Level 1 and Targeted Fauna Survey

Lots 6 and Lot 8 Old Coast Road, Myalup

OCTOBER 2020

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COMMON TERMS/ACRONYMS

BC Act	WA *Biodiversity Conservation Act 2016*
DAWE	Federal Department of Agriculture, Water and the Environment
DBCA	WA Department of Biodiversity, Conservation and Attractions
DBH	Diameter at Breast Height in centimetres
DWER	WA Department of Water and Environmental Regulation
EP Act	WA *Environmental Protection Act 1986*
EPBC Act	Federal *Environment Protection and Biodiversity Conservation Act 1999*
FRTBC	Forest Red-tailed Black Cockatoo
Project	The proposed action
Proposal area	The Project extent as provided by the client
Study area	The areas surveyed in this study
Suitable DBH tree	Tree of a suitable size to develop large hollows (>50cm DBH).
WA	Western Australia

Executive summary

Patane Produce, 'the proponent' and owners of Lots 6 and 8 Old Coast Road, Myalup, intend to clear parts of Lots 6 (37 ha) and 8 (20.7 ha) (herein referred to as the 'study area') for the purposes of market gardens. The study area excludes the eastern portion of Lot 8, which is associated with an artificial dam. A Level 1 vertebrate fauna survey was required to inform the Clearing Permit assessment and guide proponent in terms of their obligations under the EPBC Act. The survey was to include targeted for Western Ringtail Possum (WRP) and Baudin's cockatoo, Carnaby's cockatoo, and Forest Red Tailed Black Cockatoo (FRTBC).

Local records (Naturemap 2020), supplemented by species that may occur locally from other literature, identified a total of 228 terrestrial species that have been recorded locally, with birds by far the most abundant class. Based on the evaluation provided in Appendix D, there are 29 vertebrate fauna of conservation significance that may occur locally (not necessarily within the study area). Additionally, two fish and two invertebrates of conservation significance may also potentially occur locally.

The fieldwork identified three key fauna habitat types:

- Cleared with occasional trees (24.27 ha)
- Open woodland of Tuart, Jarrah and Marri (26.99 ha)
- Swamp Paperbark shrubland with Peppermint, Flooded gum or other trees (1.88 ha)

The fauna fieldwork recorded included 27 birds, five mammals, three of which are introduced (Cow, Fox and Rabbit) and one reptile. They are generally common locally, with the exceptions of Carnaby's cockatoo, Forest Red Tailed Black Cockatoo (FRTBC) and WRP which are fauna of conservation significance. Two unidentified species of bats were also observed.

The fauna habitat quality within the study area was mostly Poor, or Poor to Moderate, due to the limited structural and species diversity. Fauna habitat opportunities were therefore limited for most target fauna.

Clearing impacts to conservation significant Cattle Egret, Great Egret, Peregrine Falcon, Barking Owl (SW pop.) and Masked Owl (southern subsp) were considered to be low due to the species being wide ranging with abundant similar habitat available locally and the species not having been recorded from the site.

Although not observed at the site, the study area may provide suitable habitat for Southern Brush-tailed Phascogale and Western False Pipistrelle as part of a larger habitat patch. Impacts to any local populations if they did occur would depend on the scale of clearing proposed.

Black cockatoo surveys identified that the study area may contain habitat for all three black cockatoo species. Carnaby's cockatoo and FRTBC were observed were observed within the study area in low abundances.

There were a total of 381 suitable DBH trees (i.e. Dead, Jarrah, Marri, Flooded Gum or Tuart) within the study area.

Of the suitable DBH trees, 15 Tuarts in Lot 6 contained medium to large hollows with the highest potential to be used by black cockatoos. Twenty trees contained small or marginal hollows that are unlikely to be used by black cockatoos.

Lot 6 provides breeding habitat for Carnaby's and FRTBC. Ten trees contained hollows that were considered suitable for black cockatoo breeding, six of which had fresh chews in spring 2020. An active Carnaby's cockatoo (female observed leaving the nest in response to male call and returning after feeding) was observed on the boundary but outside of the study area (ID 0) (see Figure 4). This tree will be retained. None of the hollows within the clearing footprint were observed to be current active black cockatoo nests.

There was no evidence of roosts observed at the site.

The following canopy areas (6.79 ha) of key black cockatoo foraging plants occur over the site (note there is some overlap):

- Marri – 2.57 ha
- Jarrah – 0.68 ha
- Tuart – 3.54 ha

Marri and Jarrah are plant species foraging known to be utilised by all three black cockatoos. Tuart may also be a foraging resource for Carnaby's cockatoo (Johnstone and Kirkby undated).

Habitat within Lot 6 is unlikely to support WRP, due to the lack of midstorey and connected canopy. A single Western Ringtail Possum was observed in the eastern edge of Lot 8. The WRP observed is likely to be using the eastern edge of Lot 8 as part of a larger patch off site. The remainder of Lot 8 is considered to be marginal in terms of WRP habitat. The study area is not located along a strategic corridor and is currently unlikely to provide significant habitat to any local populations of WRP.

The following recommendations are made:

- Most impacts to target species will be associated with the loss of hollow bearing trees particularly in Lot 6. These should be retained where possible.
- Clearing should be conducted outside of spring to minimise impacts to breeding fauna.
- Retain tree ID124 as it occurs on the clearing boundary.
- Consider control of Galah and Little Corella to reduce hollow competition with black cockatoos, as an offset action.
- A licensed fauna spotter should be on site during the clearing of any hollow trees.
- The final impact footprint should be checked against the significant impact criteria (DEWHA 2013; SEWPAC 2012) for black cockatoos and WRP to determine the need to refer the project to DAWE.

1 Introduction

1.1 Background

Patane Produce, 'the proponent' and owners of Lots 6 and 8 Old Coast Road, Myalup, intend to clear parts of Lots 6 (37 ha) and 8 (20.7 ha) (herein referred to as the 'study area') for the purposes of market gardens. The location of site is shown in Figure 1 and the study area in Figure 2 (Appendix A). The study area excludes the eastern portion of Lot 8, which is associated with an artificial dam.

The Department of Water and Environmental Regulation (DWER) has been contacted by the proponent. Two clearing permit applications were applied for within Lot 6 (CPS 4854/1) and Lot 8 (CPS 4862/1). Both applications were withdrawn by the applicant on the 29 July 2013.

A preliminary assessment was conducted for both applications and a number of issues were identified that were not resolved before the applicant withdrew the applications. Both applications were identified as maybe constituting significant habitat for fauna including Western Ringtail Possum (WRP), Baudin's Cockatoo, Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo (collectively referred to as 'black cockatoos').

The proposed clearing within Lots 6 and 8 will require a new clearing permit application under the *Environmental Protection Act 1986* (EP Act). The project may also warrant referral to Department of Agriculture, Water and the Environment (DAWE) for assessment under the EPBC Act.

A Level 1 vertebrate fauna survey was required to inform the Clearing Permit assessment and guide proponent in terms of their obligations under the EPBC Act.

1.2 Scope of work

The scope of consultation includes the following for the study area (Lots 6 and 8, excluding the area around the artificial dam on the eastern portion of Lot 8):

- Vertebrate fauna survey (reconnaissance) and targeted survey for black cockatoos and WRP, in accordance with EPA Technical Guidance (EPA 2016[1]) and other relevant State and Commonwealth guidelines. The surveys will also identify whether any Matters of National Environmental Significance (EPBC Act) are present within the area.
- A desktop study will be conducted with a review of relevant reports available from the public domain, records and datasets. A list of conservation significant fauna species recorded or listed as having potential to occur within the study area will be compiled. The likelihood of each species occurring within the study area along with risk of the development impacting them will be considered. Recommendations will be provided to manage risks associated with them.
- The field survey will validate the desktop assessment. It will include opportunistic fauna surveys and focus on terrestrial vertebrate fauna.
- Hollow bearing tree mapping and black cockatoo surveys: Potential habitat trees (where species occur that typically form hollows) will be mapped and hollow height, size along with current usage noted into classes. Black cockatoo forage habitat and roosting evidence will be noted.

[1] Environmental Protection Authority and Department of Environment and Conservation (2016) Technical Guidance - Terrestrial Fauna Surveys for Environmental Impact Assessment.

- A follow up drone survey was conducted to further assess the suitability of hollows for black cockatoo breeding.
- A single nocturnal spotlight WRP survey (one person night) will be carried out.
- The results of the above will be mapped and provided in a report. Advice will be provided on whether or not the project should be referred to DAWE.

1.3 Regulatory context

1.3.1 Key legislation

Key environmental legislation that may be relevant to the Project is outlined in Table 1-1.

Table 1-1 Environmental legislation that may be relevant to the Project

Legislation	Responsible Government Department	Aspect
Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)	Federal Department of Agriculture, Water and the Environment (DAWE)	Matters of National Environmental Significance including threatened flora, fauna and ecological communities and environmental offsets.
***Biodiversity Conservation Act 2016* (BC Act)**	WA Department of Biodiversity, Conservation and Attractions Parks and Wildlife Service (DBCA)	Threatened species habitats threatened ecological communities (TECs), threatening processes, environmental pests and weeds.
***Biosecurity and Agricultural Management Act 2007* (BAM Act)**	WA Department of Primary Industries and Regional Development	Weeds, feral animals and other pests.
***Environmental Protection Act 1986* (EP Act)**	Environmental Protection Authority or DWER	Environmental impact assessment and management and offsets.

1.3.2 Fauna, flora and ecological communities

Flora, fauna and ecological communities in WA may be afforded protection under the BC Act and or federal EPBC Act.

Species listed as threatened or migratory under the above legislation are referred to collectively in this document as being 'conservation significant' or 'target' species. These terms include species and communities listed under the DBCA Priority lists.

BC Act

The WA BC Act and associated Regulations provide for the licensing and management of activities that affect biodiversity. The BC Act provides for the listing of threatened native plants (flora), threatened native animals (fauna) and threatened ecological communities that need protection as critically endangered, endangered or vulnerable species or ecological communities because they are under identifiable threat of extinction (species) or collapse (ecological communities).

The *Wildlife Conservation (Specially Protected Fauna) Notice 2018* and the *Wildlife Conservation (Rare Flora) Notice 2018* under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018* contain the lists of Threatened, Extinct and Specially Protected species under Part 2 of the BC Act. These are described below.

Threatened species and communities

- PD: Presumed totally destroyed (TECs only)
- CR: Critically endangered species
- EN: Endangered species
- VU: Vulnerable species

Extinct species

- EX: Extinct species
- EW: Extinct in the wild species

Specially protected species

- MI: Migratory species
- CD: Species of special conservation interest (conservation dependent fauna)
- OS: Other specially protected species

Priority species and communities

- Priority 1: Poorly-known species
- Priority 2: Poorly-known species
- Priority 3: Poorly-known species
- Priority 4: Rare, Near Threatened and other species in need of monitoring
- Priority Ecological Community (PEC): Where communities are considered rare but not (currently) threatened or there is insufficient information available for the community to be considered a TEC, communities can be listed as priority ecological communities (PECs).

A full description of conservation codes is provided in Appendix B.

EPBC Act

In accordance with Commonwealth legislation, the EPBC Act provides a list of 'Matters of National Environmental Significance' (NES), which includes significant fauna, flora and communities. Under the EPBC Act flora, fauna or ecological community matters of NES may be listed in any one of the following categories as defined in *Section 179* of the Act:

- Extinct,
- *Extinct in the wild,
- *Critically endangered,
- *Endangered,
- *Vulnerable,
- Conservation dependent.

*Only these categories are matters of NES under the Act.

The EPBC Act also lists migratory species that are recognized under international treaties including the Japan Australia Migratory Bird Agreement (JAMBA), the China Australia Migratory Bird Agreement (CAMBA) and the Bonn Convention (The Convention on the conservation of Migratory Species of Wild Animals). The EPBC Act is regulated by DAWE.

IUCN Red List

The IUCN Red List is an inventory of the global conservation status of species and used to assist DBCA and other agencies in attributing a given threatened species status. It does not have any statutory authority and is not considered in detail in this assessment.

1.3.3 Guidelines

The survey considers the guidelines below.

- Technical Guidance - Sampling methods for terrestrial vertebrate fauna (EPA 2010)
- Technical Guidance - Terrestrial Fauna Surveys for Environmental Impact Assessment (EPA, 2016)
- Terrestrial Biological Surveys as an Element of Biodiversity Protection. Position Statement No. 3, EPA (2002).

The following were also generally considered:

- Commonwealth Matters of National Environmental Significance – Significant impact guidelines 1.1 Environmental Protection and Biodiversity Conservation Act 1999, Department of the Environment, Water, Heritage and the Arts (DEWHA)', (2009).
- Commonwealth EPBC Act referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo (endangered), *Calyptorhynchus latirostris*, Baudin's cockatoo (vulnerable), *Calyptorhynchus baudinii,* and Forest red-tailed black cockatoo (vulnerable) *Calyptorhynchus banksii naso* (SEWPaC 2012).
- Revised draft referral guideline for three threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black Cockatoo. (Commonwealth of Australia 2017)
- Significant impact guidelines for the vulnerable western ringtail possum (*Pseudocheirus occidentalis*) in the southern Swan Coastal Plain, Western Australia Department of the Environment, Water, Heritage and the Arts (DEWHA)', (2009)

2 Methods

2.1 Desktop review

Prior to completing field surveys, a desktop review was completed and included:

- Database searches - Nature Map and the Protected Matters Search Tool database searches were carried out for the study area with a 10 km buffer (Appendix C).
- Review of previous surveys completed for the project where available.
- Review of relevant literature on the target species such as recovery plans, journal articles and other publications.
- Review of relevant mapping and spatial datasets, including but not limited to the Government of WA's Shared Land Information Platform (SLIP, 2020) and aerial photography (Landgate, 2020).
- Review of the ecology, habitat and range of target species were evaluated to determine the likelihood of conservation significant fauna occurring within the study area (Appendix D).
- Identification of likely fauna habitat types.

