <a href="#">Calidris ruficollis</a><br>Red-necked Stint [860]                                  |                       | Species or species habitat known to occur within area              |
| <a href="#">Calidris subminuta</a><br>Long-toed Stint [861]                                    |                       | Species or species habitat known to occur within area              |
| <a href="#">Charadrius dubius</a><br>Little Ringed Plover [896]                                |                       | Species or species habitat known to occur within area              |
| <a href="#">Limosa lapponica</a><br>Bar-tailed Godwit [844]                                    |                       | Species or species habitat known to occur within area              |
| <a href="#">Limosa limosa</a><br>Black-tailed Godwit [845]                                     |                       | Species or species habitat known to occur within area              |
| <a href="#">Numenius madagascariensis</a><br>Eastern Curlew, Far Eastern Curlew [847]          | Critically Endangered | Species or species habitat likely to occur within area             |
| <a href="#">Pandion haliaetus</a><br>Osprey [952]  |                       | Species or species habitat likely to occur within area             |
| <a href="#">Philomachus pugnax</a><br>Ruff (Reeve) [850]                                       |                       | Species or species habitat known to occur within area              |
| <a href="#">Tringa glareola</a><br>Wood Sandpiper [829]  |                       | Species or species   |

| Name   | Threatened | Type of Presence  |
|--|------------|---|
| <a href="#">Tringa nebularia</a><br>Common Greenshank, Greenshank [832]        |            | habitat known to occur within area<br><br>Species or species habitat known to occur within area |
| <a href="#">Tringa stagnatilis</a><br>Marsh Sandpiper, Little Greenshank [833] |            | Species or species habitat known to occur within area   |

## Other Matters Protected by the EPBC Act

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

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

| Name                |
|---------------------|
| Commonwealth Land - |

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

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

| Name   | Threatened            | Type of Presence                                       |
|--|-----------------------|--|
| <b>Birds</b>   |                       |  |
| <a href="#">Actitis hypoleucos</a><br>Common Sandpiper [59309]     |                       | Species or species habitat known to occur within area  |
| <a href="#">Apus pacificus</a><br>Fork-tailed Swift [678]          |                       | Species or species habitat likely to occur within area |
| <a href="#">Ardea alba</a><br>Great Egret, White Egret [59541]     |                       | Species or species habitat known to occur within area  |
| <a href="#">Ardea ibis</a><br>Cattle Egret [59542]                 |                       | Species or species habitat may occur within area       |
| <a href="#">Calidris acuminata</a><br>Sharp-tailed Sandpiper [874] |                       | Species or species habitat known to occur within area  |
| <a href="#">Calidris canutus</a><br>Red Knot, Knot [855]           | Endangered            | Species or species habitat known to occur within area  |
| <a href="#">Calidris ferruginea</a><br>Curlew Sandpiper [856]      | Critically Endangered | Species or species habitat known to occur within area  |
| <a href="#">Calidris melanotos</a><br>Pectoral Sandpiper [858]     |                       | Species or species habitat known to occur within area  |
| <a href="#">Calidris ruficollis</a><br>Red-necked Stint [860]      |                       | Species or species habitat known to occur              |

| Name   | Threatened            | Type of Presence within area                                       |
|--|-----------------------|--|
| <a href="#">Calidris subminuta</a><br>Long-toed Stint [861]                                    |                       | Species or species habitat known to occur within area              |
| <a href="#">Charadrius dubius</a><br>Little Ringed Plover [896]                                |                       | Species or species habitat known to occur within area              |
| <a href="#">Charadrius ruficapillus</a><br>Red-capped Plover [881]                             |                       | Species or species habitat known to occur within area              |
| <a href="#">Haliaeetus leucogaster</a><br>White-bellied Sea-Eagle [943]                        |                       | Species or species habitat known to occur within area              |
| <a href="#">Himantopus himantopus</a><br>Black-winged Stilt [870]                              |                       | Species or species habitat known to occur within area              |
| <a href="#">Limosa lapponica</a><br>Bar-tailed Godwit [844]                                    |                       | Species or species habitat known to occur within area              |
| <a href="#">Limosa limosa</a><br>Black-tailed Godwit [845]                                     |                       | Species or species habitat known to occur within area              |
| <a href="#">Merops ornatus</a><br>Rainbow Bee-eater [670]                                      |                       | Species or species habitat may occur within area                   |
| <a href="#">Motacilla cinerea</a><br>Grey Wagtail [642]  |                       | Species or species habitat may occur within area                   |
| <a href="#">Numenius madagascariensis</a><br>Eastern Curlew, Far Eastern Curlew [847]          | Critically Endangered | Species or species habitat likely to occur within area             |
| <a href="#">Pachyptila turtur</a><br>Fairy Prion [1066]  |                       | Species or species habitat likely to occur within area             |
| <a href="#">Pandion haliaetus</a><br>Osprey [952]  |                       | Species or species habitat likely to occur within area             |
| <a href="#">Philomachus pugnax</a><br>Ruff (Reeve) [850]                                       |                       | Species or species habitat known to occur within area              |
| <a href="#">Puffinus carneipes</a><br>Flesh-footed Shearwater, Fleshy-footed Shearwater [1043] |                       | Species or species habitat likely to occur within area             |
| <a href="#">Recurvirostra novaehollandiae</a><br>Red-necked Avocet [871]                       |                       | Species or species habitat known to occur within area              |
| <a href="#">Rostratula benghalensis (sensu lato)</a><br>Painted Snipe [889]                    | Endangered*           | Species or species habitat likely to occur within area             |
| <a href="#">Sterna dougallii</a><br>Roseate Tern [817]   |                       | Foraging, feeding or related behaviour likely to occur within area |
| <a href="#">Thinornis rubricollis</a><br>Hooded Plover [59510]                                 |                       | Species or species habitat likely to occur within area             |



| Name   | Threatened | Type of Presence                                      |
|--|------------|---|
| <a href="#">Tringa glareola</a><br>Wood Sandpiper [829]                        |            | Species or species habitat known to occur within area |
| <a href="#">Tringa nebularia</a><br>Common Greenshank, Greenshank [832]        |            | Species or species habitat known to occur within area |
| <a href="#">Tringa stagnatilis</a><br>Marsh Sandpiper, Little Greenshank [833] |            | Species or species habitat known to occur within area |

## Extra Information

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

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

| Name   | Status | Type of Presence                                       |
|--|--------|--|
| <b>Birds</b>   |        |  |
| Acridotheres tristis<br>Common Myna, Indian Myna [387]                 |        | Species or species habitat likely to occur within area |
| Anas platyrhynchos<br>Mallard [974]                                    |        | Species or species habitat likely to occur within area |
| Carduelis carduelis<br>European Goldfinch [403]                        |        | Species or species habitat likely to occur within area |
| Columba livia<br>Rock Pigeon, Rock Dove, Domestic Pigeon [803]         |        | Species or species habitat likely to occur within area |
| Passer domesticus<br>House Sparrow [405]                               |        | Species or species habitat likely to occur within area |
| Passer montanus<br>Eurasian Tree Sparrow [406]                         |        | Species or species habitat likely to occur within area |
| Streptopelia chinensis<br>Spotted Turtle-Dove [780]                    |        | Species or species habitat likely to occur within area |
| Streptopelia senegalensis<br>Laughing Turtle-dove, Laughing Dove [781] |        | Species or species habitat likely to occur within area |
| Sturnus vulgaris<br>Common Starling [389]                              |        | Species or species habitat likely to occur within area |

| Name  | Status | Type of Presence                                       |
|---|--------|--|
| Turdus merula<br>Common Blackbird, Eurasian Blackbird [596]   |        | Species or species habitat likely to occur within area |
| <b>Mammals</b>  |        |  |
| Bos taurus<br>Domestic Cattle [16]  |        | Species or species habitat likely to occur within area |
| Canis lupus familiaris<br>Domestic Dog [82654]  |        | Species or species habitat likely to occur within area |
| Felis catus<br>Cat, House Cat, Domestic Cat [19]  |        | Species or species habitat likely to occur within area |
| Funambulus pennantii<br>Northern Palm Squirrel, Five-striped Palm Squirrel [129]                                  |        | Species or species habitat likely to occur within area |
| Mus musculus<br>House Mouse [120]   |        | Species or species habitat likely to occur within area |
| Oryctolagus cuniculus<br>Rabbit, European Rabbit [128]  |        | Species or species habitat likely to occur within area |
| Rattus norvegicus<br>Brown Rat, Norway Rat [83]   |        | Species or species habitat likely to occur within area |
| Rattus rattus<br>Black Rat, Ship Rat [84]   |        | Species or species habitat likely to occur within area |
| Vulpes vulpes<br>Red Fox, Fox [18]  |        | Species or species habitat likely to occur within area |
| <b>Plants</b>   |        |  |
| Asparagus asparagoides<br>Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473] |        | Species or species habitat likely to occur within area |
| Brachiaria mutica<br>Para Grass [5879]  |        | Species or species habitat may occur within area       |
| Cenchrus ciliaris<br>Buffel-grass, Black Buffel-grass [20213]   |        | Species or species habitat may occur within area       |
| Chrysanthemoides monilifera<br>Bitou Bush, Boneseed [18983]   |        | Species or species habitat may occur within area       |
| Chrysanthemoides monilifera subsp. monilifera<br>Boneseed [16905]   |        | Species or species habitat likely to occur within area |
| Genista linifolia<br>Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]                                    |        | Species or species habitat likely to occur within area |
| Genista sp. X Genista monspessulana<br>Broom [67538]  |        | Species or species habitat may occur within area       |
| Lantana camara<br>Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red         |        | Species or species habitat likely to occur             |

| Name   | Status | Type of Presence  |
|--|--------|---|
| Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]<br><i>Lycium ferocissimum</i><br>African Boxthorn, Boxthorn [19235]   |        | within area<br><br>Species or species habitat likely to occur within area |
| <i>Olea europaea</i><br>Olive, Common Olive [9160]   |        | Species or species habitat may occur within area                          |
| <i>Opuntia</i> spp.<br>Prickly Pears [82753]   |        | Species or species habitat likely to occur within area                    |
| <i>Pinus radiata</i><br>Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]  |        | Species or species habitat may occur within area                          |
| <i>Rubus fruticosus</i> aggregate<br>Blackberry, European Blackberry [68406]   |        | Species or species habitat likely to occur within area                    |
| <i>Salix</i> spp. except <i>S.babylonica</i> , <i>S.x calodendron</i> & <i>S.x reichardtii</i><br>Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497] |        | Species or species habitat likely to occur within area                    |
| <i>Salvinia molesta</i><br>Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]   |        | Species or species habitat likely to occur within area                    |
| <i>Tamarix aphylla</i><br>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                    |
| <b>Reptiles</b>  |        |   |
| <i>Hemidactylus frenatus</i><br>Asian House Gecko [1708]   |        | 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

-32.345491 115.792512,-32.345518 115.792501,-32.345545 115.798059,-32.34908 115.798273,-32.349932 115.797898,-32.349941 115.794797,-32.347186 115.794787,-32.347186 115.79248,-32.3455 115.792491,-32.3455 115.792491,-32.345491 115.792512

# 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 - Fauna

Created By Guest user on 30/08/2017

**Kingdom** Animalia  
**Current Names Only** Yes  
**Core Datasets Only** Yes  
**Method** 'By Circle'  
**Centre** 115° 47' 50" E, 32° 20' 50" S  
**Buffer** 5km  
**Group By** Species Group

| Species Group | Species    | Records     |
|---------------|------------|-------------|
| Amphibian     | 2          | 11          |
| Bird          | 133        | 1757        |
| Fish          | 4          | 4           |
| Invertebrate  | 5          | 26          |
| Mammal        | 13         | 388         |
| Reptile       | 24         | 188         |
| <b>TOTAL</b>  | <b>181</b> | <b>2374</b> |

| Name ID          | Species Name   | Naturalised | Conservation Code | Endemic To Query Area |
|------------------|--|-------------|-------------------|-----------------------|
| <b>Amphibian</b> |  |             |                   |                       |
| 1.               | 25400 <i>Crinia insignifera</i> (Squelching Froglet)                             |             |                   |                       |
| 2.               | 25410 <i>Heleioporus eyrei</i> (Moaning Frog)                                    |             |                   |                       |
| <b>Bird</b>      |  |             |                   |                       |
| 3.               | 24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)       |             |                   |                       |
| 4.               | 24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)                     |             |                   |                       |
| 5.               | 24262 <i>Acanthiza inornata</i> (Western Thornbill)                              |             |                   |                       |
| 6.               | 24560 <i>Acanthorhynchus superciliosus</i> (Western Spinebill)                   |             |                   |                       |
| 7.               | 25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)                      |             |                   |                       |
| 8.               | 25536 <i>Accipiter fasciatus</i> (Brown Goshawk)                                 |             |                   |                       |
| 9.               | 25755 <i>Acrocephalus australis</i> (Australian Reed Warbler)                    |             |                   |                       |
| 10.              | 41323 <i>Actitis hypoleucos</i> (Common Sandpiper)                               |             | IA                |                       |
| 11.              | 24310 <i>Anas castanea</i> (Chestnut Teal)                                       |             |                   |                       |
| 12.              | 24312 <i>Anas gracilis</i> (Grey Teal)   |             |                   |                       |
| 13.              | 24313 <i>Anas platyrhynchos</i> (Mallard)  |             |                   |                       |
| 14.              | 24315 <i>Anas rhynchotis</i> (Australasian Shoveler)                             |             |                   |                       |
| 15.              | 24316 <i>Anas superciliosa</i> (Pacific Black Duck)                              |             |                   |                       |
| 16.              | 47414 <i>Anhinga novaehollandiae</i> (Australasian Darter)                       |             |                   |                       |
| 17.              | 24506 <i>Anous tenuirostris</i> subsp. <i>melanops</i> (Australian Lesser Noddy) |             | T                 |                       |
| 18.              | 24561 <i>Anthochaera carunculata</i> (Red Wattlebird)                            |             |                   |                       |
| 19.              | 24562 <i>Anthochaera lunulata</i> (Western Little Wattlebird)                    |             |                   |                       |
| 20.              | 24285 <i>Aquila audax</i> (Wedge-tailed Eagle)                                   |             |                   |                       |
| 21.              | 24337 <i>Ardea garzetta</i> subsp. <i>nigripes</i> (Little Egret)                |             |                   |                       |
| 22.              | 41324 <i>Ardea modesta</i> (Eastern Great Egret)                                 |             | IA                |                       |
| 23.              | 24340 <i>Ardea novaehollandiae</i> (White-faced Heron)                           |             |                   |                       |
| 24.              | 24341 <i>Ardea pacifica</i> (White-necked Heron)                                 |             |                   |                       |
| 25.              | 25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)                          |             |                   |                       |
| 26.              | 24353 <i>Artamus cyanopterus</i> (Dusky Woodswallow)                             |             |                   |                       |
| 27.              | 24318 <i>Aythya australis</i> (Hardhead)   |             |                   |                       |
| 28.              | <i>Barnardius zonarius</i>   |             |                   |                       |
| 29.              | 24319 <i>Biziura lobata</i> (Musk Duck)  |             |                   |                       |
| 30.              | 24359 <i>Burhinus grallarius</i> (Bush Stone-curlew)                             |             |                   |                       |
| 31.              | 25715 <i>Cacatua roseicapilla</i> (Galah)  |             |                   |                       |
| 32.              | 25716 <i>Cacatua sanguinea</i> (Little Corella)                                  |             |                   |                       |
| 33.              | 24729 <i>Cacatua tenuirostris</i> (Eastern Long-billed Corella)                  | Y           |                   |                       |
| 34.              | 25598 <i>Cacomantis flabelliformis</i> (Fan-tailed Cuckoo)                       |             |                   |                       |
| 35.              | 42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)                                 |             |                   |                       |
| 36.              | 24779 <i>Calidris acuminata</i> (Sharp-tailed Sandpiper)                         |             | IA                |                       |
| 37.              | 24784 <i>Calidris ferruginea</i> (Curlew Sandpiper)                              |             | T                 |                       |
| 38.              | 24788 <i>Calidris ruficollis</i> (Red-necked Stint)                              |             | IA                |                       |
| 39.              | 24789 <i>Calidris subminuta</i> (Long-toed Stint)                                |             |                   |                       |

| Name ID | Species Name   | Naturalised | Conservation Code | <sup>1</sup> Endemic To Query Area |
|---------|--|-------------|-------------------|------------------------------------|
|         |  |             | IA                |                                    |
| 40.     | 25717 <i>Calyptrorhynchus banksii</i> (Red-tailed Black-Cockatoo)  |             |                   |                                    |
| 41.     | 24731 <i>Calyptrorhynchus banksii</i> subsp. <i>naso</i> (Forest Red-tailed Black-Cockatoo)                      |             | T                 |                                    |
| 42.     | 24734 <i>Calyptrorhynchus latirostris</i> (Carnaby's Cockatoo (short-billed black-cockatoo), Carnaby's Cockatoo) |             | T                 |                                    |
| 43.     | 24377 <i>Charadrius ruficapillus</i> (Red-capped Plover)   |             |                   |                                    |
| 44.     | 24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)   |             |                   |                                    |
| 45.     | <i>Chroicocephalus novaehollandiae</i>   |             |                   |                                    |
| 46.     | 24288 <i>Circus approximans</i> (Swamp Harrier)  |             |                   |                                    |
| 47.     | 24774 <i>Cladorhynchus leucocephalus</i> (Banded Stilt)  |             |                   |                                    |
| 48.     | 25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)  |             |                   |                                    |
| 49.     | 24399 <i>Columba livia</i> (Domestic Pigeon)   | Y           |                   |                                    |
| 50.     | 25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)  |             |                   |                                    |
| 51.     | 25592 <i>Corvus coronoides</i> (Australian Raven)  |             |                   |                                    |
| 52.     | 25595 <i>Cracticus tibicen</i> (Australian Magpie)   |             |                   |                                    |
| 53.     | 25596 <i>Cracticus torquatus</i> (Grey Butcherbird)  |             |                   |                                    |
| 54.     | 24322 <i>Cygnus atratus</i> (Black Swan)   |             |                   |                                    |
| 55.     | 30901 <i>Dacelo novaeguineae</i> (Laughing Kookaburra)   | Y           |                   |                                    |
| 56.     | 25673 <i>Daphoenositta chrysoptera</i> (Varied Sittella)   |             |                   |                                    |
| 57.     | <i>Egretta novaehollandiae</i>   |             |                   |                                    |
| 58.     | <i>Elanus axillaris</i>  |             |                   |                                    |
| 59.     | <i>Eolophus roseicapillus</i>  |             |                   |                                    |
| 60.     | 24567 <i>Epthianura albifrons</i> (White-fronted Chat)   |             |                   |                                    |
| 61.     | 24379 <i>Erythronyctes cinctus</i> (Red-kneed Dotterel)  |             |                   |                                    |
| 62.     | 25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)   |             |                   |                                    |
| 63.     | 25623 <i>Falco longipennis</i> (Australian Hobby)  |             |                   |                                    |
| 64.     | 25727 <i>Fulica atra</i> (Eurasian Coot)   |             |                   |                                    |
| 65.     | 24761 <i>Fulica atra</i> subsp. <i>australis</i> (Eurasian Coot)   |             |                   |                                    |
| 66.     | 24763 <i>Gallinula tenebrosa</i> subsp. <i>tenebrosa</i> (Dusky Moorhen)   |             |                   |                                    |
| 67.     | 25530 <i>Gerygone fusca</i> (Western Gerygone)   |             |                   |                                    |
| 68.     | 24443 <i>Grallina cyanoleuca</i> (Magpie-lark)   |             |                   |                                    |
| 69.     | 24487 <i>Haematopus longirostris</i> (Pied Oystercatcher)  |             |                   |                                    |
| 70.     | 24293 <i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)  |             |                   |                                    |
| 71.     | 24295 <i>Haliastur sphenurus</i> (Whistling Kite)  |             |                   |                                    |
| 72.     | 47965 <i>Hieraaetus morphnoides</i> (Little Eagle)   |             |                   |                                    |
| 73.     | 25734 <i>Himantopus himantopus</i> (Black-winged Stilt)  |             |                   |                                    |
| 74.     | 24491 <i>Hirundo neoxena</i> (Welcome Swallow)   |             |                   |                                    |
| 75.     | <i>Hydroprogne caspia</i>  |             |                   |                                    |
| 76.     | 24511 <i>Larus novaehollandiae</i> subsp. <i>novaehollandiae</i> (Silver Gull)                                   |             |                   |                                    |
| 77.     | 25661 <i>Lichmera indistincta</i> (Brown Honeyeater)   |             |                   |                                    |
| 78.     | 24582 <i>Lichmera indistincta</i> subsp. <i>indistincta</i> (Brown Honeyeater)                                   |             |                   |                                    |
| 79.     | 24691 <i>Macronectes halli</i> (Northern Giant Petrel)   |             | IA                |                                    |
| 80.     | 24326 <i>Malacorhynchus membranaceus</i> (Pink-eared Duck)   |             |                   |                                    |
| 81.     | 25654 <i>Malurus splendens</i> (Splendid Fairy-wren)   |             |                   |                                    |
| 82.     | 24552 <i>Malurus splendens</i> subsp. <i>splendens</i> (Splendid Fairy-wren)                                     |             |                   |                                    |
| 83.     | 25758 <i>Megalurus gramineus</i> (Little Grassbird)  |             |                   |                                    |
| 84.     | 24598 <i>Merops ornatus</i> (Rainbow Bee-eater)  |             | IA                |                                    |
| 85.     | <i>Microcarbo melanoleucos</i>   |             |                   |                                    |
| 86.     | 24738 <i>Neophema elegans</i> (Elegant Parrot)   |             |                   |                                    |
| 87.     | 24798 <i>Numenius madagascariensis</i> (Eastern Curlew)  |             | T                 |                                    |
| 88.     | 25564 <i>Nycticorax caledonicus</i> (Rufous Night Heron)   |             |                   |                                    |
| 89.     | 24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)  |             |                   |                                    |
| 90.     | 24328 <i>Oxyura australis</i> (Blue-billed Duck)   |             | P4                |                                    |
| 91.     | 25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)  |             |                   |                                    |
| 92.     | 25681 <i>Pardalotus punctatus</i> (Spotted Pardalote)  |             |                   |                                    |
| 93.     | 25682 <i>Pardalotus striatus</i> (Striated Pardalote)  |             |                   |                                    |
| 94.     | 24648 <i>Pelecanus conspicillatus</i> (Australian Pelican)   |             |                   |                                    |
| 95.     | 48061 <i>Petrochelidon nigricans</i> (Tree Martin)   |             |                   |                                    |
| 96.     | 48066 <i>Petroica boodang</i> (Scarlet Robin)  |             |                   |                                    |
| 97.     | 25697 <i>Phalacrocorax carbo</i> (Great Cormorant)   |             |                   |                                    |
| 98.     | 25698 <i>Phalacrocorax melanoleucos</i> (Little Pied Cormorant)  |             |                   |                                    |
| 99.     | 24667 <i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)   |             |                   |                                    |
| 100.    | 25699 <i>Phalacrocorax varius</i> (Pied Cormorant)   |             |                   |                                    |
| 101.    | 24409 <i>Phaps chalcoptera</i> (Common Bronzewing)   |             |                   |                                    |
| 102.    | 48071 <i>Phylidonyris niger</i> (White-cheeked Honeyeater)   |             |                   |                                    |
| 103.    | 24596 <i>Phylidonyris novaehollandiae</i> (New Holland Honeyeater)   |             |                   |                                    |
| 104.    | 24841 <i>Platalea flavipes</i> (Yellow-billed Spoonbill)   |             |                   |                                    |
| 105.    | 25720 <i>Platycercus icterotis</i> (Western Rosella)   |             |                   |                                    |
| 106.    | 25721 <i>Platycercus zonarius</i> (Australian Ringneck, Ring-necked Parrot)                                      |             |                   |                                    |
| 107.    | 24750 <i>Platycercus zonarius</i> subsp. <i>semitorquatus</i> (Twenty-eight Parrot)                              |             |                   |                                    |