A key aim of the assessment was to determine the likelihood of any species of conservation significance (target species) occurring within the study area and the importance of the study area to them. Common (non-target) species are also considered more generally.

2.1.1 Previous surveys

Tree survey

A tree survey was carried out by surveyor using a differential GPS in early 2020. Surveyed tree data (trees over 50cm DBH, species, diameter at breast height and canopy spread) was provided to SW Environmental and used to inform this report.

Previous reports

Previous surveys and reports carried out locally were also used to assist in identifying fauna that may occur within the study area. The referenced reports below include comprehensive local surveys. The Dawesville to Binningup study area described in the reports below included an extensive section of coastal land west of the Old Coast Road including Yalgorup National Park, Tuart woodlands, semi-cleared farmlands (similar to the study area) around Preston Beach, Myalup and Binningup.

- Bullen, R.D. Binningup Bat Survey (2009). *Echolocation Survey of Bat Activity in the Lake Clifton and Lake Preston Localities on the Swan Coastal Plain*. Prepared for Department of Environment and Conservation by Bat Call WA. Hillarys, WA
- Dell, J. and Hyder, B. (2009). *An Assessment of the Avifauna of the area between Dawesville and Binningup, Southern Swan Coastal Plain.* Report prepared for Environmental Protection Authority, Perth
- EPA, (2010) *Strategic Environmental Advice on the Dawesville to Binningup Area*, Advice of the Environmental Protection Authority to the Minister for Environment under Section 16(e) of the *Environmental Protection Act 1986* Report 1359
- Hyder, B. and Dell, J. (2009) *An Assessment of the Non-volant Mammal Fauna of the area between Dawesville and Binningup, Southern Swan Coastal Plain*. Report prepared for Environmental Protection Authority, Perth
- Hyder, B and Dell, J (2009) *Summary of the vertebrate fauna values of the area between Dawesville and Binningup, Southern Swan Coastal Plain*, a report to the Environmental Protection Authority
- How, R. A., Maryan, B. and Stevenson, C. A. (2009) *An Assessment of Herpetofauna on Near-Coastal Landforms between Dawesville and Binningup*, Southern Swan Coastal Plain. Prepared for Department of Environment and Conservation. Welshpool, WA
- Harewood (2012a) *Habitat tree assessment. Lots 6 and 8 Old Coast Road Myalup.* Unpublished report to the Palmer Group
- Harewood (2012b) *Western Ringtail Possum Assessment Lots 6 and 8 Old Coast Road Myalup*. Unpublished report to the Palmer Group
- Harewood (2012c) *Black Cockatoo Habitat Assessment Lots 6 and 8 Old Coast Road Myalup.* Unpublished report to the Palmer Group
- ngh environmental (2012) *Level 1 Fauna Survey and Habitat Assessment, Lot 1254 Old Coast Road, Myalup.* Unpublished report to Patane Produce.

2.1.2 Publications

Publications consulted for general distribution of fauna included, but was not limited to:

- A Field Guide to the Mammals of Australia (Menkhorst and Knight, 2013),
- Frogs of Western Australia (Thomson-Dans and Wardell-Johnson, 2002)
- Scats, Tracks and Other Traces: A field guide to Australian mammals (Triggs, 2008),

- The Field Guide to the Birds of Australia (Pizzey and Knight, 2012),
- Michael Morcombe's Birds of Australia eGuide, (Michael Morcombe, 2011),
- A Complete Guide to Reptiles of Australia (Wilson and Swan, 2017),
- Reptiles and Frogs in the Bush: Southwestern Australia (Bush *et al.*, 2007),
- Field guide to frogs of Western Australia (Doughty and Tyler, 2009),
- Waterbirds of South-west Wetlands (Thomson-Dans and Halse, 2001),
- Numerous online publications, journal articles and other general species references (see *References* section).

2.1.3 Taxonomy and nomenclature

The taxonomy and nomenclature used in this report follows several sources, depending on the faunal group. It primarily follows the Naturemap database (2020) but also the following:

- Amphibians: Bush *et al.* (2007),
- Aves: Pizzey and Knight (2007),
- Mammals: Menkhorst and Knight (2013),
- Reptiles: Wilson and Swan (2017).

2.1.4 Expert advice

Mr. Kirkby is a recognised black cockatoo expert with over 20 years full time black cockatoo field survey experience, a role in the Recovery Team for black cockatoos and consultant experience to numerous clients including the WA Museum. Mr. Kirkby assisted with the hollow watch to identify the presence of breeding black cockatoos.

Mr. Kirkby has written or contributed to numerous papers relating to black cockatoos. These include but are not limited to Johnstone, R.E. & T. Kirkby (2008), Johnstone, R.E., T. Kirkby and Mannion, M., (2015), Johnstone, R.E., Sarti, K. and Kirkby, T. (2010a, b, c, 13a, b) and Johnstone R.E., and Kirkby, T. (Undated) referenced in this report.

2.2 Field surveys

The intent of the field surveys were to

- validate the desktop assessment,
- document habitat types and quality,
- record any vertebrate fauna observed.

Targeted black cockatoo and WRP surveys were also conducted.

2.2.1 General habitat assessment and opportunistic recordings

Field work consisted of a diurnal site reconnaissance on 27th March and 1st April 2020.

Non-systematic opportunistic observations of fauna species were made and recorded, along with secondary evidence of fauna such as tracks, nests, scat, bones, diggings and characteristic feed signs.

Fauna habitat quality was based on Table 2-1. Representative site photos are shown in Appendix E.

Table 2-1 Fauna habitat quality categories and descriptions (SW Environmental, undated).

Quality	Description
Good	• Native vegetation with intact and diverse habitat structure. Different vegetation age classes present at most stratum levels (ground, understorey, midstorey, canopy). • Forest/woodland: abundant hollow-bearing trees, including those with or likely to develop large hollows. Mature trees offer more foraging resources (nectar/seed). • Presence of shelter/refuges at ground level (dense understorey plants, tussock, rocky outcrop, hollow logs). • High habitat complexity (ecotones between vegetation types or habitat mosaic). This increases the range of foraging and shelter opportunities within a habitat. • Presence of key foraging and microhabitat components for target species. • Little to no obvious weed invasion or evidence of grazing. • May be large patch and/or connected to other areas of native vegetation.
Moderate	• Native flora species dominant with moderate habitat structure complexity appropriate to vegetation type. Ground litter intact or slightly disturbed. More than one age class present. • Forest/woodland: low to moderate abundance of hollow-bearing trees or trees likely to develop hollows. • Some shelter and refuge present for ground dwelling fauna. • Some habitat complexity (ecotones between vegetation types or areas forming a habitat mosaic). • Marginal presence of key microhabitat components for target species. • May be small or large in scale, and isolated or well connected.
Poor	• Habitat highly disturbed and simplified with low structural complexity. Ground litter layer absent or highly modified. Complexity reduced by only one age class present. • Little or no shelter and refuge for ground dwelling fauna. • Forest/woodland: not likely to support hollow-bearing trees. • Lack of key foraging and microhabitat components for target species. • May have evidence of weed invasion or grazing. • May be narrow or small area and substantially influenced by edge effects, and isolated from other areas of native vegetation.

2.2.2 Black cockatoos

Black cockatoo habitat surveys included:

- Foraging habitat assessment: The amount and quality of potential black cockatoo foraging habitat was noted, with presence of feed residue observed.
- Roosting habitat survey: Direct and indirect evidence of black cockatoos roosting within trees on site were noted if observed.
- Breeding assessment: Breeding and hollow assessments were based on the black cockatoo breeding requirements described in the section below.

  Suitable DBH tree survey: Suitable DBH Trees (those with a DBH[2] >50cm and considered old enough to start developing large hollows and ongoing hollow recruitment; SEWPAC 2012) were recorded over the site.

  Hollows were recorded with the number, height and size of hollows noted in size classes. Hollow classes included the following hollow entrance sizes
    - 20 cm plus - Large hollow, preferred by black cockatoos

[2] DBH – Diameter at breast height

- 15-20 cm – Medium hollow, still used by black cockatoos in the absence of large hollows
- 10-15 cm – Small hollow, less likely to be used by black cockatoos
- <10 cm – not used by black cockatoos (too small to access)

Evidence of use such as chews, wear and other factors were noted along with the suitability of the hollow for black cockatoo breeding, e.g. orientation, access, chamber size or use by other animals.

- A follow up drone survey (DJI Mavic Pro with a 12 MP camera) was undertaken on 5th June 2020 targeting medium to large hollows. The surveys were undertaken to confirm the presence of hollows, assess suitability and record any indicators of black cockatoo usage. The existing hollow data from ground surveys was updated accordingly.

  Images (still photos) of each hollow assessed were captured by the drone and analysed post-survey. Some images were enhanced using professional photo enhancement software (Photoshop) to assist in assessing the hollow. Most hollows were accessible with only two hollow unable to be assessed due to position on the tree or canopy cover around it.

  The following information was revised for each assessed hollow:

  - If the hollow was in actually hollow (large, medium, small or not hollow)
  - If the hollow was suitable to support black cockatoo breeding (based on size, orientation, depth, and other species use) (graded as suitable, marginal, unsuitable),
  - Likelihood of black cockatoo using for breeding (including signs of black cockatoo usage e.g. chewing), (graded as possible with evidence, possible, unlikely, nil).
- A spring time targeted breeding survey was conducted on 28th October 2020 to identify if any of the suitable hollows were being actively used by black cockatoos during the peak of the 2020 breeding season. This was carried out by Shane Priddle and Tony Kirkby and included:
  - Ground based recheck of the trees with hollows most likely to provide suitable breeding habitat (to identify any fresh evidence of use, chews etc),
  - Dusk watch to observe black cockatoo behaviour at the site to identify which if any of the hollows are being actively used.

Black cockatoo breeding requirements

Black cockatoos rely on large hollows for breeding, typically >20cm in diameter. Hollows take many years to form. The onset of hollow-formation is dependent on damage to the tree, from fire, animals (vertebrates or invertebrates), or dropping branches. Young and healthy trees can quickly heal after damage and subsequently trees less than 100 years old are unlikely to contain hollows.

For nesting, black cockatoos generally show a preference for

- large senescing trees,
- hollows not angled more than 45 degrees,
- entrances of at least 12cm but usually much larger (20-30cm),
- deep or well sheltered hollows in main trunk or large branches which are able to provide a floor space of at least 30cm diameter or more.

SW Environmental and Kirkby (2019)

All three species of black cockatoo are a similar size and utilise similar types of tree hollows when breeding. The actual species of tree is probably unimportant to each individual species, for example Carnaby's cockatoo use Wandoo when in the wheatbelt areas and Marri, when in the Marri forest and Karri when in Karri forest areas. All three species are known to use the same individual hollows when not occupied in the breeding season by another black cockatoo species (Kirkby pers comm, 2019).

Jarrah are much less likely than Marri to develop hollows with suitable characteristics required for black cockatoo nesting (Johnstone et al 2013a). It is estimated that upwards of 95% of hollows utilised by black cockatoos in the Jarrah Marri forest are in large Marri rather than Jarrah (Johnstone et al 2013a) (SW Environmental and Kirkby 2019). Wayne (2005) also notes that Marri trees are more likely to develop usable hollows than Jarrah.

Hollows suitable for use by black cockatoos are usually in trees at least 150 years old (Koch 2009). Inions et al. (1989) found that in the Jarrah Forest, large hollows appear to develop in Marri when trees reach a mean age of about 200 years, and in Jarrah when trees reached a mean age of about 300 years, with the average age of trees inhabited being 400 years for Marri and 500 years for Jarrah. Hollows suitable for use by FRTBC are in Marri aged between 140 and 410 years of age (Johnstone et al 2015) and 120 - 150 years in Jarrah (Whitford et al 2013) . Mawson et al. (1994) found that hollows utilised by the medium sized Long-billed Corella (which can utilise smaller hollows than black cockatoos) may take an average of 450 years to form in Marri and over 1000 years in Jarrah (as stags) (Wayne 2005).

Marri, Jarrah and Blackbutt are considered by Commonwealth of Australia (2017) to be large enough to develop hollows once they are >50cm DBH.

2.2.3 Western Ringtail Possum

Diurnal searches included searching for evidence of WRP or suitable habitat on 27th March and 1st April 2020. Scat searches were general and targeted areas such as the base of hollow bearing trees, patches of Peppermint or other midstorey vegetation, vegetation within the low areas, etc where they were most likely to be found. The survey transects used to guide to survey are provided in Figure 5, note the actual transects varied slightly on the ground depending on the locations of trees.

Nocturnal surveys were carried out on 1st and 6th of April 2020 to map the distribution and abundance of WRP. Surveys were undertaken by foot traverse using high powered LED head torch and slow moving vehicle where there were cattle nearby. They covered the entire study area. Climatic conditions at the time of the survey were suitable with no rain and light winds (BOM 2020).