| Name ID | Species Name  | Naturalised | Conservation Code | <sup>1</sup> Endemic To Query Area |
|---------|---|-------------|-------------------|------------------------------------|
| 108.    | 24843 <i>Plegadis falcinellus</i> (Glossy Ibis)   |             | IA                |                                    |
| 109.    | 25704 <i>Podiceps cristatus</i> (Great Crested Grebe)   |             |                   |                                    |
| 110.    | 24681 <i>Poliiocephalus poliocephalus</i> (Hoary-headed Grebe)  |             |                   |                                    |
| 111.    | 25722 <i>Polytelis anthopeplus</i> (Regent Parrot)  |             |                   |                                    |
| 112.    | 25731 <i>Porphyrio porphyrio</i> (Purple Swamphen)  |             |                   |                                    |
| 113.    | 24767 <i>Porphyrio porphyrio</i> subsp. <i>bellus</i> (Purple Swamphen)   |             |                   |                                    |
| 114.    | 24769 <i>Porzana fluminea</i> (Australian Spotted Crane)  |             |                   |                                    |
| 115.    | 24771 <i>Porzana tabuensis</i> (Spotless Crane)   |             |                   |                                    |
| 116.    | <i>Purpureicephalus spurius</i>   |             |                   |                                    |
| 117.    | 24776 <i>Recurvirostra novaehollandiae</i> (Red-necked Avocet)  |             |                   |                                    |
| 118.    | 48096 <i>Rhipidura albiscapa</i> (Grey Fantail)   |             |                   |                                    |
| 119.    | 25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)  |             |                   |                                    |
| 120.    | 24454 <i>Rhipidura leucophrys</i> subsp. <i>leucophrys</i> (Willie Wagtail)                                       |             |                   |                                    |
| 121.    | 25534 <i>Sericornis frontalis</i> (White-browed Scrubwren)  |             |                   |                                    |
| 122.    | 30948 <i>Smicronis brevirostris</i> (Weebill)   |             |                   |                                    |
| 123.    | 25643 <i>Sterna hybrida</i> (Whiskered Tern)  |             |                   |                                    |
| 124.    | 25590 <i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)   | Y           |                   |                                    |
| 125.    | 25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)                               |             |                   |                                    |
| 126.    | 24682 <i>Tachybaptus novaehollandiae</i> subsp. <i>novaehollandiae</i> (Australasian Grebe, Black-throated Grebe) |             |                   |                                    |
| 127.    | 24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)   |             |                   |                                    |
| 128.    | <i>Thalasseus bergii</i>  |             |                   |                                    |
| 129.    | 24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)   |             |                   |                                    |
| 130.    | 24806 <i>Tringa glareola</i> (Wood Sandpiper)   |             | IA                |                                    |
| 131.    | 24808 <i>Tringa nebularia</i> (Common Greenshank)   |             | IA                |                                    |
| 132.    | 24809 <i>Tringa stagnatilis</i> (Marsh Sandpiper)   |             | IA                |                                    |
| 133.    | 48147 <i>Turnix varius</i> (Painted Button-quail)   |             |                   |                                    |
| 134.    | 24386 <i>Vanellus tricolor</i> (Banded Lapwing)   |             |                   |                                    |
| 135.    | 25765 <i>Zosterops lateralis</i> (Grey-breasted White-eye, Silvereye)   |             |                   |                                    |

#### Fish

|      |                                |
|------|--------------------------------|
| 136. | <i>Afurcagobius suppositus</i> |
| 137. | <i>Dactylophora nigricans</i>  |
| 138. | <i>Dactylopus dactylopus</i>   |
| 139. | <i>Siphonognathus radiatus</i> |

#### Invertebrate

|      |   |    |
|------|---|----|
| 140. | <i>Aname mainae</i>   |    |
| 141. | <i>Idiommata blackwalli</i>                                   |    |
| 142. | <i>Missulena granulosa</i>                                    |    |
| 143. | 33992 <i>Synemon gratiosa</i> (Graceful Sunmoth)              | P4 |
| 144. | 34113 <i>Westralunio carteri</i> (Carter's Freshwater Mussel) | T  |

#### Mammal

|      |  |   |    |
|------|--|---|----|
| 145. | 30883 <i>Canis lupus</i> subsp. <i>familiaris</i> (Dog)                                    | Y |    |
| 146. | 24186 <i>Chalinolobus gouldii</i> (Gould's Wattled Bat)                                    |   |    |
| 147. | 24041 <i>Felis catus</i> (Cat)   | Y |    |
| 148. | 24215 <i>Hydromys chrysogaster</i> (Water-rat, Rakali)                                     |   | P4 |
| 149. | 25478 <i>Isoodon obesulus</i> (Southern Brown Bandicoot)                                   |   | P4 |
| 150. | 24153 <i>Isoodon obesulus</i> subsp. <i>fusciventer</i> (Quenda, Southern Brown Bandicoot) |   | P4 |
| 151. | 24132 <i>Macropus fuliginosus</i> (Western Grey Kangaroo)                                  |   |    |
| 152. | 24223 <i>Mus musculus</i> (House Mouse)  | Y |    |
| 153. | 24194 <i>Nyctophilus geoffroyi</i> (Lesser Long-eared Bat)                                 |   |    |
| 154. | 24085 <i>Oryctolagus cuniculus</i> (Rabbit)  | Y |    |
| 155. | 24245 <i>Rattus rattus</i> (Black Rat)   | Y |    |
| 156. | 25521 <i>Trichosurus vulpecula</i> (Common Brushtail Possum)                               |   |    |
| 157. | 24206 <i>Vespadelus regulus</i> (Southern Forest Bat)                                      |   |    |

#### Reptile

|      |  |    |
|------|--|----|
| 158. | 24991 <i>Aprasia repens</i> (Sand-plain Worm-lizard)                   |    |
| 159. | 42381 <i>Brachyurophis semifasciatus</i> (Southern Shovel-nosed Snake) |    |
| 160. | 24980 <i>Christinus marmoratus</i> (Marbled Gecko)                     |    |
| 161. | 30893 <i>Cryptoblepharus buchananii</i>                                |    |
| 162. | 25020 <i>Cryptoblepharus plagiocephalus</i>                            |    |
| 163. | 25027 <i>Ctenotus australis</i>  |    |
| 164. | 25039 <i>Ctenotus fallens</i>  |    |
| 165. | 25119 <i>Hemiergis quadrilineata</i>                                   |    |
| 166. | 25133 <i>Lerista elegans</i>   |    |
| 167. | 25147 <i>Lerista lineata</i> (Perth Slider, Lined Skink)               | P3 |
| 168. | 25005 <i>Lialis burtonis</i>   |    |
| 169. | 25184 <i>Menetia greyii</i>  |    |
| 170. | 25240 <i>Morelia spilota</i> subsp. <i>imbricata</i> (Carpet Python)   |    |



| Name ID | Species Name  | Naturalised | Conservation Code | <sup>1</sup> Endemic To Query Area |
|---------|---|-------------|-------------------|------------------------------------|
| 171.    | 25191 <i>Morethia lineocellata</i>                            |             |                   |                                    |
| 172.    | 25252 <i>Notechis scutatus</i> (Tiger Snake)                  |             |                   |                                    |
| 173.    | 25253 <i>Parasuta gouldii</i>                                 |             |                   |                                    |
| 174.    | 25510 <i>Pogona minor</i> (Dwarf Bearded Dragon)              |             |                   |                                    |
| 175.    | 24907 <i>Pogona minor subsp. minor</i> (Dwarf Bearded Dragon) |             |                   |                                    |
| 176.    | 25511 <i>Pseudonaja affinis</i> (Dugite)                      |             |                   |                                    |
| 177.    | 25259 <i>Pseudonaja affinis subsp. affinis</i> (Dugite)       |             |                   |                                    |
| 178.    | 25266 <i>Simoselaps bertholdi</i> (Jan's Banded Snake)        |             |                   |                                    |
| 179.    | 25203 <i>Tiliqua occipitalis</i> (Western Bluetongue)         |             |                   |                                    |
| 180.    | 25519 <i>Tiliqua rugosa</i>                                   |             |                   |                                    |
| 181.    | 25207 <i>Tiliqua rugosa subsp. rugosa</i>                     |             |                   |                                    |

**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 D – Fauna data

Fauna species list

Fauna likelihood of occurrence assessment guidelines

Fauna likelihood of occurrence assessment

Black cockatoo habitat assessment results

## Fauna species recorded during the survey

| Family            | Species                                    | Common Name                      | Status                           |
|-------------------|--|----------------------------------|----------------------------------|
| <b>Birds</b>      |  |                                  |                                  |
| Acanthizidae      | <i>Sericornis frontalis</i>                | White-browed Scrubwren           |                                  |
| Acanthizidae      | <i>Smicrornis brevirostris</i>             | Weebill                          |                                  |
| Alcedinidae       | <i>Dacelo novaeguineae</i>                 | Laughing Kookaburra              | Introduced                       |
| Cacatuidae        | <i>Cacatua roseicapilla</i>                | Galah                            |                                  |
| Cacatuidae        | <i>Cacatua sanguinea</i>                   | Little Corella                   |                                  |
| Cacatuidae        | <i>Calyptorhynchus banksii subsp. naso</i> | Forest Red-tailed Black Cockatoo | Vulnerable (EPBC Act and WC Act) |
| Cacatuidae        | <i>Calyptorhynchus latirostris</i>         | Carnaby's Black Cockatoo         | Endangered (EPBC Act and WC Act) |
| Cacatuidae        | <i>Platycercus spurius</i>                 | Red-capped Parrot                |                                  |
| Campephagidae     | <i>Coracina novaehollandiae</i>            | Black-faced Cuckoo-shrike        |                                  |
| Corvidae          | <i>Corvus coronoides</i>                   | Australian Raven                 |                                  |
| Cracticidae       | <i>Cracticus tibicen</i>                   | Australian Magpie                |                                  |
| Cracticidae       | <i>Cracticus torquatus</i>                 | Grey Butcherbird                 |                                  |
| Maluridae         | <i>Malurus splendens</i>                   | Splendid Fairy-wren              |                                  |
| Meliphagidae      | <i>Anthochaera carunculata</i>             | Red Wattlebird                   |                                  |
| Meliphagidae      | <i>Lichmera indistincta</i>                | Brown Honeyeater                 |                                  |
| Psittacidae       | <i>Platycercus zonarius</i>                | Australian Ringneck              |                                  |
| Psittacidae       | <i>Polytelis anthopeplus</i>               | Regent Parrot                    |                                  |
| Rhipiduridae      | <i>Rhipidura albiscapa</i>                 | Grey Fantail                     |                                  |
| Rhipiduridae      | <i>Rhipidura leucophrys</i>                | Willie Wagtail                   |                                  |
| Threskiornithidae | <i>Threskiornis spinicollis</i>            | Straw-necked Ibis                |                                  |
| Zosteropidae      | <i>Zosterops lateralis</i>                 | Silvereye                        |                                  |
| <b>Reptiles</b>   |  |                                  |                                  |
| Elapidae          | <i>Notechis scutatus</i>                   | Tiger Snake                      |                                  |
| Gekkonidae        | <i>Christinus marmoratus</i>               | Marbled Gecko                    |                                  |
| Scincidae         | <i>Cryptoblepharus plagiocephalus</i>      | Fence Skink                      |                                  |
| Scincidae         | <i>Lerista elegans</i>                     | West Coast Four-toed Lerista     |                                  |
| Scincidae         | <i>Tiliqua rugosa subsp. rugosa</i>        | Bobtail                          |                                  |
| <b>Mammals</b>    |  |                                  |                                  |
| Felidae           | <i>Felis catus</i>                         | Cat                              | Introduced                       |
| Macropodidae      | <i>Macropus fuliginosus</i>                | Western Grey Kangaroo            |                                  |
| Muridae           | <i>Mus musculus</i>                        | House Mouse                      | Introduced                       |
| Phalangeridae     | <i>Trichosurus vulpecula</i>               | Brushtail Possum                 |                                  |

### Parameters of fauna likelihood of occurrence assessment

| Assessment outcome | Description  |
|--------------------|--|
| Present            | Species recorded during the field survey or from recent, reliable records from within or close proximity to the survey area.   |
| Likely             | Species are <b>likely</b> to occur in the survey area where there is suitable habitat within the survey area and there are recent records of occurrence of the species in close proximity to the survey area.<br>OR<br>Species known distribution overlaps with the survey area and there is suitable habitat within the survey area.  |
| Unlikely           | Species assessed as <b>unlikely</b> include those species previously recorded within 5 km of the survey area however: <ul style="list-style-type: none"> <li>• There is limited (i.e. the type, quality and quantity of the habitat is generally poor or restricted) habitat in the survey area.</li> <li>• The suitable habitat within the survey area is isolated from other areas of suitable habitat and the species has no capacity to migrate into the survey area.</li> </ul> OR<br>Those species that have a known distribution overlapping with the survey area however: <ul style="list-style-type: none"> <li>• There is limited habitat in the survey area (i.e. the type, quality and quantity of the habitat is generally poor or restricted).</li> <li>• The suitable habitat within the survey area is isolated from other areas of suitable habitat and the species has no capacity to migrate into the survey area.</li> </ul> |
| Highly unlikely    | Species that are considered <b>highly unlikely</b> to occur in the survey area include: <ul style="list-style-type: none"> <li>• Those species that have no suitable habitat within the survey area.</li> <li>• Those species that have become locally extinct, or are not known to have ever been present in the region of the survey area.</li> </ul>  |

#### Source information - desktop searches

NM – DBCA *NatureMap* (accessed October 2017).

DBCA – SWA – DBCA (2007–) records of threatened fauna, database search within the SWA study area (accessed October 2017).

DBCA – Swan – DBCA (2017) DBCA Threatened and Priority Fauna List (current as of 6 January 2017) - *Wildlife Conservation Act 1950* for the DBCA Swan region. Available at: <https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals>.

PMST – DEE Protected Matters Search Tool (PMST) to identify fauna listed under the EPBC Act potentially occurring within the study area (accessed October 2017).

## Definitions

| Term        | Description  |
|-------------|--|
| study area  | a 5 km buffer around the survey area                           |
| survey area | the area subject to the current survey                         |
| region      | the area within an approximate 20 km radius of the survey area |
| Cr          | Critically endangered  |
| En          | Endangered   |
| Vu          | Vulnerable   |
| IA          | International agreement  |
| Mi          | Migratory  |
| Ma          | Marine   |
| CD          | Conservation dependent   |
| OS          | Other specially protected fauna                                |
| P1 – P4     | Priority 1 – Priority 4  |

## Fauna likelihood of occurrence assessment

| Species Name  | Status          |           | Desktop Search |      |             | Description and habitat requirements   | Likelihood   |
|---|-----------------|-----------|----------------|------|-------------|--|--|
|   | EPBC Act Status | WA Status | NM             | PMST | DBCA – Swan |  |  |
| <b>Birds</b>  |                 |           |                |      |             |  |  |
| <i>Actitis hypoleucos</i> / <i>Tringa hypoleucos</i> (Common Sandpiper) | Mi              | IA        | X              | X    | X           | Habitat for the Common Sandpiper is 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. This species is widespread and scattered, common on the north and west coasts and uncommon in the south-east and interior (Morcombe 2004).   | Highly unlikely<br>The survey area does not contain suitable habitat for this species. |
| <i>Anous tenuirostris melanops</i> (Australian Lesser Noddy)            | Vu              | En        | X              | X    |             | The Australian Lesser Noddy is usually found only around its breeding islands in the Houtman Abrolhos Islands. It usually occupies coral-limestone islands that are densely fringed with White Mangrove <i>Avicennia marina</i> . It occasionally occurs on shingle or sandy beaches. The bird roosts mainly in mangroves, especially at night, but may sometimes rest on a beach. They can commonly be found dead after winter storms | Highly unlikely<br>The survey area does not contain suitable habitat for this species. |

| Species Name  | Status          |           | Desktop Search |      |             | Description and habitat requirements   | Likelihood  |
|---|-----------------|-----------|----------------|------|-------------|--|---|
|   | EPBC Act Status | WA Status | NM             | PMST | DBCA – Swan |  |   |
|   |                 |           |                |      |             | along the southwest coast between Yanchep and Dunsborough (DotEE 2017b).   |   |
| <i>Ardea modesta</i><br>(Great Egret)                   | Ma              | IA        | X              | X    | X           | The Eastern Great Egret is widespread in Australia, and in the south west is particularly abundant on the Swan Coastal Plain (Nevill 2013). They have been reported in a wide range of wetland habitats, including swamps and marshes; margins of rivers and lakes; damp or flooded grasslands, pastures or agricultural lands; reservoirs; sewage treatment ponds; drainage channels; salt pans and salt lakes; salt marshes; estuarine mudflats, tidal streams; mangrove swamps; coastal lagoons; and offshore reefs. In the south west, breeding sites are located in Melaleuca swamps (DotEE 2017b). | Unlikely<br>No suitable habitat present within the survey area.                 |
| <i>Botaurus poiciloptilus</i><br>(Australasian Bittern) | En              | En        |                | X    |             | The Australasian Bittern prefers densely vegetated freshwater wetlands and, rarely, in estuaries or tidal wetlands. In the southwest of WA, the Bittern is found in beds of tall rush mixed with or near short fine sedge or open pools. It also occurs around swamps, lakes, pools, rivers and channels fringed with <i>Lignum muehlenbeckia</i> , canegrass ( <i>Eragrostis</i> spp.) or other dense vegetation. It occasionally ventures into areas of open water or onto banks (DotEE 2017b).  | Unlikely<br>The survey area does not contain suitable habitat for this species. |

| Species Name  | Status          |           | Desktop Search |      |             | Description and habitat requirements   | Likelihood  |
|---|-----------------|-----------|----------------|------|-------------|--|---|
|   | EPBC Act Status | WA Status | NM             | PMST | DBCA – Swan |  |   |
| <i>Calidris acuminata</i><br>(Sharp-tailed Sandpiper) | Mi              | IA        | X              | X    | X           | In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, salt pans and hypersaline salt lakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. Sometimes they occur on rocky shores (DotEE 2017b). They are found throughout many wetlands on the Swan Coastal Plain, in Perth lakes with wet grassed margins and receding waters, Vasse and Harvey Estuaries, and the Busselton wetlands, but are less common on the south coast until the Esperance region (Nevill 2013). | Unlikely<br>The survey area does not contain suitable habitat for this species. |
| <i>Calidris canutus</i><br>(Red Knot)                 | En, Mi          | IA        |                | X    | X           | In Australasia the Red Knot mainly inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps (DotEE 2017b). They are found near mudflats and estuaries from Murchison to Bunbury but are then uncommon from Wilson Inlet to Esperance. In Perth region they are mainly seen in Alfred Cove and Peel Inlet (Nevill 2013).  | Unlikely<br>The survey area does not contain suitable habitat for this species. |

| Species Name                                     | Status          |           | Desktop Search |      |             | Description and habitat requirements  | Likelihood  |
|--|-----------------|-----------|----------------|------|-------------|---|---|
|  | EPBC Act Status | WA Status | NM             | PMST | DBCA – Swan |   |   |
| <i>Calidris ferruginea</i><br>(Curlew Sandpiper) | Mi, Cr          | Vu, IA    | X              | X    | X           | Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters (DotEE 2017b).  | Unlikely<br>The survey area does not contain suitable habitat for this species. |
| <i>Calidris ruficollis</i><br>(Red-Necked Stint) | Mi              | IA        | X              | X    | X           | The Red-necked Stint can be found in fresh and saline water, but primarily in coastal regions (Nevill 2013). It is mostly found in areas including sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores. Occasionally they have been recorded on exposed or ocean beaches, and on stony or rocky shores, reefs or shoals. They also occur in saltworks and sewage farms; saltmarsh; ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in saltflats. They have occasionally been recorded on dry gibber plains, with little or no perennial vegetation (DotEE 2017b). They are common in many parts of the south west, and can be found in the Murchison down to Busselton and Augusta to Cape Arid, and on islands, particularly Rottneest (Nevill 2013). | Unlikely<br>The survey area does not contain suitable habitat for this species. |



| Species Name  | Status          |           | Desktop Search |      |             | Description and habitat requirements  | Likelihood  |
|---|-----------------|-----------|----------------|------|-------------|---|---|
|   | EPBC Act Status | WA Status | NM             | PMST | DBCA – Swan |   |   |
| <i>Calyptorhynchus banksii naso</i><br>(Forest Red-tailed Black Cockatoo) | Vu              | Vu        | X              | X    | X           | Forest Red-tailed Black Cockatoo typically occurs in dense Jarrah ( <i>Eucalyptus marginata</i> ), Karri ( <i>E. diversicolor</i> ) and Marri ( <i>Corymbia calophylla</i> ) forests, however the species also occurs in a range of other forest and woodland types, including Blackbutt ( <i>E. patens</i> ), Wandoo ( <i>E. wandoo</i> ), Tuart ( <i>E. gomphocephala</i> ), Albany Blackbutt, Yate ( <i>E. cornuta</i> ), and Flooded Gum ( <i>E. rudis</i> ) Habitats also tend to have an understorey of <i>Banksia spp.</i> , <i>Persoonia spp.</i> , <i>Allocasuarina spp.</i> In recent years the species has been recorded utilising areas of the Swan Coastal Plain for resources (Johnstone <i>et al</i> 2017). The Forest Red-tailed Black Cockatoo generally nests in hollows in live or dead trees of Marri, Karri, Wandoo, Bullich, Blackbutt, Tuart and Jarrah in the Darling Range and recently on the Swan Coastal Plain (DotEE 2017b). | Present<br>The survey area provides suitable foraging, roosting and breeding habitat for this species. This species is known to occur in the local area and evidence of feeding was observed on jarrah and marri nuts within the survey area. This species was also heard calling in nearby bushland during the survey. |
| <i>Calyptorhynchus baudinii</i> (Baudin's Black Cockatoo)                 | Vu              | En        | X              | X    | X           | Baudin's Black Cockatoo occurs in high-rainfall areas, usually at sites that are heavily forested and dominated by Marri ( <i>Corymbia calophylla</i> ) and Eucalyptus species, especially Karri ( <i>E. diversicolor</i> ) and Jarrah ( <i>E. marginata</i> ). The species also occurs in woodlands of Wandoo ( <i>E. wandoo</i> ), Blackbutt ( <i>E. patens</i> ), Flooded Gum ( <i>E. rudis</i> ), and Yate ( <i>E. cornuta</i> ). Baudin's Black Cockatoo breeds in the Jarrah, Marri and Karri forests of the deep south-west in areas averaging more than 750 mm of rainfall annually. The range of the species extends from Albany to Gidgegannup and Mundaring (east of Perth), and inland to the Stirling Ranges and near Boyup Brook. Preferred roosts are in areas with a dense canopy close to permanent water sources that provide the birds with protection from weather conditions (DotEE 2017b).  | Likely<br>The survey area provides suitable foraging, roosting and breeding habitat for this species. The survey area is located just outside of the currently documented range for the Baudin's Black Cockatoo however there is potential for this species to utilise the area in the future.                          |

| Species Name   | Status          |           | Desktop Search |      |             | Description and habitat requirements   | Likelihood  |
|--|-----------------|-----------|----------------|------|-------------|--|---|
|  | EPBC Act Status | WA Status | NM             | PMST | DBCA – Swan |  |   |
| <i>Calyptorhynchus latirostris</i><br>(Carnaby's Black Cockatoo) | En              | En        | X              | X    | X           | This species mainly occurs in uncleared or remnant native eucalypt woodlands and in shrubland or kwongan heathland dominated by <i>Hakea</i> , <i>Banksia</i> and <i>Grevillea</i> species. The species also occurs in forests containing Marri ( <i>Corymbia calophylla</i> ), Jarrah ( <i>Eucalyptus marginata</i> ) or Karri ( <i>E. diversicolor</i> ). Breeding usually occurs in the western Wheatbelt region of WA, with flocks moving to the higher rainfall coastal area to forage after the breeding season. Feeds on the seeds of a variety of native plants, including <i>Allocasuarina</i> , <i>Banksia</i> , <i>Eucalyptus</i> , <i>Grevillea</i> and <i>Hakea</i> , and some introduced plants (DotEE 2017b). | Present<br>The survey area provides suitable foraging, roosting and breeding habitat for this species. This species is known to occur in the local area and was heard calling in nearby bushland during the survey. |
| <i>Falco peregrinus</i><br>(Peregrine Falcon)                    |                 | OS        |                |      | X           | The Peregrine Falcon is seen occasionally anywhere in the south-west of WA. It is found everywhere from woodlands to open grasslands and coastal cliffs - though less frequently in desert regions. The species nests primarily on ledges of cliffs, shallow tree hollows, and ledges of building in cities. (Morcombe 2004).  | Likely<br>The survey area provides suitable habitat for this species. The species is known from the area with records around Safety Bay.  |
| <i>Leipoa ocellata</i><br>(Malleefowl)                           | Vu              | Vu        |                | X    | X           | The Malleefowl generally occurs in semi-arid areas of WA, from Carnarvon to south east of the Eyre Bird Observatory (south-east WA). It occupies shrublands and low woodlands that are dominated by mallee vegetation, as well as native pine ( <i>Callitris</i> spp.) woodlands, <i>Acacia</i> shrublands, Broombush ( <i>Melaleuca uncinata</i> ) vegetation or coastal heathlands. The nest is a large mound of sand or soil and organic matter (Jones & Goth 2008; Morcombe, 2004). Few records are present on the Swan Coastal Plain and are historical observations.   | Highly unlikely<br>This species is considered locally extinct.  |

| Species Name  | Status          |           | Desktop Search |      |              | Description and habitat requirements   | Likelihood   |
|---|-----------------|-----------|----------------|------|--------------|--|--|
|   | EPBC Act Status | WA Status | NM             | PMST | DBCAs – Swan |  |  |
| <i>Limosa lapponica baueri</i> (Western Alaskan Bar-tailed Godwit)      | Vu, Mi          | IA        |                | X    | X            | The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (DotEE 2017b). They are uncommon in the south west, but can be sighted from Geraldton to Bunbury, at Alfred Cove, and then at a few estuaries on the south coast including Kalgan River Mouth and Oyster Harbour (Nevill 2013). | Highly unlikely<br>The survey area does not support suitable habitat for this species.                       |
| <i>Limosa lapponica menzbieri</i> (Northern Siberian Bar-tailed Godwit) | Cr, Mi          | IA        |                | X    | X            | The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (DotEE 2017b). They are uncommon in the south west, but can be sighted from Geraldton to Bunbury, at Alfred Cove, and then at a few estuaries on the south coast including Kalgan River Mouth and Oyster Harbour (Nevill 2013). | Highly unlikely<br>The survey area does not support suitable habitat for this species.                       |
| <i>Merops ornatus</i> (Rainbow Bee-eater)                               | Ma              | IA        | X              |      | X            | The Rainbow Bee-eater is found throughout the state except in desert regions, particularly in open forests and woodlands, with sandy, loamy soil, but also sand ridges, sandpits, riverbanks, mangroves, rainforest shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation. They also inhabit sand dune systems in coastal areas and at inland sites that are in close proximity to water (Morcombe 2004; Pizzey & Knight 2012). They dig nests in open areas where there is relatively soft but firm sands, either on flat ground or in the side of a sandy bank (Nevill 2013).                | Likely<br>The survey area provides suitable habitat for this species. The species is common and wide spread. |