2.3 Limitations

In accordance with *Technical Guidance* (EPA 2016) potential survey limitations are identified below.

Table 2-2 Limitations of flora and fauna survey adequacy and accuracy

Aspect	Constraint	Comment
Competency	No	Suitably qualified individuals carried out the work: [redacted] (Certified Environmental Practitioner No.310) with nearly 20 years' experience conducting fauna surveys throughout NSW and WA. [redacted] (Zoologist) assisted with the second night of nocturnal surveys (Lot 6). [redacted] a recognised black cockatoo expert (see Section 2.1.4).
Scope	No	The scope is adequate to provide the information required to support clearing assessment.
Proportion of flora and fauna identified, recorded and/or collected	No	Suitable survey effort has been adopted to identify the biodiversity constraints associated with the study area. A precautionary approach has also been adopted.
Sources of information	No	The desktop assessment was based on Naturemap and PMST database searches. These focus on the southern Swan Coastal Plain, which is well surveyed from a fauna perspective.
The proportion of the task achieved and further work	No	The surveys were completed adequately, to a sufficient level with respect to the scope.
Timing/weather/season/cycle	No	The surveys were completed in March and April 2020. The survey timing and weather conditions were suitable to detect most target species.
Disturbances which affected results of survey	No	There were no disturbances that affected the survey.
Intensity (in retrospect, was the intensity adequate)	No	Based on the results the survey is considered adequate to meet the project scope.
Completeness (e.g. was relevant area fully surveyed);	No	The survey was completed adequately, to a sufficient level with respect to the scope. The survey area is relatively small and achievable within the survey period.
Resources (e.g. degree of expertise available in animal identification to taxon level);	No	The surveys were completed adequately.
Remoteness and/or access problems;	No	Site was on private land and accessible.
Availability of contextual information on the region.	No	Naturemap includes previous local fauna survey data. Specialist books/publications and data were also consulted.
Identification of hollows	Low	There are known limitations inherent in ground survey of hollows, such as bias with multiple surveyors/survey times due to differing familiarity with vegetation types, levels of training and expertise, survey conditions such as weather and time of day, and survey technique (Gorrod & Keith 2008, Rayner et al. 2011). Poor visibility (such as overcast weather) is known to affect results also (Rayner et al. 2011). Ground-based counts of hollows are subjective, it is not possible to be certain that the feature is a hollow. Limitations to identifying tree hollows from the ground include the likelihood that some hollows, particularly small hollows, hollows in branches and vertical hollows may be missed, may not be observable or may be

		obscured. Only hollows identified from the ground were followed up with drone assessment. As well as providing inaccurate counts of hollow abundance, ground-based surveys provide incomplete or inaccurate information on hollow dimensions and use of hollows by fauna (Koch 2008). Generally, ground-based surveys lead to overestimation of hollows (Rayner et al. 2011). The suitability of hollow may change over time. The drone survey whilst adding further knowledge to the ground survey may incorrectly determine if a hollow is in fact hollow or not and relies in part on the experience of the assessor. There is some risk, though low, that black cockatoos may be breeding in a hollow where evidence of use was not visible or hollow characteristics were atypical. Whilst the black cockatoo breeding survey was carried out during peak season, there is a chance that there may have been early or late breeding by Carnaby's cockatoo, eggs may have been predated and the adults left, variation of use over different seasons etc, so the number of active hollows may not be representative of the number of actual suitable breeding hollows.

3 Desktop review

3.1 Desktop assessment

3.1.1 Local and regional context

Land use

The project is located on the Southern Swan Coastal Plain, adjacent to the Forrest Highway. The area has undergone significant clearing, mostly attributed to farming. The main local land uses are dry-land agriculture (improved pasture/grazing, pine plantations), easements, reserves, mining and rural residential. A small rural subdivision and strata development associated with Lakeside Drive occurs to the north of Lot 8 and east of Lot 6.

The study area itself is highly disturbed, most of the vegetation either cleared or retained as paddock trees. Both lots have been historically grazed and contained cattle at the time of the survey.

Interim Biogeographic Regionalisation of Australia (IBRA) values

The Interim Biogeographic Regionalisation for Australia (IBRA) classifies Australia's landscapes into 89 large geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information. IBRA also provides for the national and regional planning framework for the systematic development of a comprehensive, adequate and representative (CAR) National Reserve System, endorsed by all levels of government as a key tool for identifying land for conservation under Commonwealth's Australia's Strategy for the National Reserve System 2009-2030 (DE, 2017).

The Project occurs within the Swan Coastal Plain Sub-region (SWA02) of the Swan Coastal Plain IBRA region. This bioregion consists of a low lying coastal plain, mainly covered with woodland. Woodlands are 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) (Williams et al 2002).

DBCA managed lands

There are numerous DBCA managed reserves (6,154 ha) within 10 km of the study area (SLIP 2020). These account for approximately 18% of local lands 35,025 ha). The following are listed in order of highest area within the 10 km radius:

- Myalup State Forest 3206 ha
- Yalgorup National Park 1593 ha
- Other reserves 1265 ha
- Byrd Swamp Nature Reserve 41 ha
- Crampton Nature Reserve 36 ha
- Wellard Nature Reserve 10 ha

The Myalup State Forest is the closest, sharing its western boundary with the eastern edge of Lot 8.

Habitat connectivity, linkage or corridor values

In a local context there is approximately 13,100 ha of native vegetation mapped (or 37%) remaining within 10 km of the study area (35,025 ha) (Government of Western Australia 2019).

Linkages (SWREL) project identifies regional scale ecological linkages and aims to respond to the issues of fragmentation and climate change through land use planning policy and procedures. It also seeks to retain native vegetation and fauna habitat and reduce the loss of biodiversity and ecological function in the South West. The SWREL axis lines can be summarised as a series of vegetation patches which due to their proximity, act as habitat stepping stones thereby facilitating ecological processes and movement of organisms within and across the landscape (i.e. at the landscape scale) (Molloy et al 2009).

The study area does not occur within any mapped SWREL axis line. Parts of the vegetation near the artificial dam at the far east of Lot 8, outside of the study area, are located within an area mapped *3a: with an edge touching or within <1000m of a linkage* (Molloy et al 2009).

Based on the above the vegetation within the study area has negligible to low habitat connectivity, linkage or corridor importance at the patch and landscape scales.

Important Bird Areas (IBA)

Important Bird Areas (IBAs) are areas identified by Birdlife International. IBAs are considered conservation priorities, sites able to be conserved in their entirety and are usually part of a protected-area network or recognised as having global bird conservation importance (Birdlife International, 2020). The Yalgorup IBA is the closest and only IBA within 10 km of the study area. It occurs approximately 1.7km to the west, separated from the study area by the Forrest Highway and other agricultural land.

The Yalgorup IBA includes the wetlands of the Yalgorup National Park, south of Mandurah and in the shires of Murray, Waroona and Harvey in Western Australia. The Yalgorup lakes vary from about 1-4 metres in depth and are evaporative salt lakes principally supplied by fresh groundwater and precipitation. Large parts of the shoreline throughout Yalgorup have been cleared, mostly for agriculture. The IBA is part of the Peel-Yalgorup Ramsar site (Birdlife International, 2020).

The IBA has supported more than 1% of the world population of two species, each on a single occasion (Birdlife International, 2020):

- 2500 Red-capped Plovers in 2001 but max 6060 from 1994-1999
- 2210 Red-necked Avocet at Lake Clifton in 1988 but max 304 in 1994-1999
- Other high counts from Lake Clifton include Pacific Black Duck (4308 in 1990), Little Black Cormorant (2007 in 1986) and breeding Great Crested Grebe (max 190); and at Lake Pollard, up to 2000 Black Swan (DEWHA 2008). Fairy Terns occur occasionally.

The site also holds significant populations of three threatened mammals, Chuditch (*Dasyurus geoffroii*), Southern Brown Bandicoot (*Isoodon obesulus*) and Western Ringtail Possum (*Pseudocheirus occidentalis*) (Birdlife International, 2020).

3.1.2 Environmental values of the study area

Landform, soils and climate

Soil mapping by the Department of Agriculture and Food (Tille and Lantzke 1990) identifies three soil units within the both Lots, within the Spearwood Dunes landform.

- 211SpW SWAMP - Swamp
- 211Sp S4a - Flat to gently undulating sandplain with deep, pale and sometimes bleached, sands with yellow-brown subsoils.
- 211Sp S4b - Flat to gently undulating sandplain with shallow to moderately deep siliceous yellow-brown and grey-brown sands with minor limestone outcrop.

Local climate is classified as Warm Mediterranean and rainfall ranges between 600 and 1000mm annually (Environment Australia, 2000).

Wetlands and watercourses

The term 'wetlands' refers to damplands, estuary-peripheral and water body, floodplains, palusplain and sumplands. The wetland categories are recognised by the EPA, DBCA, DWER and other decision making authorities.

Guidance on protecting the environment during planning and development is set out in the *Environmental Protection Authority's Guidance Statement 33 - Environmental Guidance for Planning and Development* (EPA 2008). Chapter B4 describes the requirements for the protection of wetlands. The EPA considers wetlands in terms of the three broad wetland management categories: Conservation (0-5% disturbed), Resource Enhancement (5-90%) and Multiple Use (90-100% disturbed).

A search of the SLIP wetlands layers (Consanguineous Wetlands Suites, Directory of Important Wetlands in Australia, Geomorphic Wetlands, and RAMSAR) available from SLIP (Government of Western Australia, 2020) indicates that the following within the study area:

- 'Multiple Use' Sumpland (ID 1591) and Dampland (ID 1589) through Lot 6 (Photo 1) and Dampland (ID 1494) just south of the artificial dam on Lot 8.

Multiple Use Wetlands have *few remaining important attributes and functions* (GS33, EPA 2008).

The study area does not contain any wetlands listed under the Directory of Important Wetlands in Australia or RAMSAR (List of Wetlands of International Importance).

Vegetation

Vegetation complexes in the area were mapped by Webb et al. (2009) as an extension of earlier work by Heddle et al. (1980) and revised through Webb et al. (2016). Vegetation is mapped as Yoongarillup Complex – Woodland to tall woodland of *Eucalyptus gomphocephala* (Tuart) with *Agonis flexuosa* in the second storey. This represents most of the vegetation in Lot 6. Less consistently an open forest of *Eucalyptus gomphocephala* (Tuart) - *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri). This vegetation occurs more through Lot 8.

The study area contains vegetation likely to develop large hollows. Hollow bearing trees are critical elements for many fauna species, including many arboreal mammals (such as phascogales and possums), bats and bird species (such as owls and black cockatoos). Animals can be selective in their use of tree hollows, preferentially using hollows of a particular size, shape and orientation. Many hollow dependant fauna are considered threatened, which is often at least partially attributed to a lack of suitable nesting sites (Koch 2008).

Hollows take many years to form. The onset of hollow-formation is dependent on damage to the tree, from fire, animals (vertebrates or invertebrates), or dropping branches. Young and healthy trees can quickly heal after damage and subsequently trees less than 100 years old are unlikely to contain hollows. Hollows suitable for use by animals are usually 150+ years old (Koch 2009). Suitable DBH trees are discussed in Section 2.2.

3.1.3 Potential fauna records

Fauna recorded locally

Local records (Naturemap 2020), supplemented by species that may occur locally from other literature, are provided in Appendix F. A total of 228 terrestrial species have been recorded locally, with birds by far the most abundant class.

Class	**Species**
Amphibians	11
Birds	159
Mammals	24
Reptiles	34
TOTAL	228

At least nine of the listed fauna are introduced or naturalised species. Invertebrates, marine or aquatic dependant species (fish) are not included. Some near coastal or wetland taxa may be included in the list even though they may not occur within the study area. This list is not exhaustive, nor would all species occur within the study area.

Fauna of conservation significance

Based on the evaluation provided in Appendix D, there are 29 vertebrate fauna of conservation significance that may occur locally (not necessarily within the study area). Additionally, two fish and two invertebrates of conservation significance may also potentially occur locally. A summary is provided below and in Table 3-3.

Class	**Species**
Bird	10

Mammals	6
Reptiles	2
Fish	2
Invertebrate	2
TOTAL	22

Table 3-1 Threatened and Priority fauna recorded, or that may occur, within 10 km of the study area (Naturemap, 2020) (PMST, 2020).