| Species Name  | Status          |           | Desktop Search |      |             | Description and habitat requirements   | Likelihood  |
|---|-----------------|-----------|----------------|------|-------------|--|---|
|   | EPBC Act Status | WA Status | NM             | PMST | DBCA – Swan |  |   |
| <i>Motacilla cinerea</i><br>(Grey Wagtail)                        | Mi              | IA        |                | X    |             | The non-breeding habitat only of the Grey Wagtail has a strong association with water, particularly rocky substrates along water courses but also lakes and marshes (DEE 2017). It is a rare visitor to WA. It can be found mainly in banks and rocks in fast-running freshwater habitats: rivers, creeks, streams, and around waterfalls, in forest and open country; but can occur anywhere during migration (Johnstone & Storr 2004).                               | Unlikely<br>Suitable habitat is present for this species however they are migratory and rarely found on the Swan Coastal Plain. Use maybe periodic and opportunistic.                                   |
| <i>Ninox connivens connivens</i><br>(Barking Owl Southern subsp.) |                 | P2        |                |      | X           | The southwest subspecies of the Barking Owl is found in the deep south-west region and is very scarce (Nevill 2013). They reside in open forests, woodlands, dense scrubs, and foothills, with red river gums, paperbarks, and other large trees near watercourses that penetrate otherwise open country (Pizzey & Knight 2012). It can be seen in the Busselton, Augusta and Esperance regions, in from Katanning to Cranbrook (Nevill 2013).                         | Unlikely<br>There is some suitable habitat present within the survey area. The nearest record is located approximately 20 km north at Bibra Lake. There are very few records on the Swan Coastal Plain. |
| <i>Numenius madagascariensis</i><br>(Eastern Curlew)              | Mi, Cr          | Vu, IA    | X              | X    | X           | The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (Marchant & Higgins 1993).  | Highly unlikely<br>The survey area does not contain key habitat for this species.   |
| <i>Oxyura australis</i><br>(Blue-billed Duck)                     |                 | P4        | X              |      | X           | The blue-billed Duck is a small Australian almost entirely aquatic duck, with both the male and female growing to a length of 40 cm. The male has a slate-blue bill which changes to bright-blue during the breeding season. The Blue-billed Duck is endemic to Australia's temperate regions, ranging from the south west of WA, extending to southern Queensland, through New South Wales and Victoria, to Tasmania. The species is readily seen on freshwater lakes | Highly unlikely<br>There is no suitable habitat within the survey area.   |

| Species Name   | Status          |           | Desktop Search |      |             | Description and habitat requirements  | Likelihood   |
|--|-----------------|-----------|----------------|------|-------------|---|--|
|  | EPBC Act Status | WA Status | NM             | PMST | DBCA – Swan |   |  |
|  |                 |           |                |      |             | and billabongs where deep fresh water is present (Morcombe 2004).   |  |
| <i>Plegadis falcinellus</i> (Glossy Ibis)              | Mi              | IA        | X              |      | X           | The Glossy Ibis' preferred habitat for foraging and breeding are shallow, grassy, fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, and cultivated areas under irrigation. The species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons, and in wooded swamps, artificial wetlands (such as irrigated fields), and in mangroves. It may retreat to permanent wetlands and/or coastal areas (including tidal wetlands) during drought (DotEE 2017b). It can be seen at Herdsman Lake regularly, and at Joondalup, McClarty, Thompson and Forrestdale Lakes when winter wet (Nevill 2013). | Unlikely<br>The survey area does not contain key habitat for this species.                           |
| <i>Rostratula australis</i> (Australian Painted Snipe) | En, Ma          | En        |                | X    | X           | The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. Australian Painted Snipe breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. The species rarely occurs in the south-western of WA (Marchant & Higgins 1993; Garnett & Crowley 2000).  | Unlikely<br>There are limited records within the region. No suitable habitat within the survey area. |
| <i>Sterna nereis nereis</i> (Fairy Tern)               | Vu, Mi          | Vu, IA    |                | X    | X           | The Fairy Tern occurs along the coast of WA as far north as the Dampier Archipelago near Karratha, but mostly in the southern part of Australia including most of the coastline in the south west. It nests on sheltered sandy beaches, coastal inlets, spits and banks above the high tide line and below vegetation. It has been found in embayments of habitats including offshore, estuarine or lake islands, wetlands, and mainland coastline (DotEE 2017b; Nevill 2013; Pizzey & Knight 2012).  | Unlikely<br>There is no suitable habitat within the survey area.                                     |

| Species Name                                   | Status          |           | Desktop Search |      |             | Description and habitat requirements  | Likelihood  |
|--|-----------------|-----------|----------------|------|-------------|---|---|
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| <i>Tringa glareola</i><br>(Wood Sandpiper)     | Mi              | IA        |                | X    | X           | The Wood Sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially Melaleuca and River Red Gums <i>E. camaldulensis</i> . They also frequent inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding. They can occasionally be found at drying or stony small wetlands, but rarely use brackish wetlands, or dry stunted saltmarsh. They can also use artificial wetlands, including open sewage ponds, reservoirs, large farm dams, and bore drains (DotEE 2017b). In WA, they can be found in many of Perth's wetlands including drainage channels, in Wheatbelt inland ephemeral lakes if they are not too saline, but are uncommon on the south coast (Nevill 2013). | Unlikely<br>There is no suitable habitat within the survey area.                                      |
| <i>Tringa nebularia</i><br>(Common Greenshank) | Mi              | IA        | X              | X    | X           | The Common Greenshank does not breed in Australia; however, the species occurs in all types of wetland and has the widest distribution of any shorebird in Australia. The Common Greenshank is generally absent from the Western Deserts although there are a few records from the Great Sandy Desert and the Nullarbor Plain. It occurs around the coast from Cape Arid in the south to Carnarvon in the north-west (DotEE 2017b).   | Unlikely<br>There is no suitable habitat within the survey area.                                      |
| <i>Tringa stagnatilis</i><br>(Marsh Sandpiper) | Mi              | IA        |                | X    | X           | The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes. In WA they prefer freshwater to marine environments (DotEE 2017b), but are uncommon  | Unlikely<br>There is no suitable habitat within the survey area. The closest record is at Folly Pool. |

| Species Name   | Status          |           | Desktop Search |      |             | Description and habitat requirements   | Likelihood  |
|--|-----------------|-----------|----------------|------|-------------|--|---|
|  | EPBC Act Status | WA Status | NM             | PMST | DBCA – Swan |  |   |
|  |                 |           |                |      |             | throughout most of the south west, with the exception of a few freshwater lakes, including Bibra, Kogolup, North, Thompson, Herdsman, and McLarty Lakes (Nevill 2013).   |   |
| <i>Tyto novaehollandiae novaehollandiae</i> (Masked Owl southern subsp.) |                 | P3        |                |      | X           | The Masked Owl is found across a range of habitats from wet sclerophyll forest, dry sclerophyll forest, non eucalypt dominated forest, scrub and cleared land with remnant old growth trees. There are however several aspects of habitat preference which appear to be common: the Masked Owl requires large hollows in old growth eucalypts for nesting; it often favours areas with dense understorey or ecotones comprising dense and sparse ground cover, they are often recorded foraging within 100-300 m of the boundary of two vegetation types (Bell & Mooney 2002).   | Unlikely<br>The survey area contains suitable habitat. The closest record is over 18 km north in Henderson. There are limited records between Perth and Mandurah. |
| <i>Calidris melanotos</i> (Pectoral Sandpiper)                           | Mi              | IA        |                | X    |             | In Australia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum (DotE 2016). The bird can be seen on the Swan Coastal Plain but is rare to scarce on Lake Thompson, and as well on any freshwater wetland in the southwest with shallow, well-grassed margins. They are seen at Lake Warden, Esperance, and at Lake McLarty (Nevill 2013). | Unlikely<br>There is no suitable habitat within the survey area.  |
| <i>Calidris subminuta</i> (Long-toed Stint)                              | Mi              | IA        | X              | X    |             | In Australia, the Long-toed Stint occurs in a variety of terrestrial wetlands. They prefer shallow freshwater or brackish wetlands including lakes, swamps, river floodplains, streams, lagoons and sewage ponds. The species is also fond of areas of muddy shoreline, growths of short grass, weeds, sedges, low or floating aquatic vegetation, reeds, rushes and   | Unlikely<br>There is no suitable habitat within the survey area.  |

| Species Name                                    | Status          |           | Desktop Search |      |             | Description and habitat requirements   | Likelihood   |
|---|-----------------|-----------|----------------|------|-------------|--|--|
|   | EPBC Act Status | WA Status | NM             | PMST | DBCA – Swan |  |  |
|   |                 |           |                |      |             | occasionally stunted samphire. It has been observed at open, less vegetated shores of larger lakes and ponds and is common on muddy fringes of drying ephemeral lakes and swamps, and frequents permanent wetlands such as reservoirs and artificial lakes. In WA the species is found mainly along the coast, with a few scattered inland records. On the south coast the Long-toed Stint is found from Esperance to Albany and inland to Lake Cassencarry and Dumbleyung, on the coast from the Vasse River estuary, Guraga Lake and the Namming Nature Reserve, and on the Swan Coastal Plain (DotE 2016; Nevill 2013). |  |
| <i>Charadrius dubius</i> (Little Ringed Plover) | Mi              | IA        |                | X    |             | he Little Ringed Plover is found on shores and marshes (Simpson & Day 1996)  | Unlikely<br>There is no suitable habitat within the survey area. |
| <i>Limosa lapponica</i> (Bar-tailed Godwit)     | Mi              | IA        |                | X    |             | The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh (Morcombe 2004). They usually forage near the edge of water or in shallow water, mainly in tidal estuaries and harbours and roost on sandy beaches, sandbars, spits and also in near-coastal saltmarshs (Marchant & Higgins 1993).   | Unlikely<br>There is no suitable habitat within the survey area. |
| <i>Limosa limosa</i> (Black-tailed Godwit)      | Mi              | IA        |                | X    |             | In Australia the Black-tailed Godwit has a primarily coastal habitat environment. The species is commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand or shell-grit; occasionally recorded on rocky coasts or coral islets. It is also found in shallow and sparsely vegetated, near-coastal, wetlands; such as saltmarsh, saltflats, river pools, swamps, lagoons and floodplains. There are a few inland records, around shallow, freshwater and saline lakes, swamps, dams and bore-overflows. They also use lagoons in sewage farms    | Unlikely<br>There is no suitable habitat within the survey area. |



| Species Name                      | Status          |           | Desktop Search |      |             | Description and habitat requirements  | Likelihood  |
|-----------------------------------|-----------------|-----------|----------------|------|-------------|---|---|
|                                   | EPBC Act Status | WA Status | NM             | PMST | DBCA – Swan |   |   |
|                                   |                 |           |                |      |             | and saltworks. In the south-west, there is some evidence that small flocks move along the coast during April (DotE 2016).   |   |
| <i>Pandion haliaetus</i> (Osprey) | Mi              | IA        |                | X    |             | Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging. They frequent a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes. They exhibit a preference for coastal cliffs and elevated islands in some parts of their range but may also occur on low sandy, muddy or rocky shores and over coral cays. They may occur over atypical habitats such as heath, woodland or forest when travelling to and from foraging (DSEWPac 2017). | Unlikely<br>The preferred habitat for this species is not present within the survey area. |
| <i>Philomachus pugnax</i> (Ruff)  | Mi              | IA        |                | X    |             | In Australia the Ruff is found on generally fresh or saline wetlands with exposed mudflats at the edges. It is found in terrestrial wetlands including lakes, swamps, pools, lagoons, tidal rivers, swampy fields and floodlands. They are occasionally seen on sheltered coasts, in harbours, estuaries, seashores and are known to visit sewage farms and saltworks. They are sometimes found on wetlands surrounded by dense vegetation including grass, sedges, saltmarsh and reeds. They have been observed on sand spits and other sandy habitats including shingles. In WA the species has been recorded at the lower King River and it is mostly found in the south-west region of the state. It has been sighted at the Vasse River estuary, north to Namming Lake and Lake McLarty (DotE 2017).   | Unlikely<br>There is no suitable habitat within the survey area.                          |
| <b>Mammals</b>                    |                 |           |                |      |             |   |   |

| Species Name   | Status          |           | Desktop Search |      |             | Description and habitat requirements   | Likelihood   |
|--|-----------------|-----------|----------------|------|-------------|--|--|
|  | EPBC Act Status | WA Status | NM             | PMST | DBCA – Swan |  |  |
| <i>Bettongia penicillata</i><br>(Woylie, Brush-tailed Bettong) | En              | Cr        |                | X    | X           | Preferred habitat for the Woylie includes dense undergrowth, logs and rock-cavities and occasionally in burrows (Burbidge 2004). Scattered Woylie populations may be found throughout the Jarrah forest in the south-west corner of WA. Extant naturally occurring populations of the species are restricted to three small wheatbelt reserves in WA – Dryandra Woodland, Tutanning Nature Reserve and Perup Forest. All are characterised by the presence of thickets of the plant <i>Gastrolobium</i> . The species historically occurred in a wide variety of habits, however is now restricted to areas where predation has been controlled (or excluded) (Van Dyck & Strahan 2008). | Highly unlikely<br>The species is no longer known from the area and is likely extinct in the region. No nearby records known.  |
| <i>Dasyurus geoffroii</i><br>(Western Quoll, Chuditch)         | Vu              | Vu        |                | X    | X           | The Chuditch inhabits eucalypt forest (especially Jarrah, <i>Eucalyptus marginata</i> ), dry woodland and mallee shrublands. In Jarrah forest, Chuditch populations occur in both moist, densely vegetated, steeply sloping forest and drier, open, gently sloping forest. Most diurnal resting sites in sclerophyll forest consist of hollow logs or earth burrows (Van Dyck & Strahan, 2008). The species can travel large distances, has a large home range and is sparsely populated through a large portion of its range.   | Highly unlikely<br>This species requires large areas of connected habitat to persist. The habitat in the survey area is not considered key habitat for this species.   |
| <i>Falsistrellus mackenziei</i><br>(Western False Pipistrelle) |                 | P4        |                |      | X           | The Western False Pipistrelle occurs in wet sclerophyll forest dominated by Karri ( <i>Eucalyptus diversicolor</i> ), and in the high rainfall zones of the Jarrah ( <i>E. marginata</i> ) and Tuart ( <i>E. gomphocephala</i> ) forests. The species is restricted to areas in or adjacent to stands of old growth forest. It has also been recorded in mixed Tuart-Jarrah tall woodlands on the adjacent coastal plain. Marri ( <i>E. calophylla</i> ), Sheoak ( <i>Casuarina heugeliana</i> ) and Peppermint ( <i>Agonis flexuosa</i> ) trees are often co-dominant at its collection localities (Churchill 2008).  | Unlikely<br>Suitable habitat is present for this species. The nearest record is located over 18 km away to the north at the Harry Waring Marsupial Reserve. There are very limited records for this species on the Swan Coastal Plain. |

| Species Name   | Status          |           | Desktop Search |      |             | Description and habitat requirements   | Likelihood  |
|--|-----------------|-----------|----------------|------|-------------|--|---|
|  | EPBC Act Status | WA Status | NM             | PMST | DBCA – Swan |  |   |
| <i>Hydromys chrysogaster</i> (Water Rat)                               |                 | P4        | X              |      | X           | Water-rats live primarily in a wide variety of freshwater habitats, from sub-alpine streams and other inland waterways to lakes, swamps, farm dams and irrigation channels and are thought to be one of the few native species to have at least partially benefited from human encroachment (Gardner & Serena 1995).   | Unlikely<br>There is no suitable habitat within the survey area. The closest known record is approximately 5 km east at Folly Pool Reserve.   |
| <i>Isoodon obesulus fusciventer</i> (Quenda, Southern Brown Bandicoot) |                 | P4        | X              |      | X           | The Quenda prefers dense scrubby, often swampy, vegetation with dense cover up to one metre high. However, it also occurs in woodlands, and may use less ideal habitat where this habitat occurs adjacent to the thicker, more desirable vegetation. The species often feeds in adjacent forest and woodland that is burnt on a regular basis and in areas of pasture and cropland close to dense cover (Van Dyck & Strahan 2008). | Unlikely<br>This species is known to occur in the nearby Rockingham Lakes Nature Reserve. However this species prefers a dense understorey cover which is not present within the survey area. The survey area does not contain suitable habitat for this species. |
| <i>Pseudocheirus occidentalis</i> (Western Ringtail Possum)            | Vu              | En        |                | X    | X           | The Western Ringtail Possum occurs in and near coastal Peppermint Tree ( <i>Agonis flexuosa</i> ) forest and Tuart ( <i>Eucalyptus gomphocephala</i> ) dominated forest with a Peppermint Tree understorey from Bunbury to Albany. Also occurs in Jarrah ( <i>Eucalyptus marginata</i> ) forest and Jarrah-Marri ( <i>Corymbia calophylla</i> ) forest associated with Peppermint Tree (Van Dyck & Strahan 2008).                  | Highly unlikely<br>The species is not known from the Swan Coastal Plain north of Mandurah.  |
| <b>Reptiles</b>  |                 |           |                |      |             |  |   |
| <i>Ctenotus gemmula</i> (SWA subpop.)                                  |                 | P3        |                |      | X           | The Jewelled South-West Ctenotus occurs on pale sandplains supporting heaths in association with Banksia or mallee woodlands (Wilson & Swan 2013, Kay & Keogh 2012).   | Unlikely<br>Habitat in the survey area may be   |

| Species Name                                       | Status          |           | Desktop Search |      |             | Description and habitat requirements   | Likelihood  |
|--|-----------------|-----------|----------------|------|-------------|--|---|
|  | EPBC Act Status | WA Status | NM             | PMST | DBCA – Swan |  |   |
| (Jewelled south-west Ctenotus)                     |                 |           |                |      |             |  | considered suitable. The closest known record is approximately 10 km north of the survey area recorded in Kwinana (1979). There are no records from the survey area however this is likely due to a lack of current data for this species and records in the region. Given the degraded nature of the site it is considered unlikely. |
| <i>Ctenotus ora</i> (Coastal Plains Skink)         |                 | P4        |                |      | X           | The Coastal Plains Skink is locally restricted the sandy regions of the southern portion of the Swan Coastal Plain. It inhabits open eucalypt woodland over <i>Banksia</i> , as well as sandy coastal plain and coastal dunes between Pinjarra and Yallingup Brook (Wilson & Swan 2013). The species seems to have a preference for sandy substrates with low vegetation with open <i>Eucalyptus</i> woodland over banksia (Kay and Keogh 2012). | Highly unlikely<br>The species is not known from the Swan Coastal Plain north of Mandurah.  |
| <i>Lerista lineata</i> (Perth Slider, Lined Skink) |                 | P3        | X              |      | X           | The Perth Slider is locally restricted to the Swan Coastal Plain south of the Swan River, including Rottnest and Garden Islands, where it inhabits coastal dunes, <i>Banksia</i> /eucalypt woodlands and suburban gardens. There are also isolated populations on the mid-west coast at Woodleigh Station and in Busselton (Wilson & Swan 2013).   | Likely<br>The tuart/jarraah woodland may provide suitable habitat for this species. There are multiple records within 5 km of the survey area. Has been recorded at the nearby  |

| Species Name                                   | Status          |           | Desktop Search |      |             | Description and habitat requirements  | Likelihood  |
|--|-----------------|-----------|----------------|------|-------------|---|---|
|  | EPBC Act Status | WA Status | NM             | PMST | DBCA – Swan |   |   |
|  |                 |           |                |      |             |   | Port Kennedy Scientific Park, Cape Peron and Garden Island.   |
| <i>Neelaps calonotos</i> (Black-striped Snake) |                 | P3        |                |      | X           | This Black-striped Snake is restricted to the sandy coastal strip near Perth, between Mandurah and Lancelin. It occurs on dunes and sand-plains vegetated with heaths and eucalypt/banksia woodlands. This species is seriously threatened by increasing development within its restricted distribution (Wilson & Swan 2013).   | Likely<br>The tuart/jarraah woodland may provide suitable habitat for this species. Nearby records include Port Kennedy Scientific Park, Peron, Lake Coo loongup Flora and Fauna Reserve. |
| <b>Invertebrates</b>                           |                 |           |                |      |             |   |   |
| <i>Synemon gratio sa</i> (Graceful Sunmoth)    |                 | P4        | X              |      | X           | The Graceful Sunmoth occurs within the Swan, South West and Midwest WA DBCA regions, and the South-west, Swan and Northern Agricultural Natural Resource Management regions. The range of the Graceful Sunmoth is from Namburg National Park (near Dandaragan) in the north to Mandurah in the south. The Graceful Sun Moth is associated with two habitat types: (1) Coastal heathland on Quindalup dunes where it is restricted to secondary sand dunes due to the abundance of the preferred host plant <i>Lomandra maritima</i> . (2) Banksia woodland on Spearwood and Bassendean dunes, where the second known host plant <i>L. hermaphrodita</i> is widespread (DotEE 2017). | Unlikely<br>No suitable habitat within the survey area.   |

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Potential Black cockatoo habitat trees recorded in the survey area

| Tree ID | Species                         | DBH (mm) | Hollow  | Evidence of Breeding | Evidence of Feeding | Comment   | Easting     | Northing    |
|---------|---------------------------------|----------|---------|----------------------|---------------------|---|-------------|-------------|
| 1       | <i>Eucalyptus gomphocephala</i> | 900      | 0       | No                   | No                  |   | 386882.5033 | 6420489.987 |
| 2       | <i>Eucalyptus gomphocephala</i> | 800      | 0       | No                   | No                  |   | 386887.6543 | 6420492.262 |
| 3       | <i>Eucalyptus gomphocephala</i> | 700      | 0       | No                   | No                  |   | 386875.9316 | 6420502.479 |
| 4       | <i>Eucalyptus gomphocephala</i> | 500      | 0       | No                   | No                  |   | 386888.3058 | 6420504.096 |
| 5       | <i>Eucalyptus gomphocephala</i> | 700      | 0       | No                   | No                  |   | 386892.9166 | 6420498.604 |
| 6       | <i>Eucalyptus gomphocephala</i> | 800      | 1 small | No                   | No                  |   | 386893.7884 | 6420518.756 |
| 7       | <i>Eucalyptus gomphocephala</i> | 550      | 0       | No                   | No                  |   | 386853.3754 | 6420527.541 |
| 8       | <i>Eucalyptus gomphocephala</i> | 650      | 0       | No                   | No                  |   | 386864.6072 | 6420547.07  |
| 9       | <i>Eucalyptus gomphocephala</i> | 800      | 0       | No                   | No                  |   | 386882.3969 | 6420583.304 |
| 10      | <i>Eucalyptus gomphocephala</i> | 800      | 0       | No                   | No                  |   | 386886.7305 | 6420588.526 |
| 11      | <i>Eucalyptus gomphocephala</i> | 800      | 0       | No                   | No                  |   | 386893.1197 | 6420592.294 |
| 12      | <i>Eucalyptus gomphocephala</i> | 700      | 0       | No                   | No                  | Main trunk hollowed and broken off. Multi-stemmed tree. | 386877.6438 | 6420587.501 |
| 13      | <i>Eucalyptus gomphocephala</i> | 500      | 0       | No                   | No                  |   | 386865.3587 | 6420577.938 |
| 14      | <i>Eucalyptus gomphocephala</i> | 520      | 0       | No                   | No                  | Multi stemmed   | 386863.1226 | 6420595.468 |
| 15      | <i>Eucalyptus marginata</i>     | 650      | 0       | No                   | No                  |   | 386843.45   | 6420573.257 |
| 16      | <i>Eucalyptus gomphocephala</i> | 1000     | 0       | No                   | No                  |   | 386839.0293 | 6420575.795 |
| 17      | <i>Eucalyptus marginata</i>     | 510      | 0       | No                   | No                  |   | 386829.8473 | 6420513.418 |
| 18      | <i>Eucalyptus gomphocephala</i> | 1300     | 0       | No                   | No                  |   | 386777.0683 | 6420519.847 |
| 19      | <i>Eucalyptus gomphocephala</i> | 1200     | 0       | No                   | No                  |   | 386775.4512 | 6420538.123 |
| 20      | <i>Eucalyptus gomphocephala</i> | 1000     | 0       | No                   | No                  |   | 386774.5039 | 6420538.667 |
| 21      | <i>Eucalyptus gomphocephala</i> | 900      | 0       | No                   | No                  |   | 386776.7237 | 6420550.518 |
| 22      | <i>Eucalyptus gomphocephala</i> | 1200     | 0       | No                   | No                  | Few dead upper branches                                 | 386791.78   | 6420564.731 |
| 23      | <i>Eucalyptus gomphocephala</i> | 700      | 0       | No                   | No                  |   | 386793.3392 | 6420579.532 |
| 24      | <i>Eucalyptus gomphocephala</i> | 600      | 0       | No                   | No                  |   | 386785.3068 | 6420582.398 |