Class	Family Genus species	Vernacular	Status Federal	Stat. WA
AVES	**Ardeidae** *Ardea ibis*	Cattle Egret	IA	-
	Ardea modesta	Great Egret	IA	-
	Botaurus poiciloptilus	Australasian Bittern	EN	EN
	Ixobrychus flavicollis	Black Bittern		P2
	Cacatuidae *Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo	VU	VU
	Calyptorhynchus baudinii	Baudin's Cockatoo	EN	EN
	Calyptorhynchus latirostris	Carnaby's Cockatoo	EN	EN
	Falconidae *Falco peregrinus*	Peregrine Falcon	-	OS
	Strigidae *Ninox connivens connivens*	Barking Owl (SW pop.)	-	P3
	Tyto novaehollandiae subsp. novaehollandiae	Masked Owl (southern subsp)	-	P3
MAMMALS	**Dasyuridae** *Dasyurus geoffroii*	Chuditch	VU	VU
	Phascogale tapoatafa	Southern Brush-tailed Phascogale	-	S
	Muridae *Hydromys chrysogaster*	Water Rat	-	P4
	Peramelidae *Isoodon obesulus fusciventer*	Southern Brown Bandicoot	-	P4
	Pseudocheiridae *Pseudocheirus occidentalis*	Western Ringtail Possum	CR	CR
	Vespertilionidae *Falsistrellus mackenziei*	Western False Pipistrelle	-	P4
REPTILES	**Scincidae** *Ctenotus ora*	Coastal Plains Skink	-	P3
	Lerista lineata	Perth Slider	-	P3
FISH	**Galaxiidae** *Galaxiella munda*	Mud minnow, Western dwarf galaxias	-	EN
	Percichthyidae *Nannatherina balstoni*	Balston's Pygmy Perch	VU	VU
INVERT	**Hyriidae** *Westralunio carteri*	Carters Freshwater Mussel	VU	VU

Class	Family Genus species	Vernacular	Status Federal	Stat. WA
	Idiopidae *Idiosoma sigillatum*	Swan Coastal Plain Trapdoor Spider	-	P3

4 Results

4.1 Fauna habitat

4.1.1 General fauna habitat

Three key fauna habitat types were identified; a predominantly cleared pasture with scattered trees, an open woodland without a native overstorey, and small patches of low lying shrubland vegetation with a mosaic of native and planted species. Vegetation condition over the entire site was in a completely degraded condition.

Habitat types within the study area are described in more detail below and mapped in Figure 3.

- Cleared with occasional trees (24.27 ha)
- Open woodland (26.99 ha)
    - Tuart (*Eucalyptus gomphocephala)* open woodland with occasional Marri (*Corymbia calophylla*), Jarrah (*Eucalyptus marginata),* Peppermint (*Agonis flexuosa*) over weeds or pasture grass (12.33 ha)
    - Marri open woodland with occasional Jarrah and Peppermint (14.66 ha)
- Swamp Paperbark shrubland with Peppermint, Flooded gum or other trees (1.88 ha)
    - Peppermint, Swamp Paperbark (*Melaleuca rhaphiophylla*) shrubland with occasional Marri trees (0.53 ha)
    - Swamp Paperbark shrubland and planted species (0.35 ha)
    - Flooded gum, Marri and planted *Eucalyptus sp*. over Swamp paperbark and *Acacia saligna* over weeds or pasture grass (1.00 ha)

In considering the quality categories in Table 2.1, fauna habitat quality within the study area was mostly Poor due to the limited structural and species diversity. This in turn limits fauna refuge and food resources. The Poor to Moderate habitat quality areas included the woodland and areas where the native woodland had a native midstorey.

Table 4-1 Fauna habitat types over the study area

Vegetation description	Vegetation Condition	Fauna habitat value	Example photo
Cleared with occasional native trees **24.27 ha**	Completely Degraded	Poor	

Vegetation description	Vegetation Condition	Fauna habitat value	Example photo
Tuart open woodland with occasional Marri, Jarrah, Peppermint over weeds or pasture grass **12.33 ha**	Completely Degraded	Poor to Moderate	
Marri open woodland with occasional Jarrah and Peppermint **14.66 ha**	Completely Degraded	Poor to Moderate	
Peppermint, Swamp Paperbark (*Melaleuca rhaphiophylla*) shrubland with occasional Marri trees. **0.53 ha**	Completely Degraded	Poor to Moderate	
Swamp Paperbark shrubland and planted species **0.35 ha**	Completely Degraded	Poor	
Flooded gum, Marri and planted *Eucalyptus* sp. over Swamp paperbark and *Acacia saligna* over weeds or pasture grass **1.00 ha**	Completely Degraded	Poor	

Note the areas above are approximate and include cleared areas between the tree canopies.

The are no intact drainage lines within the study area. The wetland on Lot 6 is completely degraded, cleared, grazed and likely to be only seasonally wet. There is a small pool open to cattle with high levels of eutrophication observed (Photo 2). The artificial dam on Lot 8 is outside of the study area but also degraded (Photo 3).

Photo 1 Multiple Use wetland – degraded seasonal sumpland in Lot 6.

Photo 2 Multiple Use wetland – degraded pool in Lot 6.

Photo 3 Artificial dam within Lot 8 but outside of the study area.

4.1.2 Hollows and suitable DBH trees

There were a total of 381 suitable DBH trees (i.e. Dead, Jarrah, Marri, Flooded Gum or Tuart >50cm DBH) within the study area (Appendix G). The Tuart trees were nearly all located within Lot 6 and Marri trees within Lot 8 (Appendix A Figure 3). The remaining species were mixed throughout, mostly but not always fringing the wetter areas (Appendix A Figure 4).

Initial ground surveys identified 37 trees with 46 hollows greater than 10 cm in size. These included one dead tree, two Jarrah, 8 Marri and 26 Tuart trees. Additionally, there were numerous small hollows (<10cm) with limited access for most target fauna. These are not considered further. It is unlikely that all of the hollows will actually be hollow – see Limitations in Section 2.3. Follow up surveys (drone and breeding survey) identified 15 trees, mostly Tuarts, that contained medium to large hollows.

4.2 Fauna recorded

Thirty-five species of fauna were observed within the study area. This included observations from the artificial dam on Lot 8, due to the close proximity to the remaining study area.

The fauna recorded included 27 birds, five mammals, three of which are introduced (Cow, Fox and Rabbit) and one reptile. They are generally common locally, with the exceptions of Carnaby's cockatoo, FRTBC and WRP which are fauna of conservation significance. Two unidentified species of bats were also observed, identified as different species by size.

Table 4-2 Fauna recorded within the study area

Class	Family	Scientific name	Vernacular name
AVES	ACANTHIZIDAE	*Acanthiza chrysorrhoa*	Yellow-Rumped Thornbill
AVES	ACANTHIZIDAE	*Smicrornis brevirostris*	Weebill
AVES	ACCIPITRIDAE	*Aquila audax*	Wedge-Tailed Eagle
AVES	ANATIDAE	*Anas superciliosa*	Pacific Black Duck
AVES	ANATIDAE	*Chenonetta jubata*	Australian Wood Duck
AVES	ANATIDAE	*Cygnus atratus*	Black Swan
AVES	CACATUIDAE	*Cacatua sanguinea**	Little Corella
AVES	CACATUIDAE	*Cacatua roseicapilla**	Galah
AVES	CACATUIDAE	*Calyptorhynchus banksii*	Red-Tailed Black Cockatoo
AVES	CACATUIDAE	*Calyptorhynchus latirostris*	Carnaby's Cockatoo
AVES	CORVIDAE	*Corvus coronoides*	Australian Raven
AVES	FALCONIDAE	*Falco cenchroides*	Nankeen Kestrel
AVES	HIRUNDINIDAE	*Hirundo neoxena*	Welcome Swallow
AVES	HIRUNDINIDAE	*Petrochelidon nigricans*	Tree Martin
AVES	MELIPHAGIDAE	*Anthochaera carunculata*	Red Wattlebird
AVES	MELIPHAGIDAE	*Anthochaera chrysoptera*	Little Wattlebird
AVES	MONARCHIDAE	*Grallina cyanoleuca*	Magpie-Lark
AVES	PARDALOTIDAE	*Pardalotus striatus*	Striated Pardalote
AVES	PHALACROCORACIDAE	*Phalacrocorax varius*	Pied Cormorant
AVES	PODICIPEDIDAE	*Poliocephalus poliocephalus*	Hoary-Headed Grebe
AVES	PSITTACIDAE	*Platycercus zonarius*	Australian Ringneck
AVES	PSITTACIDAE	*Polytelis anthopeplus*	Regent Parrot
AVES	RALLIDAE	*Gallinula tenebrosa*	Dusky Moorhen

Class	Family	Scientific name	Vernacular name
AVES	RHIPIDURIDAE	*Rhipidura albiscapa*	Grey Fantail
AVES	RHIPIDURIDAE	*Rhipidura leucophrys*	Willie Wagtail
AVES	STRIGIDAE	*Ninox novaeseelandiae*	Southern Boobook
AVES	THRESKIORNITHIDAE	*Threskiornis molucca*	Australian White Ibis
MAMMALIA	BOVIDAE	*Bos taurus*	Cow*
MAMMALIA	CANIDAE	*Vulpes vulpes*	Fox*
MAMMALIA	LEPORIDAE	*Oryctolagus cuniculus*	Rabbit*
MAMMALIA	MACROPODIDAE	*Macropus fuliginosus*	Western Grey Kangaroo
MAMMALIA	PSEUDOCHEIRIDAE	*Pseudocheirus occidentalis*	Western Ringtail Possum
REPTILIA	GEKKONIDAE	*Christinus marmoratus*	Marbled Gecko

4.3 Fauna of conservation significance

Database searches and other sources identified 10 fauna of conservation significance, recorded or likely to occur within 10 km of the study area (see Appendix D).

A threatened fauna evaluation table was prepared for conservation significant fauna based on the desktop assessment and site reconnaissance (Appendix B). It excludes marine, marine migratory and regionally extinct species and has been updated with other records where the species may occur. Fauna of conservation significance that possibly occur within the study area are summarised in the Table below.

Three conservation significant fauna were actually recorded from the study area, including WRP, Carnaby's cockatoo and FRTBC. Baudins cockatoo may is also likely to utilise the study area, most likely for foraging at certain times of the year.

A single WRP was observed in Lot 8.

Table 4-3 Conservation significant fauna that may occur within the study area, based on habitat suitability.

Class	Family Genus species	Vernacular	Status Federal	Stat WA	Habitat	Likelihood of occurrence
AVES	**Ardeidae** *Ardea ibis*	Cattle Egret	IA	-	Present	Possible visitor – foraging
	Ardea modesta	Great Egret	IA	-		
	Cacatuidae *Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo	VU	VU	Present	Present, potential breeding and foraging
	Calyptorhynchus latirostris	Carnaby's Cockatoo	EN	EN	Present	Present, potential breeding and foraging
	Calyptorhynchus baudinii	Baudin's Cockatoo	EN	EN	Present	Possible visitor – foraging/ breeding
AVES	**Falconidae** *Falco peregrinus*	Peregrine Falcon	-	OS	Present	Possible visitor – foraging/ breeding

Class	Family Genus species	Vernacular	Status Federal	Stat WA	Habitat	Likelihood of occurrence
	Strigidae *Ninox connivens connivens*	Barking Owl (SW pop.)	-	P3	Present	Possible visitor – foraging/ breeding
	Tyto novaehollandiae subsp. novaehollandiae	Masked Owl (southern subsp)	-	P3	Present	Possible visitor – foraging/ breeding
	Dasyuridae *Phascogale tapoatafa*	Southern Brush-tailed Phascogale	-	S	Present	Possible – foraging/ breeding
	Pseudocheiridae *Pseudocheirus occidentalis*	Western Ringtail Possum	CR	CR	Present	Present (1) in Lot 8 – foraging/ breeding
	Vespertilionidae *Falsistrellus mackenziei*	Western False Pipistrelle	-	P4	Present	Possible – foraging/ breeding

5 Species profiles and site values

Cattle Egret (*Ardea ibis*) IA and **Great Egret (*Ardea modesta*)** IA

These birds are waders that occur in stock paddocks, pastures, crop lands, wetlands, mudflats, drains, irrigation areas and estuaries (Pizzey and Knight 2007).

These birds are wide ranging, may only occur within the study area intermittently for foraging with abundant similar habitat locally. Impacts to these species would be negligible.

Peregrine Falcon (*Falco peregrinus*) OS

Peregrine Falcons occur in woodland, plains, gorges, wetlands but tend to breed either in stick-nests in trees or nest on cliff ledges. Hollows and large abandoned nests of other birds may be used where cliff ledges are limited. Breeds Aug-Dec. Where good habitat occurs, and the density of Peregrine Falcons is high, active nests may occur within 2.5km of each other. The diet of the Peregrine Falcon includes wood duck, pigeons and doves, galahs, rosellas and cockatoo, starlings and larks (Olsen et al. 2006).

They are wide ranging, with abundant habitat locally. Impacts to this species would be negligible.

Barking Owl (SW pop.) (*Ninox connivens connivens*) WA Priority 3

Occurs in forest, woodlands, dense scrub, foothills, river red gums and other large trees near water courses penetrating open country. They prefer woodlands and forests with a high density of large trees and particularly sites with hollows that are used by the owls as well as their prey (Pizzey and Knight 2007).

Suitable habitat occurs within the study area, with some prey species likely to present (Rabbit and possums), numerous large hollows and open country near a water course (farm dams and wetland). The species is wide ranging and sparse with no local records (Naturemap 2020). No evidence of nesting was observed within the study area in association with any of the hollows (whitewash or pellets). It is probably unlikely to be nesting within the study area but clearing outside of the nesting period July to November would ensure risks to this species are minimised.

Masked Owl (southern subsp) (*Tyto novaehollandiae subsp. novaehollandiae*) WA Priority 3

Masked Owls inhabit forests, open woodlands and farmlands with large trees, including timber watercourses paperbark woodlands. It nests in large hollows and caves. Widespread but very sparse, they breed any time of the year when conditions are favourable with a nesting period of about three months (Pizzey and Knight 2007).

The species is wide ranging and sparse with no local records (Naturemap 2020). No evidence of nesting was observed within the study area in association with any of the hollows (whitewash or pellets). The species is unlikely to be nesting within the study area and the study area is likely to only have limited foraging value given the amounts of similar habitat locally.