| Tree ID | Species                         | DBH (mm) | Hollow              | Evidence of Breeding | Evidence of Feeding | Comment                   | Easting     | Northing    |
|---------|---------------------------------|----------|---------------------|----------------------|---------------------|---------------------------|-------------|-------------|
| 25      | <i>Eucalyptus gomphocephala</i> | 800      | 0                   | No                   | No                  |                           | 386779.6045 | 6420615.226 |
| 26      | <i>Eucalyptus gomphocephala</i> | 600      | 0                   | No                   | No                  |                           | 386778.58   | 6420566.8   |
| 27      | <i>Eucalyptus gomphocephala</i> | 1600     | 0                   | No                   | No                  |                           | 386760.4637 | 6420573.619 |
| 28      | <i>Eucalyptus gomphocephala</i> | 1000     | 0                   | No                   | No                  |                           | 386629.2983 | 6420603.742 |
| 29      | <i>Eucalyptus gomphocephala</i> | 1600     | 0                   | No                   | No                  |                           | 386610.1921 | 6420600.94  |
| 30      | <i>Eucalyptus gomphocephala</i> | 700      | 0                   | No                   | No                  |                           | 386590.9279 | 6420612.18  |
| 31      | <i>Eucalyptus gomphocephala</i> | 750      | 0                   | No                   | No                  |                           | 386592.3915 | 6420607.577 |
| 32      | <i>Eucalyptus gomphocephala</i> | 700      | 0                   | No                   | No                  |                           | 386601.0576 | 6420604.164 |
| 33      | <i>Eucalyptus gomphocephala</i> | 750      | 0                   | No                   | No                  | Half died off             | 386597.7962 | 6420587.311 |
| 34      | <i>Eucalyptus gomphocephala</i> | 720      | 0                   | No                   | No                  |                           | 386589.6921 | 6420582.6   |
| 35      | <i>Eucalyptus gomphocephala</i> | 750      | 0                   | No                   | No                  |                           | 386587.9585 | 6420583.32  |
| 36      | <i>Eucalyptus gomphocephala</i> | 530      | 0                   | No                   | No                  |                           | 386574.8529 | 6420590.934 |
| 37      | <i>Eucalyptus gomphocephala</i> | 850      | 0                   | No                   | No                  |                           | 386569.6936 | 6420589.397 |
| 38      | <i>Eucalyptus gomphocephala</i> | 500      | 0                   | No                   | No                  |                           | 386566.773  | 6420570.146 |
| 39      | <i>Eucalyptus gomphocephala</i> | 800      | 0                   | No                   | No                  |                           | 386553.5404 | 6420589.031 |
| 40      | <i>Eucalyptus gomphocephala</i> | 510      | 0                   | No                   | No                  |                           | 386547.5603 | 6420604.67  |
| 41      | <i>Eucalyptus gomphocephala</i> | 900      | 0                   | No                   | No                  |                           | 386548.3391 | 6420619.093 |
| 42      | <i>Eucalyptus gomphocephala</i> | 600      | 0                   | No                   | No                  |                           | 386532.1144 | 6420611.149 |
| 43      | <i>Eucalyptus gomphocephala</i> | 500      | 0                   | No                   | No                  |                           | 386518.1446 | 6420611.915 |
| 44      | <i>Eucalyptus gomphocephala</i> | 700      | 0                   | No                   | No                  |                           | 386515.3554 | 6420622.787 |
| 45      | <i>Eucalyptus gomphocephala</i> | 750      | 1 large             | Potential chew       | No                  |                           | 386524.0095 | 6420592.579 |
| 46      | <i>Eucalyptus gomphocephala</i> | 550      | 0                   | No                   | No                  |                           | 386506.0617 | 6420584.431 |
| 47      | <i>Eucalyptus gomphocephala</i> | 700      | 0                   | No                   | No                  |                           | 386496.3309 | 6420584.875 |
| 48      | <i>Eucalyptus gomphocephala</i> | 1300     | 1 medium<br>2 small | No                   | No                  | Bee hive in medium hollow | 386523.9789 | 6420567.447 |
| 49      | <i>Eucalyptus gomphocephala</i> | 1300     | 1 medium            | No                   | No                  |                           | 386542.6665 | 6420565.625 |

| Tree ID | Species                         | DBH (mm) | Hollow   | Evidence of Breeding | Evidence of Feeding | Comment       | Easting     | Northing    |
|---------|---------------------------------|----------|----------|----------------------|---------------------|---------------|-------------|-------------|
| 50      | <i>Eucalyptus gomphocephala</i> | 900      | 0        | No                   | No                  |               | 386578.4495 | 6420550.136 |
| 51      | <i>Eucalyptus gomphocephala</i> | 950      | 0        | No                   | No                  |               | 386582.9585 | 6420553.698 |
| 52      | <i>Eucalyptus gomphocephala</i> | 1500     | 2 small  | No                   | No                  |               | 386587.3086 | 6420557.442 |
| 53      | <i>Eucalyptus gomphocephala</i> | 1200     | 1 medium | No                   | No                  | Half died off | 386604.2272 | 6420559.481 |
| 54      | <i>Eucalyptus gomphocephala</i> | 500      | 0        | No                   | No                  |               | 386606.0636 | 6420563.567 |
| 55      | <i>Eucalyptus gomphocephala</i> | 520      | 0        | No                   | No                  |               | 386607.4981 | 6420561.55  |
| 56      | <i>Eucalyptus gomphocephala</i> | 1200     | 0        | No                   | No                  |               | 386632.0513 | 6420554.25  |
| 57      | <i>Eucalyptus gomphocephala</i> | 1900     | 2 small  | No                   | No                  |               | 386639.9747 | 6420547.133 |
| 58      | <i>Eucalyptus gomphocephala</i> | 1400     | 0        | No                   | No                  |               | 386627.659  | 6420512.439 |
| 59      | <i>Eucalyptus gomphocephala</i> | 850      | 0        | No                   | No                  |               | 386611.9337 | 6420529.816 |
| 60      | <i>Eucalyptus gomphocephala</i> | 650      | 0        | No                   | No                  |               | 386619.8178 | 6420498.306 |
| 61      | <i>Eucalyptus gomphocephala</i> | 700      | 0        | No                   | No                  |               | 386609.8629 | 6420490.803 |
| 62      | <i>Eucalyptus gomphocephala</i> | 720      | 0        | No                   | No                  |               | 386610.0385 | 6420489.142 |
| 63      | <i>Eucalyptus gomphocephala</i> | 650      | 0        | No                   | No                  |               | 386632.325  | 6420488.099 |
| 64      | <i>Eucalyptus gomphocephala</i> | 1000     | 0        | No                   | No                  |               | 386635.4414 | 6420462.079 |
| 65      | <i>Eucalyptus gomphocephala</i> | 1100     | 0        | No                   | No                  |               | 386641.5823 | 6420446.071 |
| 66      | <i>Eucalyptus gomphocephala</i> | 650      | 0        | No                   | No                  |               | 386621.77   | 6420450.283 |
| 67      | <i>Eucalyptus gomphocephala</i> | 800      | 0        | No                   | No                  |               | 386613.61   | 6420450.561 |
| 68      | <i>Eucalyptus gomphocephala</i> | 1000     | 0        | No                   | No                  | Multi stemmed | 386612.0186 | 6420452.576 |
| 69      | <i>Eucalyptus gomphocephala</i> | 800      | 0        | No                   | No                  |               | 386595.4377 | 6420462.368 |
| 70      | <i>Eucalyptus gomphocephala</i> | 500      | 0        | No                   | No                  |               | 386596.6333 | 6420453.696 |
| 71      | <i>Eucalyptus gomphocephala</i> | 650      | 0        | No                   | No                  | Multi stemmed | 386599.5106 | 6420448.924 |
| 72      | <i>Eucalyptus gomphocephala</i> | 700      | 0        | No                   | No                  | Multi stemmed | 386586.1713 | 6420463.372 |
| 73      | <i>Eucalyptus gomphocephala</i> | 850      | 0        | No                   | No                  |               | 386586.1663 | 6420449.883 |
| 74      | <i>Eucalyptus gomphocephala</i> | 900      | 0        | No                   | No                  |               | 386568.1354 | 6420449.125 |
| 75      | <i>Eucalyptus gomphocephala</i> | 700      | 0        | No                   | No                  |               | 386569.4181 | 6420460.597 |

| Tree ID | Species                         | DBH (mm) | Hollow                         | Evidence of Breeding | Evidence of Feeding | Comment                                      | Easting     | Northing    |
|---------|---------------------------------|----------|--------------------------------|----------------------|---------------------|--|-------------|-------------|
| 76      | <i>Eucalyptus gomphocephala</i> | 850      | 0                              | No                   | No                  | Multi stemmed                                | 386536.3863 | 6420454.681 |
| 77      | <i>Eucalyptus gomphocephala</i> | 850      | 0                              | No                   | No                  |  | 386574.1696 | 6420498.347 |
| 78      | <i>Eucalyptus gomphocephala</i> | 750      | 0                              | No                   | No                  | Multi stemmed                                | 386599.1446 | 6420481.443 |
| 79      | <i>Eucalyptus gomphocephala</i> | 550      | 0                              | No                   | No                  |  | 386609.6981 | 6420463.637 |
| 80      | <i>Eucalyptus gomphocephala</i> | 500      | 0                              | No                   | No                  |  | 386614.5498 | 6420464.616 |
| 81      | <i>Eucalyptus gomphocephala</i> | 600      | 0                              | No                   | No                  |  | 386614.3122 | 6420443.917 |
| 82      | <i>Eucalyptus gomphocephala</i> | 650      | 0                              | No                   | No                  |  | 386619.9482 | 6420444.904 |
| 83      | <i>Eucalyptus gomphocephala</i> | 750      | 0                              | No                   | No                  |  | 386630.9377 | 6420444.104 |
| 84      | <i>Eucalyptus gomphocephala</i> | 950      | 0                              | No                   | No                  |  | 386636.1813 | 6420424.205 |
| 85      | <i>Eucalyptus gomphocephala</i> | 1000     | 0                              | No                   | No                  |  | 386678.2934 | 6420431.701 |
| 86      | <i>Eucalyptus gomphocephala</i> | 2500     | 1 large<br>1 medium<br>1 small | No                   | No                  | Tuart healthy some chew evident large hollow | 386702.5523 | 6420436.594 |
| 87      | <i>Eucalyptus gomphocephala</i> | 1500     | no                             | No                   | No                  |  | 386708.4511 | 6420400.257 |
| 88      | <i>Eucalyptus gomphocephala</i> | 700      | no                             | No                   | No                  |  | 386709.4566 | 6420394.54  |
| 89      | <i>Eucalyptus gomphocephala</i> | 1800     | no                             | No                   | No                  |  | 386707.2421 | 6420396.178 |
| 90      | <i>Eucalyptus gomphocephala</i> | 600      | no                             | No                   | No                  | Trunk fused to spotted gum                   | 386757.1806 | 6420363.292 |
| 91      | <i>Eucalyptus marginata</i>     | 650      | no                             | No                   | No                  | Multi stemmed                                | 386746.1891 | 6420364.278 |
| 92      | <i>Eucalyptus gomphocephala</i> | 210      | no                             | No                   | No                  |  | 386789.4053 | 6420399.134 |
| 93      | <i>Corymbia calophylla</i>      | 500      | no                             | No                   | No                  |  | 386791.6813 | 6420433.9   |
| 94      | <i>Corymbia calophylla</i>      | 600      | no                             | No                   | No                  |  | 386794.8464 | 6420445.392 |
| 95      | <i>Eucalyptus gomphocephala</i> | 800      | no                             | No                   | No                  |  | 386809.6188 | 6420442.971 |
| 96      | <i>Eucalyptus gomphocephala</i> | 600      | no                             | No                   | No                  |  | 386810.374  | 6420445.567 |
| 97      | <i>Eucalyptus gomphocephala</i> | 650      | no                             | No                   | No                  |  | 386498.1624 | 6420575.472 |
| 98      | <i>Eucalyptus gomphocephala</i> | 1600     | no                             | No                   | No                  |  | 386496.2011 | 6420582.472 |
| 99      | <i>Eucalyptus gomphocephala</i> | 800      | no                             | No                   | No                  |  | 386481.7186 | 6420614.831 |
| 100     | <i>Eucalyptus gomphocephala</i> | 600      | no                             | No                   | No                  |  | 386481.6325 | 6420608.548 |

| Tree ID | Species                         | DBH (mm) | Hollow              | Evidence of Breeding | Evidence of Feeding | Comment  | Easting     | Northing    |
|---------|---------------------------------|----------|---------------------|----------------------|---------------------|--|-------------|-------------|
| 101     | <i>Eucalyptus gomphocephala</i> | 650      | no                  | No                   | No                  |  | 386489.5108 | 6420577.592 |
| 102     | <i>Eucalyptus gomphocephala</i> | 650      | no                  | No                   | No                  |  | 386497.4697 | 6420567.333 |
| 103     | <i>Eucalyptus gomphocephala</i> | 850      | no                  | No                   | No                  |  | 386487.0713 | 6420557.422 |
| 104     | <i>Eucalyptus gomphocephala</i> | 660      | no                  | No                   | No                  |  | 386479.753  | 6420580.438 |
| 105     | <i>Eucalyptus gomphocephala</i> | 520      | no                  | No                   | No                  |  | 386471.6345 | 6420577.021 |
| 106     | <i>Eucalyptus gomphocephala</i> | 700      | no                  | No                   | No                  | Multi stemmed                                      | 386451.0952 | 6420603.953 |
| 107     | <i>Eucalyptus gomphocephala</i> | 750      | no                  | No                   | No                  |  | 386448.2213 | 6420594.497 |
| 108     | <i>Eucalyptus gomphocephala</i> | 700      | no                  | No                   | No                  |  | 386458.8966 | 6420579.834 |
| 109     | <i>Eucalyptus marginata</i>     | 650      | no                  | No                   | No                  |  | 386469.5511 | 6420567.019 |
| 110     | <i>Eucalyptus gomphocephala</i> | 2150     | 2 large,<br>1 small | No                   | No                  |  | 386477.4468 | 6420548.444 |
| 111     | <i>Eucalyptus gomphocephala</i> | 700      | no                  | No                   | No                  |  | 386461.7476 | 6420549.561 |
| 112     | <i>Eucalyptus gomphocephala</i> | 900      | no                  | No                   | No                  |  | 386458.3372 | 6420559.87  |
| 113     | <i>Eucalyptus gomphocephala</i> | 1100     | no                  | No                   | No                  |  | 386428.8424 | 6420574.136 |
| 114     | <i>Eucalyptus gomphocephala</i> | 1150     | no                  | No                   | No                  |  | 386402.5422 | 6420569.405 |
| 115     | <i>Eucalyptus gomphocephala</i> | 1200     | no                  | No                   | No                  |  | 386407.9298 | 6420578.52  |
| 116     | <i>Eucalyptus gomphocephala</i> | 700      | no                  | No                   | No                  |  | 386411.3575 | 6420580.592 |
| 117     | <i>Eucalyptus gomphocephala</i> | 550      | no                  | No                   | No                  |  | 386398.5494 | 6420603.546 |
| 118     | <i>Eucalyptus gomphocephala</i> | 1150     | no                  | No                   | No                  |  | 386398.9285 | 6420569.918 |
| 119     | <i>Eucalyptus gomphocephala</i> | 900      | 1 medium            | No                   | No                  | Bees in hollow                                     | 386404.5446 | 6420544.85  |
| 120     | <i>Eucalyptus gomphocephala</i> | 800      | no                  | No                   | No                  |  | 386390.2633 | 6420545.429 |
| 121     | <i>Eucalyptus marginata</i>     | 900      | 2 medium<br>1 small | No                   | No                  | Jarrah half burnt out some dead branches but alive | 386402.5571 | 6420526.349 |
| 122     | <i>Eucalyptus gomphocephala</i> | 800      | no                  | No                   | No                  |  | 386420.5756 | 6420528.215 |
| 123     | <i>Eucalyptus gomphocephala</i> | 550      | no                  | No                   | No                  |  | 386417.4151 | 6420516.353 |
| 124     | <i>Eucalyptus gomphocephala</i> | 900      | 2 medium<br>1 small | No                   | No                  |  | 386396.2112 | 6420504.842 |

| Tree ID | Species                         | DBH (mm) | Hollow                         | Evidence of Breeding | Evidence of Feeding | Comment | Easting     | Northing    |
|---------|---------------------------------|----------|--------------------------------|----------------------|---------------------|---------|-------------|-------------|
| 125     | <i>Eucalyptus gomphocephala</i> | 1250     | no                             | No                   | No                  |         | 386398.9749 | 6420482.329 |
| 126     | <i>Eucalyptus gomphocephala</i> | 700      | no                             | No                   | No                  |         | 386432.0013 | 6420460.896 |
| 127     | <i>Eucalyptus gomphocephala</i> | 510      | no                             | No                   | No                  |         | 386433.5156 | 6420465.718 |
| 128     | <i>Eucalyptus gomphocephala</i> | 800      | no                             | No                   | No                  |         | 386439.8725 | 6420500.16  |
| 129     | <i>Eucalyptus gomphocephala</i> | 1100     | 1 medium                       | No                   | No                  |         | 386487.9048 | 6420539.138 |
| 130     | <i>Eucalyptus gomphocephala</i> | 700      | no                             | No                   | No                  |         | 386513.9969 | 6420562.345 |
| 131     | <i>Eucalyptus gomphocephala</i> | 1200     | 1 medium                       | No                   | No                  |         | 386514.8993 | 6420468.298 |
| 132     | <i>Eucalyptus marginata</i>     | 580      | no                             | No                   | No                  |         | 386492.6661 | 6420450.678 |
| 133     | <i>Eucalyptus marginata</i>     | 550      | no                             | No                   | No                  |         | 386450.461  | 6420465.355 |
| 134     | <i>Eucalyptus gomphocephala</i> | 600      | no                             | No                   | No                  |         | 386482.5824 | 6420496.391 |
| 135     | <i>Eucalyptus gomphocephala</i> | 520      | no                             | No                   | No                  |         | 386482.7142 | 6420498.61  |
| 136     | <i>Eucalyptus gomphocephala</i> | 540      | no                             | No                   | No                  |         | 386493.404  | 6420482.654 |
| 137     | <i>Eucalyptus gomphocephala</i> | 550      | no                             | No                   | No                  |         | 386491.8529 | 6420495.018 |
| 138     | <i>Eucalyptus gomphocephala</i> | 1900     | 1 medium                       | No                   | No                  |         | 386506.2021 | 6420474.483 |
| 139     | <i>Eucalyptus gomphocephala</i> | 2000     | 3 large<br>1 medium<br>1 small | No                   | No                  |         | 386529.1022 | 6420488.6   |
| 140     | <i>Eucalyptus gomphocephala</i> | 570      | no                             | No                   | No                  |         | 386551.7636 | 6420496.062 |
| 141     | <i>Eucalyptus gomphocephala</i> | 570      | no                             | No                   | No                  |         | 386550.0175 | 6420497.89  |
| 142     | <i>Eucalyptus gomphocephala</i> | 600      | no                             | No                   | No                  |         | 386558.243  | 6420505.744 |
| 143     | <i>Eucalyptus gomphocephala</i> | 1100     | no                             | No                   | No                  |         | 386565.219  | 6420499.17  |
| 144     | <i>Eucalyptus gomphocephala</i> | 1000     | no                             | No                   | No                  |         | 386553.6029 | 6420513.822 |
| 145     | <i>Eucalyptus gomphocephala</i> | 800      | 1 small                        | No                   | No                  |         | 386532.3305 | 6420550.171 |
| 146     | <i>Eucalyptus gomphocephala</i> | 1200     | 1 medium                       | No                   | No                  |         | 386581.8992 | 6420536.316 |
| 147     | <i>Eucalyptus gomphocephala</i> | 1000     | no                             | No                   | No                  |         | 386594.6762 | 6420557.895 |
| 148     | <i>Eucalyptus gomphocephala</i> | 1100     | 1 small                        | No                   | No                  |         | 386582.6718 | 6420551.292 |

| Tree ID | Species                         | DBH (mm) | Hollow                         | Evidence of Breeding | Evidence of Feeding | Comment                  | Easting     | Northing    |
|---------|---------------------------------|----------|--------------------------------|----------------------|---------------------|--------------------------|-------------|-------------|
| 149     | <i>Eucalyptus gomphocephala</i> | 1700     | 1 medium<br>1 small            | No                   | No                  |                          | 386519.4709 | 6420508.079 |
| 150     | <i>Eucalyptus gomphocephala</i> | 510      | 0                              | No                   | No                  | Few dead branches        | 386525.4872 | 6420503.158 |
| 151     | <i>Eucalyptus marginata</i>     | 620      | 0                              | No                   | No                  |                          | 386478.0047 | 6420498.927 |
| 152     | <i>Eucalyptus gomphocephala</i> | 700      | 0                              | No                   | No                  |                          | -32.348327  | 115.795429  |
| 153     | <i>Corymbia calophylla</i>      | 700      | 0                              | No                   | Yes                 |                          | -32.348635  | 115.794867  |
| 154     | <i>Corymbia calophylla</i>      | 750      | 0                              | No                   | Yes                 |                          | -32.348737  | 115.794954  |
| 155     | <i>Corymbia calophylla</i>      | 750      | 0                              | No                   | Yes                 |                          | -32.348756  | 115.794949  |
| 156     | <i>Corymbia calophylla</i>      | 550      | 0                              | No                   | Yes                 |                          | -32.34883   | 115.794957  |
| 157     | <i>Corymbia calophylla</i>      | 600      | 0                              | No                   | Yes                 |                          | -32.348908  | 115.794964  |
| 158     | <i>Corymbia calophylla</i>      | 500      | 0                              | No                   | Yes                 |                          | -32.3489    | 115.795192  |
| 159     | <i>Corymbia calophylla</i>      | 1900     | 0                              | No                   | Yes                 |                          | -32.348938  | 115.795265  |
| 160     | <i>Corymbia calophylla</i>      | 600      | 0                              | No                   | Yes                 |                          | -32.348964  | 115.795565  |
| 161     | <i>Corymbia calophylla</i>      | 650      | 0                              | No                   | Yes                 |                          | -32.348772  | 115.795503  |
| 162     | <i>Eucalyptus gomphocephala</i> | 900      | 1 small                        | No                   | No                  |                          | -32.348568  | 115.795618  |
| 163     | <i>Eucalyptus gomphocephala</i> | 600      | 0                              | No                   | No                  |                          | -32.348573  | 115.795784  |
| 164     | <i>Corymbia calophylla</i>      | 650      | 0                              | No                   | Yes                 |                          | -32.348907  | 115.795699  |
| 165     | <i>Eucalyptus gomphocephala</i> | 900      | 1 medium                       | No                   | Potentially         |                          | -32.34856   | 115.796293  |
| 166     | <i>Eucalyptus gomphocephala</i> | 1300     | 0                              | No                   | Potentially         |                          | -32.348601  | 115.79628   |
| 167     | <i>Eucalyptus gomphocephala</i> | 800      | 0                              | No                   | Potentially         |                          | -32.3486    | 115.79628   |
| 168     | <i>Eucalyptus gomphocephala</i> | 1200     | 1 medium<br>1 small            | No                   | Potentially         | Bee hive in small hollow | -32.348655  | 115.796214  |
| 169     | <i>Eucalyptus gomphocephala</i> | 650      | 0                              | No                   | Potentially         |                          | -32.34864   | 115.796167  |
| 170     | <i>Eucalyptus gomphocephala</i> | 1500     | 1 large<br>1 medium<br>3 small | No                   | Potentially         |                          | -32.348878  | 115.796058  |
| 171     | <i>Eucalyptus gomphocephala</i> | 500      | 0                              | No                   | Potentially         |                          | -32.348918  | 115.796055  |
| 172     | <i>Eucalyptus gomphocephala</i> | 650      | 0                              | No                   | Potentially         |                          | -32.348929  | 115.796214  |

| Tree ID | Species                         | DBH (mm) | Hollow                         | Evidence of Breeding | Evidence of Feeding | Comment                           | Easting    | Northing   |
|---------|---------------------------------|----------|--------------------------------|----------------------|---------------------|-----------------------------------|------------|------------|
| 173     | <i>Eucalyptus gomphocephala</i> | 1200     | 0                              | No                   | Potentially         |                                   | -32.348753 | 115.797056 |
| 174     | <i>Eucalyptus gomphocephala</i> | 2400     | 3 small<br>1 medium<br>1 large | No                   | Potentially         |                                   | -32.348903 | 115.797156 |
| 175     | <i>Eucalyptus gomphocephala</i> | 800      | 1 small                        | No                   | Potentially         |                                   | -32.348785 | 115.797382 |
| 176     | <i>Eucalyptus gomphocephala</i> | 1400     | 0                              | No                   | Potentially         | Multi-stemmed. No hollows visible | -32.348866 | 115.797593 |
| 177     | <i>Eucalyptus gomphocephala</i> | 900      | 0                              | No                   | Potentially         |                                   | -32.348586 | 115.797513 |

Hollow size: small <5 cm, medium 5-10 cm, large >10 cm

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