Southern Brush-tailed Phascogale (*Phascogale tapoatafa*) CD (BC Act)

This arboreal species is found in a variety of forest types. Ideal habitat for this species consists of dry sclerophyll forest and open woodland (Jarrah, Marri, and mixed Jarrah Karri) that contain hollow bearing trees and sparse ground cover. Their many nesting sites include hollow tree limbs, rotten stumps and even birds' nests. Lactating females prefer a large tree cavity with a small entrance with a nest made of bark, feathers and fur. A female's home range covers 20 to 70 hectares, a male's home ranges over laps females and increases during breeding season. It is predominantly carnivorous, foraging on arthropods, invertebrates, small vertebrates and nectar (Strahan 1995).

There are no nearby records with the closest being south of Bunbury (Naturemap 2020). The study area provides suitable habitat but would only be a portion of a larger patch given the species large home range requirements. Given the species large home range it is possible that even with clearing proposed that a local population would still persist, particularly if only part of the site was cleared. The loss of an individual is not likely to have a significant impact on local populations of this species.

Western False Pipistrelle (*Falsistrellus mackenziei*) WA Priority 4

This microbat occurs in wet sclerophyll forest dominated by Karri, and in the high rainfall zones of the Jarrah and Tuart forests. Since 1961, the species has been collected at 34 locations in south-west Australia. It is known from 27 operational forest 'blocks'. It has also been recorded in mixed Tuart-Jarrah tall woodlands on the adjacent coastal plain. Marri, Sheoak and Peppermint trees are often co-dominant at its collection localities (DEWHA, 2009). This species roosts in tree hollows in colonies of 5 to 30 bats (Aust Museum, 2009) (Phillips & Inwards 1985). The species feed on flying insects between below the forest canopy.

Records occur approximately three kilometres to the southwest (Naturemap 2020). Surveys carried out locally by Bat Call WA (2009) have recorded the species at sites combining woodland with a nearby (within 1.5 km) permanent fresh water source, in what appears to be similar habitat to that at the site. Given the presence of Tuart/Peppermint/Marri/Jarrah with hollows, and that at least two species of microbats were seen during the nocturnal surveys, the presence of this species cannot be ruled out without further targeted survey work.

If a population of Western False Pipistrelle was present within the study area, and the whole study area was cleared, it would be impacted directly by loss of habitat (roosting and foraging) as well as potentially the direct mortality of any individuals (potentially a colony) roosting within a hollow tree during clearing.

5.1.1 Black cockatoos

Baudin's Cockatoo (*Calyptorhynchus baudinii*) EN (EPBC Act), EN (BC Act)

Baudin's Cockatoo is a large, iconic forest cockatoo endemic to the south west corner of WA. It has suffered a substantial decline in number in the past 50 years. Direct causes of this decline include large numbers shot by orchardists, fragmentation of habitat and the impact of hollow competitors (Johnstone and Kirkby 2008). Depending on their region of origin, Baudin's cockatoo is a resident, a post nuptial nomad or migrant with the bulk of the population vacating the coldest parts of their range (i.e. the Karri forest block) in the autumn and migrating northwards during the non-breeding season. Small numbers also appear resident in a few places including Leeuwin – Naturaliste Ridge and Manjimup (Johnstone and Kirkby 2008). Flock sizes vary from small family groups to large aggregations at roosting sites.

In the non-breeding season, Baudin's Cockatoo is mainly an inhabitant of the Jarrah Marri forest but is also frequently seen in farmland and orchards. It feeds on a variety of foods including nectar and seeds from hakeas and banksia spp. also apples, persimmons and macadamias. Overall, its

main food is Marri from which it takes seeds, grubs and nectar. Its long bill is adapted to removing seeds from Marri fruit capsules.

Breeding mainly takes place in the Karri forested areas from August to November (egg laying dates). Baudin's Cockatoos are also known to breed in small numbers in other areas outside the Karri forest including Nannup, Serpentine Hills, Collie, Mount Solus and the Wungong and 31 Mile Brook areas south of Perth). The nearest known breeding location to the project area is 26 km to the south west at the Donnelly Boat Landing. Breeding is also known 33 km to the south east at Quinninup (Johnstone and Kirkby unpublished data).

Roost sites are usually in smooth barked eucalypts (occasionally rough barked eucalypts, i.e. Marri, Jarrah and Blackbutt) including Wandoo, Flooded Gum, Bullich and smooth barked exotic eucalypts including plantations (Johnstone and Kirkby 2008) Roosting is also recorded in Karri during the breeding season (T. Kirkby pers comm) (SPRAT 2019).

No feed residue was observed within the study area. There are no nearby records from within 5 km (Naturemap 2020).

Carnaby's Cockatoo (*Calyptorhynchus latirostris*) EN (EPBC Act), EN (BC Act)

This species is a postnuptial nomad, tending to move west after breeding. Carnaby's cockatoo mainly occurs in or near eucalypt woodlands, especially those dominated by Wandoo or Salmon Gum, and sometimes reported in forests of Marri, Jarrah, Karri and Tuart. Nesting hollows may be located anywhere over two metres from ground, mainly in the Wheatbelt (Cale 2003, SPRAT 2019, WA Museum 2010).

It is known to forage in native shrubland, kwongan heathland and woodland dominated by proteaceous plant species such as Banksia spp. Hakea spp. and Grevillea spp. Forages in pine plantations, eucalypt woodland and forest that contains foraging species, individual trees and small stands of these species (SEWPAC 2012).

This species is currently expanding its breeding range westward and south into the Jarrah-Marri forests of the Darling Scarp and into the Tuart forests of the Swan Coastal Plain. This may be due to climate change. Breeding occurs mainly from early July to mid-December. Breeding success is largely dependent on suitable feeding habitat adjacent to the nest site to provide the necessary food for the survival of the chick, for example adjacent pine forest or remnant vegetation (Johnstone and Kirkby, Undated). Carnaby's Cockatoo is also known to breed in Karri forest at Porongurup, Walpole, Albany, Denmark and Mount Manypeaks. The nearest known breeding location is 38 km to the north west at Blackwood River National Park (Johnstone and Kirkby unpublished data).

Carnaby's Cockatoos are known to roost in Jarrah, Marri, Blackbutt, Bullich, exotic eucalypt species and pines.

Feed residue was observed within the study area within Lot 8, in low abundances. There are 44 records from within 5 km (Naturemap 2020).

Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) (FRTBC) VU (EPBC Act), VU (BC Act)

The FRTBC is a large, iconic forest cockatoo, endemic to the south-west corner of Western Australia. Formerly common, but now rare to uncommon and patchily distributed, it has disappeared from about 30% of its former range. It has suffered a marked decline in numbers over the past 60 years. The main reasons for this decline include the destruction and fragmentation of habitat (especially Jarrah-Marri forest), the apparent decline in Marri along the eastern side of the Darling Scarp, logging, the impact of hollow competitors, fire and possibly climate change (Johnstone, Kirkby and Sarti 2013a, b). FRTBC occurs throughout the Jarrah Marri Karri forested areas but in recent years has been foraging out on to the Swan Coastal Plain feeding on the seeds of Cape Lilac. Group sizes vary from small family groups and pairs to larger gatherings at roost sites.

FRTBC nest in hollows Jarrah, Marri, Blackbutt, Bullich and Wandoo. Hollows have been recorded from 6.5 – 33 m above ground (Johnstone Kirkby and Sarti 2015). FRTBC have been recorded breeding in all months but with peaks in Spring and Autumn. There are also years when very little if any breeding takes place i.e. 2008 and 2009 (Johnstone and Kirkby unpublished data). The nearest known breeding location to the project area is 36 km to the north west at Nannup.

FRTBC feed mainly on the seeds of Jarrah and Marri but also Blackbutt, Albany Blackbutt, Sheoak, Snottygobble and introduced native and non-native species such as Lemon-scented Gum, Spotted Gum and Cape Lilac (SPRAT 2019).

FRTBC are known to roost in Jarrah, Marri, Blackbutt, Bullich and introduced eucalypt species.

Feed residue was observed within the study area within Lot 8, in low abundances. There are two records from within 5 km (Naturemap 2020).

Breeding habitat

Black cockatoo breeding requirements are outlined in Section 5.1.1. The numbers of hollows and suitable DBH trees within the study area are discussed in Section 4.1.2 and further below. Hollow suitability and likelihood of being used for breeding by black cockatoos are shown in Table 5-1 updated with the results of the breeding survey.

There were a total of 381 suitable DBH trees (i.e. Dead, Jarrah, Marri, Flooded Gum or Tuart) within the study area (Appendix G).

Of the suitable DBH trees, 15 trees contained medium to large hollows with the highest potential to be used by black cockatoos. They were mostly Tuarts, and all located within Lot 6. In considering the other elements including orientation, access, chamber size or use by other animals, only a portion of those are likely to be actually suitable for breeding. Twenty trees contained small or marginal hollows that are unlikely to be used by black cockatoos.

Ten trees contained hollows that were considered suitable for black cockatoo breeding, six of which had fresh chews during the spring 2020. These have had time invested by cockatoos either for

- prospecting for suitability (with a different hollow chosen for breeding this season),
- earlier breeding where the young had left the nest this season,
- where breeding had been unsuccessful this season (e.g. predation) and no longer used,
- previous use by FRTBC but not in the nest at the time of the survey (can breed any time of the year).

An active Carnaby's cockatoo (female observed leaving the nest in response to male call and returning after feeding) was observed on the boundary but outside of the study area (ID 0) (see Figure 4). This tree will be retained.

Based on the breeding survey, the Tuarts on Lot 6 provide breeding habitat for Carnaby's and FRTBC. None of the hollows within the clearing footprint were observed to be current active black cockatoo nests.

The presence of Little Corella and Galahs (ferals) and crossover of hollow usage with black cockatoo may indicate that some of the hollows were being used by these species. However, the type and nature of the chews were consistent with black cockatoo. Further, control of these feral species would increase the usage of local hollows by black cockatoo species.

Table 5-1 Hollow descriptions updated following black cockatoo breeding survey (spring 2020)

ID	East	North	Trunk DBH (m)	Tree	BC use
8	381458	6337767	2	Tuart	Suitable no chews
12	381387	6337786	2	Tuart	Suitable with chews
27	381379	6337873	1.5	Tuart	Unlikely
38	381368	6337998	2	Tuart	Unlikely
44	381365	6338122	1.5	Tuart	Suitable old chews
54	381436	6337906	2	Tuart	Suitable with chews
71	381502	6338042	1.5	Tuart	Unlikely
90	381627	6337993	2	Tuart	Suitable probable wood duck
95	381622	6338083	2	Tuart	Suitable with chews (probable vacant FRTBC breeding hollow)
96	381619	6338097	2	Dead	Unlikely
97	381565	6338131	1.8	Tuart	Suitable with chews
99	381552	6338100	2	Tuart	Suitable no chews
124	381754	6338090	2	Tuart	Suitable with chews
126	381777	6338065	1.5	Tuart	Unlikely
842	381482	6337973	1	Tuart	Suitable with chews

Foraging habitat

Feed residue (chewed Marri cones) were observed within the study area within Lot 8, in low abundances from both Carnaby's cockatoo and FRTBC. Marri and Jarrah are plant species foraging known to be utilised by all three black cockatoos. Tuart may also be a foraging resource for Carnaby's cockatoo (Johnstone and Kirkby undated).

The following canopy areas (6.79 ha total) of key foraging plants are available over the site (note there is some overlap):

- Marri – 2.57 ha
- Jarrah – 0.68 ha
- Tuart – 3.54 ha

There was no evidence of roosts observed at the site.

Referral under the EPBC Act

SEWPAC (2012) provides referral guidelines in place of the EPBC Act general assessment of significance guidelines for black cockatoos. The final impact footprint should be assessed against these Guidelines. As it stands the clearing of the entire Lots 6 or 8 would warrant referral to DAWE due to the clearing of over 1 ha of quality foraging habitat and the presence of suitable breeding trees with some showing signs of previous use.

5.1.2 Western Ringtail Possum

Western Ringtail Possum (WRP) (*Pseudocheirus occidentalis*) CR (EPBC Act), CR (BC Act)

Present populations mostly inhabit Peppermint and Peppermint-Tuart associations from Bunbury to Albany (SPRAT 2018). In dense, coastal Peppermint forest, home ranges are about 0.5 hectares to 1.5 ha and in eucalypt forests about 2.5 ha. In the northern jarrah forests, home ranges are larger and have been recorded to at least 5.6 ha.

Peppermint leaves form the basis of the WRP diet in coastal areas (between 79-100% based on a study of WRP near Busselton by Jones et al. 1994), but when unavailable, the dominant myrtaceous species are preferred. In the inland forest, Jarrah and Marri the main food source. Garden plant varieties are also exploited in urban areas.

WRP use a range of nest and shelter sites to avoid predators and exposure to the weather. Dreys are constructed in the canopy if hollows are not available. Adequate nest and shelter sites are necessary components of good quality habitat (Jones 1994; Shedley and Williams 2014).

There are 32 Naturemap records within five kilometres of the study area but none within 2.5 km of the study area.

Several possible WRP dreys were observed within the small patch of Peppermint to the western edge of Lot 8, with a single WRP identified during the diurnal survey at that location. There were no WRP observed within either Lot during the nocturnal surveys (two Common Brushtail Possums only shown in Figure 5).

Fox predation is one of the main threats and causes of mortality to WRP (Wayne 2005) along with the loss and fragmentation of native vegetation. This is due to their high dependence on midstorey and overstorey vegetation for food, shelter and protection from predators. A Fox was identified within the study area within Lot 6. The trees within Lot 6 also have limited or no connectivity between the canopy and no midstorey over most of the site. This in turn increases WRP vulnerability to predation if they were present.

There are also concerns that an increase in fox control in areas where WRP and Brushtail Possums occur together may give Brushtail Possums a greater advantage (due to their greater amount of time spent on the ground) leading to increased competition pressure on WRP (DPaW 2014).

WRP success has been known to be negatively associated with high numbers of the sympatric Common Brushtail Possum (*Trichosurus vulpecula*) (DPaW 2014). Brushtail possums are larger, more mobile, more aggressive and have been frequently observed evicting western ringtail possums from hollows (Wayne 2005).

The feral European Honeybee, *Apis mellifera*, will also compete with WRP for hollows. At least three hollows contained bees.

Harewood (2012b) did not identify any WRP in the study area from day and night time surveys and concluded that WRP are not utilising vegetation within the areas proposed to be cleared. The apparent absence of the species from the area in 2012 was consistent with the low WRP habitat value of most of the vegetation present and the known sparse abundance of the species in this area of the Swan Coastal Plain (G. Harewood pers obs.). Vegetation within the study area was noted as being unlikely to represent habitat of significance with respect to the species recovery in the area given its overall poor quality and its ongoing decline.

The study area currently contains marginal WRP habitat. The following elements of the study area have contributed to low numbers and use of the study area by WRP:

- lack of understorey, midstorey and canopy connectivity over much of the study area allowing easy access to predators (foxes),
- competition by feral bees, and

- that the habitat patch is not part of an important landscape linkage.

The long-term viability of populations is further compromised by the size of, and connectivity between, habitat remnants (DPaW 2014). The study area is not located along a strategic corridor and is currently unlikely to provide significant habitat to any local populations of WRP. The single WRP observed is likely to be using the eastern edge of Lot 8 as part of a larger patch off site.

Referral under the EPBC Act

DAWE provides referral guidelines in place of the EPBC Act general assessment of significance guidelines for WRP (DEWHA 2009). The study area is located outside of this area. WRP habitat is likely to coincide with black cockatoo habitat in Lot 8 along with the additional areas where Peppermint is in the midstorey. The final impact footprint should be assessed against the Significant Impact Guidelines 1.1 - Matters of National Environmental Significance (Department of the Environment, Water, Heritage and the Arts, 2013). As it stands the clearing of the entire Lot 8 would warrant referral to DAWE.

6 Recommendations

The fauna habitat quality within the study area was mostly Poor, or Poor to Moderate, due to limited structural and species diversity. Fauna habitat opportunities were therefore limited for most target fauna. The following recommendations are made:

- Most impacts to target species will be associated with the loss of hollow bearing trees, particularly in Lot 6. These should be retained where possible.
- Retain tree ID124 as it occurs on the clearing boundary.
- Clearing should be conducted outside of spring to minimise impacts to breeding fauna.
- A licensed fauna spotter should be on site during the clearing of any hollow trees.
- Consider control of Galah and Little Corella to reduce hollow competition with black cockatoos, as an offset action.
- The final impact footprint should be checked against the significant impact criteria (DEWHA 2013; SEWPAC 2012) for black cockatoos and WRP to determine the need to refer the project to DAWE.

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Appendix A Figures

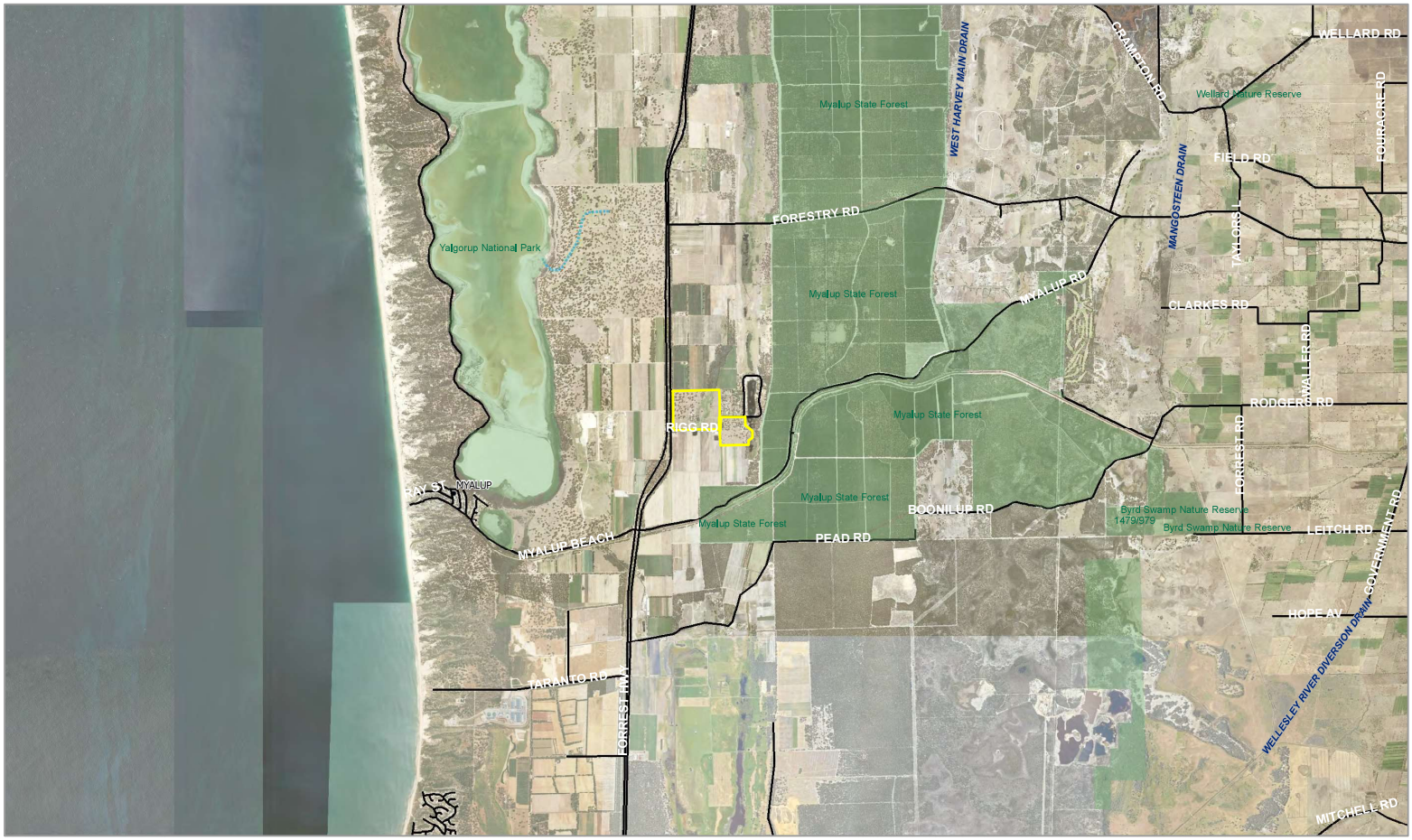

FIGURE 1 SITE LOCATION

LOTS 6 AND LOT 8
OLD COAST ROAD, MYALUP

Study area
DBCA land

Ref: SW244 Fig1
Date: 8/04/2020 Author: SP

Source: Base map © Esri and its data suppliers. SLIP Landgate (2019)

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N

SW environmental
www.swenvironmental.com.au

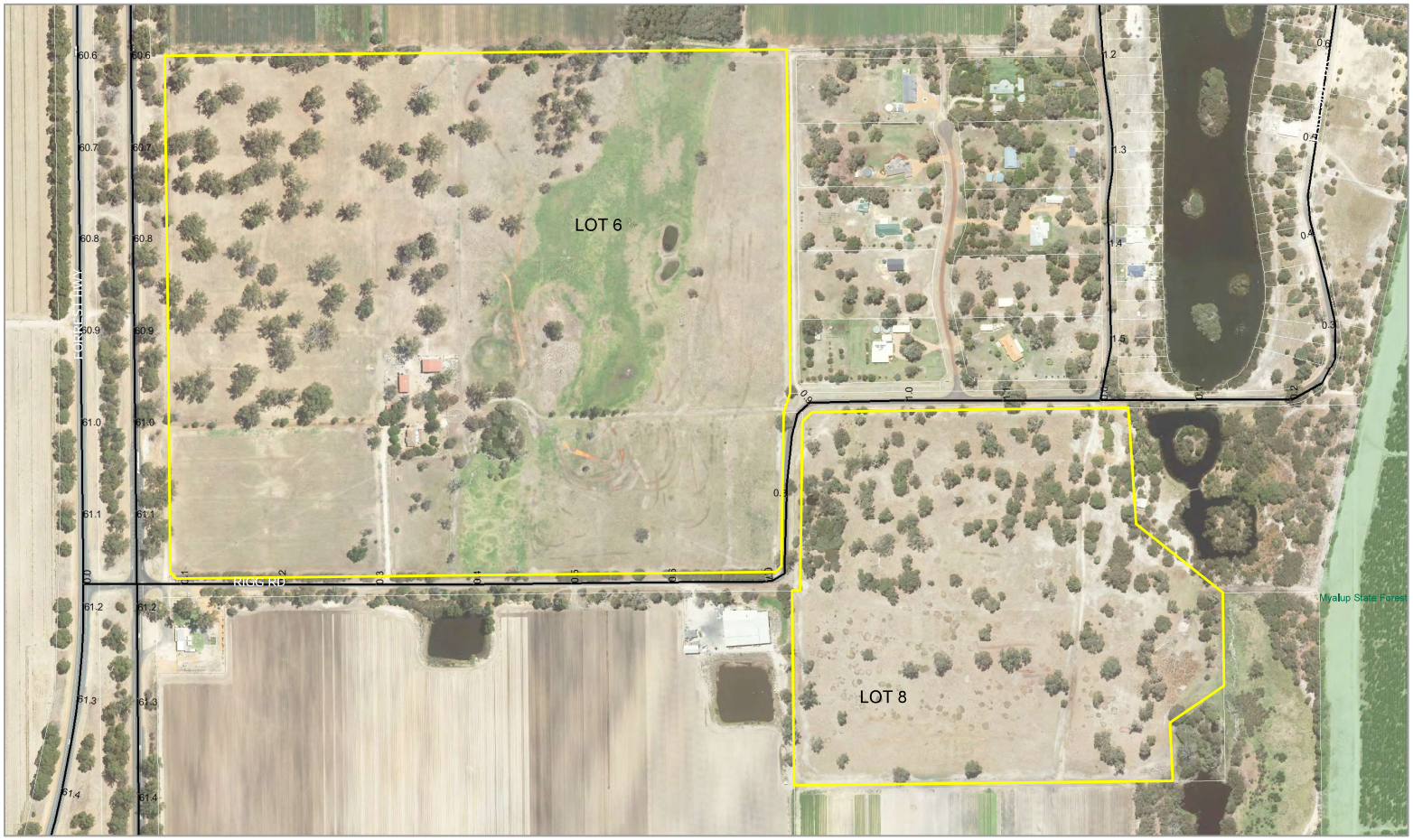


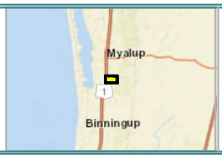
FIGURE 2 STUDY AREA

LOTS 6 AND LOT 8
OLD COAST ROAD, MYALUP

Study area
DBCA land

Ref: SW244 Fig2
Date: 8/04/2020 Author: SP

Source: Base map © Esri and its data suppliers. SLIP Landgate (2019)



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www.swenvironmental.com.au

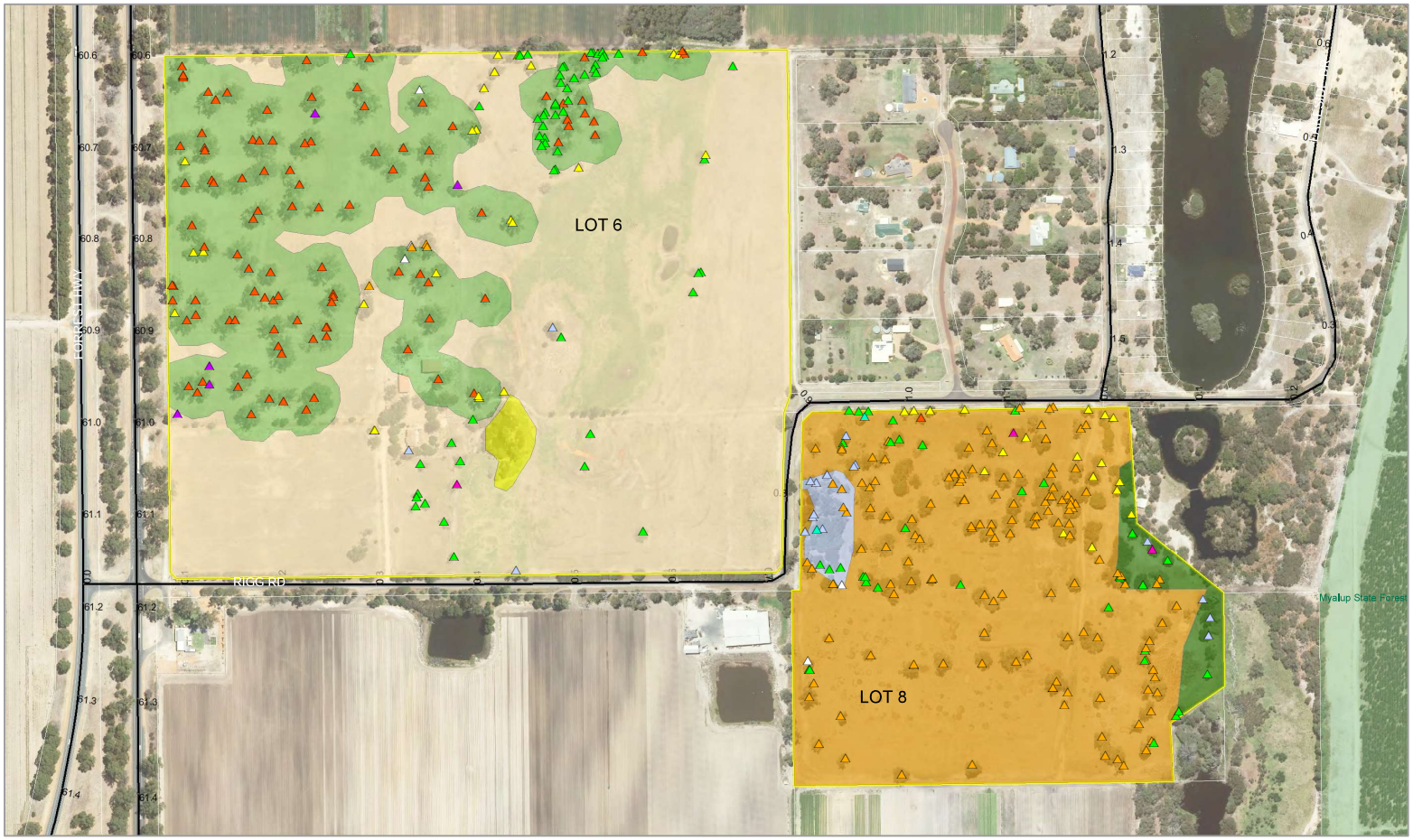


FIGURE 3 FAUNA HABITAT TYPES

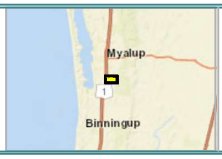
LOTS 6 AND LOT 8
OLD COAST ROAD, MYALUP

Ref: SW244 Fig3
Date: 8/04/2020 Author: SP

- Peppermint, Swamp Paperbark shubland with occasional Marri trees
- Marri open woodland with occasional Jarrah and Peppermint
- Cleared with occasional native trees
- Tuart open woodland with occasional Marri, Jarrah, Peppermint over weeds
- Flooded gum, Marri and planted Eucalypts over Swamp paperbark, Acacia saligna over weeds
- Swamp Paperbark shrubland and planted species

- Study area
- DBCA land

Tree
- Dead
- Jarrah
- Marri
- Tuart
- Flooded gum
- Paperbark
- Peppermint
- Other
- Unknown



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GRID: GDA zone 50

SW environmental
www.swenvironmental.com.au

FIGURE 4 SUITABLE DBH TREES AND HOLLOW SUITABILITY FOR BLACK COCKATOO BREEDING

LOTS 6 AND LOT 8
OLD COAST ROAD, MYALUP

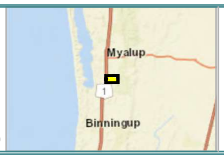
Ref: SW244 Fig4
Date: 26/10/2020 Author: SP

Hollow suitability for BC, Current use by BC for breeding

- Active Carnabys nest
- Suitable with chews
- Suitable old chews
- Suitable no chews
- Suitable, Unlikely
- Marginal, Unlikely
- Unlikely to be suitable, Not used
- Suitable DBH tree, Not hollow
- Study area
- DBCA land

Trees labelled but not mapped as hollow were downgraded following the drone assessement

Source: Base map © Esri and its data suppliers. SLIP Landgate (2020)



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SW environmental

www.swenvironmental.com.au

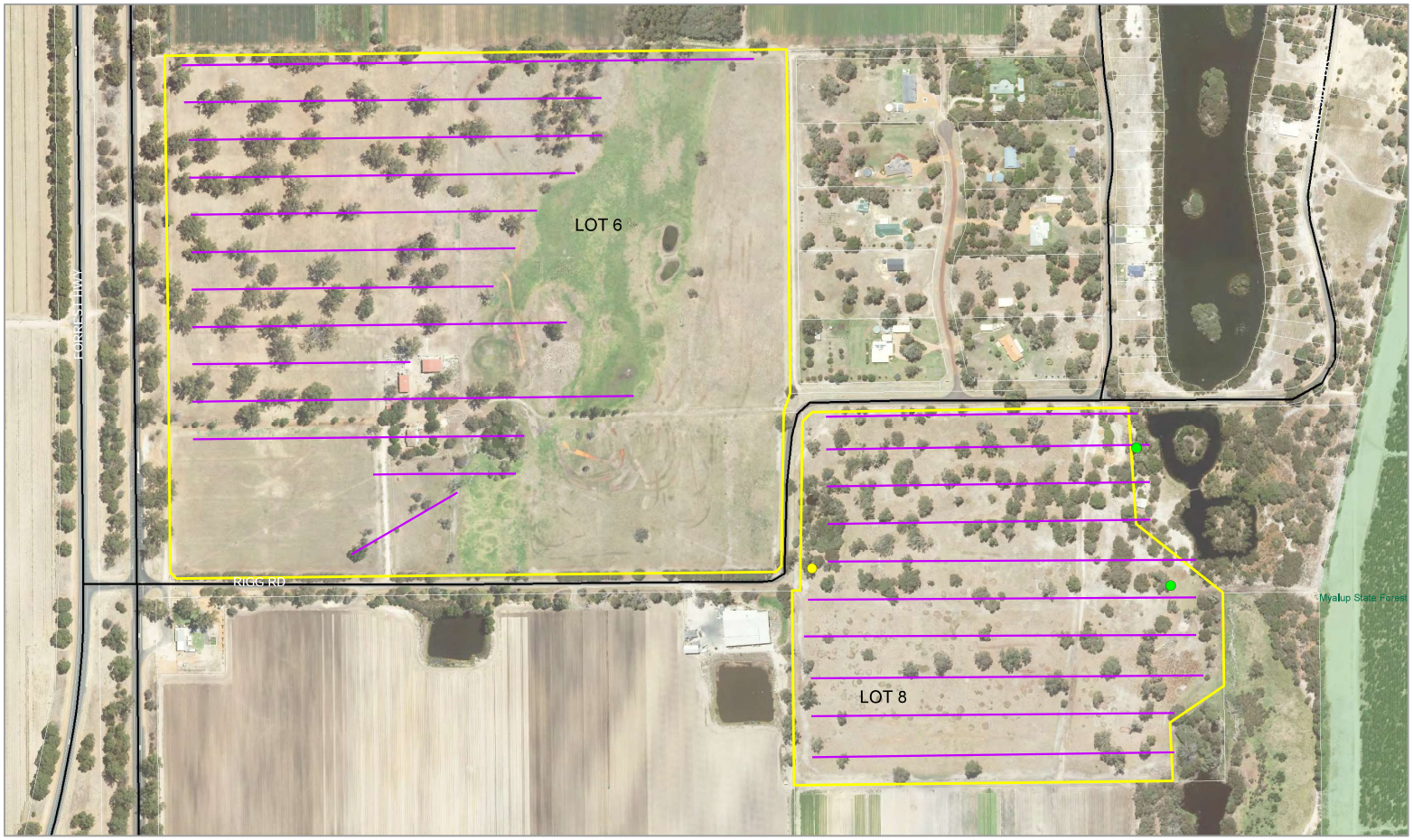


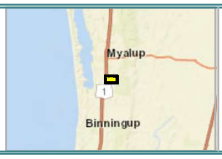
FIGURE 5 NOCTURNAL SURVEY

LOTS 6 AND LOT 8
OLD COAST ROAD, MYALUP

Ref: SW244 Fig5
Date: 8/04/2020 Author: SP

- Common Brushtail Possum
- Western Ringtail Possum
- Approximate transect location
- Study area
- DBCA land

Source: Base map © Esri and its data suppliers. SLIP Landgate (2020)



A3 @ 1:3750

0 25 50 100 m

GRID: GDA zone 50

N

SW environmental
www.swenvironmental.com.au

Appendix B Conservation codes

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

CONSERVATION CODES

For Western Australian Flora and Fauna

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

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

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

T **Threatened species**

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

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

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

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

CR **Critically endangered species**

Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN **Endangered species**

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

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

VU **Vulnerable species**

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

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct species

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

EX Extinct species

Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW Extinct in the wild species

Species that *"is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species

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

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

MI Migratory species

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD Species of special conservation interest (conservation dependent fauna)

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS Other specially protected species

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

P Priority species

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

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.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

1 Priority 1: Poorly-known species

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.

2 Priority 2: Poorly-known species

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.

3 Priority 3: Poorly-known species

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.

4 Priority 4: Rare, Near Threatened and other species in need of monitoring

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

[1] The definition of flora includes algae, fungi and lichens
[2]Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

Appendix C Naturemap and PMST database results

EPBC Act Protected Matters Report

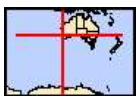
This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

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

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 03/02/20 14:26:39

Coordinates
Buffer: 10.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	61
Listed Migratory Species:	62

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	91
Whales and Other Cetaceans:	13
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	7
Regional Forest Agreements:	None
Invasive Species:	26
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Peel-yalgorup system	Within Ramsar site

Listed Threatened Ecological Communities [Resource Information]

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

Name	Status	Type of Presence
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Breeding likely to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Name	Status	Type of Presence
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Foraging, feeding or related behaviour known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Name	Status	Type of Presence
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta cauta Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Fish		
Galaxiella nigrostriata Blackstriped Dwarf Galaxias, Black-stripe Minnow [88677]	Endangered	Species or species habitat known to occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat may occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat known to occur within area
Other		
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area
Plants		
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat likely to occur within area
Austrostipa bronwenae [87808]	Endangered	Species or species habitat known to occur within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat likely to occur within area
Caladenia procera Carbunup King Spider Orchid [68679]	Critically Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Chamelaucium sp. Gingin (N.G.Marchant 6) Gingin Wax [88881]	Endangered	Species or species habitat likely to occur within area
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat known to occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat known to occur within area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat likely to occur within area
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat known to occur within area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area
Synaphea sp. Fairbridge Farm (D. Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat likely to occur within area
Synaphea sp. Serpentine (G.R. Brand 103) [86879]	Critically Endangered	Species or species habitat may occur within area
Synaphea stenoloba Dwellingup Synaphea [66311]	Endangered	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Sharks		
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat known to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

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

Name	Threatened	Type of Presence

Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Hydroprogne caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Onychoprion anaethetus Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Breeding known to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Foraging, feeding or related behaviour known to occur within area

Name	Threatened	Type of Presence
Calidris acuminata Sharp-tailed Sandpiper [874]		Foraging, feeding or related behaviour known to occur within area
Calidris alba Sanderling [875]		Foraging, feeding or related behaviour known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calidris ruficollis Red-necked Stint [860]		Foraging, feeding or related behaviour known to occur within area
Calidris subminuta Long-toed Stint [861]		Foraging, feeding or related behaviour known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Foraging, feeding or related behaviour known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Foraging, feeding or related behaviour known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Limosa limosa Black-tailed Godwit [845]		Foraging, feeding or related behaviour known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Numenius phaeopus Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area

Name	Threatened	Type of Presence
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Foraging, feeding or related behaviour known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Foraging, feeding or related behaviour known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Foraging, feeding or related behaviour known to occur within area
Tringa glareola Wood Sandpiper [829]		Foraging, feeding or related behaviour known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Foraging, feeding or related behaviour known to occur within area
Tringa totanus Common Redshank, Redshank [835]		Foraging, feeding or related behaviour known to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Foraging, feeding or related behaviour known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Foraging, feeding or

Name	Threatened	Type of Presence
		related behaviour known to occur within area
Calidris alba Sanderling [875]		Foraging, feeding or related behaviour known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calidris ruficollis Red-necked Stint [860]		Foraging, feeding or related behaviour known to occur within area
Calidris subminuta Long-toed Stint [861]		Foraging, feeding or related behaviour known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Foraging, feeding or related behaviour known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Foraging, feeding or related behaviour known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely

Name	Threatened	Type of Presence
		to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Foraging, feeding or related behaviour known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Foraging, feeding or related behaviour known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Foraging, feeding or related behaviour known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Limosa limosa Black-tailed Godwit [845]		Foraging, feeding or related behaviour known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Numenius phaeopus Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Foraging, feeding or related behaviour known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Pluvialis fulva Pacific Golden Plover [25545]		Foraging, feeding or related behaviour known to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Foraging, feeding or related behaviour known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Sterna anaethetus Bridled Tern [814]		Foraging, feeding or related behaviour likely to occur within area
Sterna caspia Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat known to occur within area
Tringa glareola Wood Sandpiper [829]		Foraging, feeding or related behaviour known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Foraging, feeding or related behaviour known to occur within area
Tringa totanus Common Redshank, Redshank [835]		Foraging, feeding or related behaviour known to occur within area
Fish		

Name	Threatened	Type of Presence
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus subelongatus West Australian Seahorse [66722]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Whales and other Cetaceans [Resource Information]

Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area

Name	Status	Type of Presence
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Byrd Swamp	WA
Crampton	WA
NTWA Bushland covenant (0004)	WA
NTWA Bushland covenant (0095)	WA
Unnamed WA01086	WA
Wellard	WA
Yalgorup	WA

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 Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within

Name	Status	Type of Presence
		area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area

Nationally Important Wetlands [Resource Information]

Name	State
Yalgorup Lakes System	WA

Caveat

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

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

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

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

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

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-33.09206 115.73578

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

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

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

Please feel free to provide feedback via the Contact Us page.

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NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 21/03/2020

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115° 44' 08" E,33° 05' 27" S
Buffer 10km
Group By Family

Family	Species	Records
Acanthizidae	6	77
Accipitridae	4	20
Actinopodidae	1	3
Aegothelidae	1	1
Agamidae	2	5
Anatidae	8	176
Araneidae	1	1
Ardeidae	7	21
Artamidae	2	6
Baetidae	1	1
Balaenidae	1	1
Balaenopteridae	1	1
Cacatuidae	1	6
Caenidae	1	2
Campephagidae	1	10
Canidae	1	146
Casuariidae	1	30
Centropagidae	1	1
Charadriidae	4	289
Cheloniidae	1	11
Cheluidae	1	1
Chironomidae	3	6
Coenagrionidae	1	1
Columbidae	3	17
Corixidae	1	2
Corvidae	1	50
Cracticidae	3	107
Cuculidae	2	9
Dasyuridae	2	8
Delphinidae	1	1
Dicruridae	3	45
Dytiscidae	1	2
Ecnomidae	1	2
Elapidae	5	11
Ephydridae	1	1
Erpobdellidae	1	1
Falconidae	2	12
Felidae	1	14
Galaxiidae	1	76
Gekkonidae	1	4
Gobiidae	1	1
Gyrinidae	1	2
Haematopodidae	1	2
Halcyonidae	2	23
Hirundinidae	2	25
Hydrophilidae	1	2
Hydropsychidae	1	2
Hylidae	2	7
Hyriidae	1	5
Kogiidae	1	1
Lamnidae	1	1
Laridae	3	21
Leporidae	1	40
Leptoceridae	1	2
Leptophlebiidae	1	1
Libellulidae	1	2
Limnodynastidae	2	59
Macropodidae	1	228
Maluridae	1	90
Meliphagidae	5	59
Meropidae	1	8
Mesoveliidae	1	1
Motacillidae	1	1
Muridae	3	29
Myobatrachidae	5	12
Nannopercidae	1	1
Nemesiidae	1	2
Neosittidae	1	1
Notonectidae	1	1
Oligochaeta	1	2
Otariidae	1	2
Pachycephalidae	2	26
Pardalotidae	2	22
Pelecanidae	1	5
Peramelidae	1	2

Perthidae	1	1
Petroicidae	1	5
Phalacrocoracidae	5	22
Phalangeridae	1	18
Phasianidae	1	6
Phocidae	1	1
Physidae	1	1
Podargidae	1	1
Podicipedidae	3	14
Poeciliidae	1	1
Procellariidae	1	1
Pseudocheiridae	1	88
Psittacidae	14	158
Pygopodidae	1	7
Rallidae	6	15
Recurvirostridae	3	50
Salticidae	1	1
Scincidae	12	242
Scolopacidae	9	56
Simuliidae	1	2
Sphaeriidae	1	2
Spheniscidae	2	2
Suidae	1	40
Sylviidae	1	1
Threskiornithidae	2	11
Triaenonychidae	1	19
Trombidiformes	1	1
Varanidae	2	18
Vespertilionidae	4	9
Zodariidae	1	1
Zosteropidae	1	25
TOTAL	**216**	**2685**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Acanthizidae					
1.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
2.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
3.	24262	*Acanthiza inornata (Western Thornbill)*			
4.	25530	*Gerygone fusca (Western Gerygone)*			
5.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
6.	30948	*Smicrornis brevirostris (Weebill)*			
Accipitridae					
7.	24285	*Aquila audax (Wedge-tailed Eagle)*			
8.	24288	*Circus approximans (Swamp Harrier)*			
9.	24295	*Haliastur sphenurus (Whistling Kite)*			
10.	24296	*Hamirostra isura (Square-tailed Kite)*			
Actinopodidae					
11.		*Missulena granulosa*			
Aegothelidae					
12.	25544	*Aegotheles cristatus (Australian Owlet-nightjar)*			
Agamidae					
13.	25510	*Pogona minor (Dwarf Bearded Dragon)*			
14.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
Anatidae					
15.	24312	*Anas gracilis (Grey Teal)*			
16.	24315	*Anas rhynchotis (Australasian Shoveler)*			
17.	24316	*Anas superciliosa (Pacific Black Duck)*			
18.	24318	*Aythya australis (Hardhead)*			
19.	24319	*Biziura lobata (Musk Duck)*			
20.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
21.	24322	*Cygnus atratus (Black Swan)*			
22.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
Araneidae					
23.		*Argiope protensa*			
Ardeidae					
24.	25558	*Ardea ibis (Cattle Egret)*			
25.	41324	*Ardea modesta (great egret, white egret)*			
26.	24340	*Ardea novaehollandiae (White-faced Heron)*			
27.	24341	*Ardea pacifica (White-necked Heron)*			
28.		*Egretta garzetta*			
29.		*Egretta novaehollandiae*			
30.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
Artamidae					
31.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
32.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
Baetidae					
33.		*Baetidae sp.*			
Balaenidae					
34.	24043	*Eubalaena australis (Southern Right Whale)*		T	
Balaenopteridae					
35.	24051	*Megaptera novaeangliae (Humpback Whale)*		S	
Cacatuidae					
36.		*Eolophus roseicapillus*			
Caenidae					
37.		*Caenidae sp.*			
Campephagidae					
38.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
Canidae					
39.	24040	*Vulpes vulpes (Red Fox)*	Y		
Casuariidae					
40.	24470	*Dromaius novaehollandiae (Emu)*			
Centropagidae					
41.		*Calamoecia clitellata*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Charadriidae					
42.	25575	*Charadrius leschenaultii (Greater Sand Plover)*		T	
43.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
44.	24383	*Pluvialis squatarola (Grey Plover)*		IA	
45.	48135	*Thinornis rubricollis (Hooded Plover, Hooded Dotterel)*		P4	
Cheloniidae					
46.	25335	*Caretta caretta (Loggerhead Turtle)*		T	
Cheluidae					
47.	43380	*Chelodina colliei (South-western Snake-necked Turtle)*			
Chironomidae					
48.		*Chironominae sp.*			
49.		*Orthocladiinae sp.*			
50.		*Tanypodinae sp.*			
Coenagrionidae					
51.		*Coenagrionidae sp.*			
Columbidae					
52.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
53.	24409	*Phaps chalcoptera (Common Bronzewing)*			
54.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
Corixidae					
55.		*Corixidae sp.*			
Corvidae					
56.	25592	*Corvus coronoides (Australian Raven)*			
Cracticidae					
57.	25595	*Cracticus tibicen (Australian Magpie)*			
58.	25596	*Cracticus torquatus (Grey Butcherbird)*			
59.	25597	*Strepera versicolor (Grey Currawong)*			
Cuculidae					
60.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
61.	25601	*Chrysococcyx lucidus (Shining Bronze Cuckoo)*			
Dasyuridae					
62.	24092	*Dasyurus geoffroii (Chuditch, Western Quoll)*		T	
63.	48070	*Phascogale tapoatafa subsp. wambenger (South-western Brush-tailed Phascogale, Wambenger)*		S	
Delphinidae					
64.	30954	*Tursiops aduncus (Indo-Pacific Bottlenose Dolphin)*			
Dicruridae					
65.	24443	*Grallina cyanoleuca (Magpie-lark)*			
66.	48096	*Rhipidura albiscapa (Grey Fantail)*			
67.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
Dytiscidae					
68.		*Dytiscidae sp.*			
Ecnomidae					
69.		*Ecnomidae sp.*			
Elapidae					
70.	43384	*Hydrophis platurus (Yellow-bellied Seasnake)*			
71.	25248	*Neelaps bimaculatus (Black-naped Snake)*			
72.	25253	*Parasuta gouldii*			
73.	25511	*Pseudonaja affinis (Dugite)*			
74.	25266	*Simoselaps bertholdi (Jan's Banded Snake)*			
Ephydridae					
75.		*Ephydridae sp.*			
Erpobdellidae					
76.		*Erpobdellidae sp.*			
Falconidae					
77.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
78.	25623	*Falco longipennis (Australian Hobby)*			
Felidae					
79.	24041	*Felis catus (Cat)*	Y		

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Galaxiidae					
80.	34027	*Galaxiella nigrostriata (Black-stripe Minnow, black-striped dwarf galaxias)*		T	
Gekkonidae					
81.	24980	*Christinus marmoratus (Marbled Gecko)*			
Gobiidae					
82.		*Pseudogobius olorum*			
Gyrinidae					
83.		*Gyrinidae sp.*			
Haematopodidae					
84.	24487	*Haematopus longirostris (Pied Oystercatcher)*			
Halcyonidae					
85.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
86.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
Hirundinidae					
87.	24491	*Hirundo neoxena (Welcome Swallow)*			
88.	48061	*Petrochelidon nigricans (Tree Martin)*			
Hydrophilidae					
89.		*Hydrophilidae sp.*			
Hydropsychidae					
90.		*Hydropsychidae sp.*			
Hylidae					
91.	25378	*Litoria adelaidensis (Slender Tree Frog)*			
92.	25388	*Litoria moorei (Motorbike Frog)*			
Hyriidae					
93.	34113	*Westralunio carteri (Carter's Freshwater Mussel)*		T	
Kogiidae					
94.	24071	*Kogia sima (Dwarf Sperm Whale)*			Y
Lamnidae					
95.	34031	*Carcharodon carcharias (Great White Shark)*		T	
Laridae					
96.		*Chroicocephalus novaehollandiae*			
97.	48587	*Hydroprogne caspia (Caspian Tern)*		IA	
98.	48597	*Thalasseus bergii (Crested Tern)*		IA	
Leporidae					
99.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
Leptoceridae					
100.		*Leptoceridae sp.*			
Leptophlebiidae					
101.		*Leptophlebiidae sp.*			
Libellulidae					
102.		*Libellulidae sp.*			
Limnodynastidae					
103.	25410	*Heleioporus eyrei (Moaning Frog)*			
104.	25415	*Limnodynastes dorsalis (Western Banjo Frog)*			
Macropodidae					
105.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
Maluridae					
106.	25654	*Malurus splendens (Splendid Fairy-wren)*			
Meliphagidae					
107.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
108.	24561	*Anthochaera carunculata (Red Wattlebird)*			
109.	24567	*Epthianura albifrons (White-fronted Chat)*			
110.	25661	*Lichmera indistincta (Brown Honeyeater)*			
111.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
Meropidae					
112.	24598	*Merops ornatus (Rainbow Bee-eater)*			
Mesoveliidae					
113.		*Mesoveliidae sp.*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Motacillidae					
114.	25670	*Anthus australis (Australian Pipit)*			
Muridae					
115.	24215	*Hydromys chrysogaster (Water-rat, Rakali)*		P4	
116.	24223	*Mus musculus (House Mouse)*	Y		
117.	24245	*Rattus rattus (Black Rat)*	Y		
Myobatrachidae					
118.	25398	*Crinia georgiana (Quacking Frog)*			
119.	25399	*Crinia glauerti (Clicking Frog)*			
120.	25400	*Crinia insignifera (Squelching Froglet)*			
121.	25404	*Geocrinia leai (Ticking Frog)*			
122.	25433	*Pseudophryne guentheri (Crawling Toadlet)*			
Nannopercidae					
123.		*Edelia vittata*			
Nemesiidae					
124.		*Aname mainae*			
Neosittidae					
125.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
Notonectidae					
126.		*Notonectidae sp.*			
Oligochaeta					
127.		*Oligochaeta sp.*			
Otariidae					
128.	24209	*Arctocephalus tropicalis (Subantarctic fur-seal)*		T	
Pachycephalidae					
129.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
130.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
Pardalotidae					
131.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
132.	25682	*Pardalotus striatus (Striated Pardalote)*			
Pelecanidae					
133.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
Peramelidae					
134.	48588	*Isoodon fusciventer (Quenda, southwestern brown bandicoot)*		P4	
Perthidae					
135.		*Perthiidae sp.*			
Petroicidae					
136.	48066	*Petroica boodang (Scarlet Robin)*			
Phalacrocoracidae					
137.		*Microcarbo melanoleucos*			
138.	25697	*Phalacrocorax carbo (Great Cormorant)*			
139.	25698	*Phalacrocorax melanoleucos (Little Pied Cormorant)*			
140.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
141.	25699	*Phalacrocorax varius (Pied Cormorant)*			
Phalangeridae					
142.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			
Phasianidae					
143.	24671	*Coturnix pectoralis (Stubble Quail)*			
Phocidae					
144.	24213	*Mirounga leonina (Southern Elephant Seal)*			
Physidae					
145.		*Physidae sp.*			
Podargidae					
146.	25703	*Podargus strigoides (Tawny Frogmouth)*			
Podicipedidae					
147.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
148.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
149.	24682	*Tachybaptus novaehollandiae subsp. novaehollandiae (Australasian Grebe, Black-throated Grebe)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Poeciliidae					
150.		*Gambusia affinis*			
Procellariidae					
151.	24693	*Pachyptila desolata (Antarctic Prion)*			
Pseudocheiridae					
152.	24166	*Pseudocheirus occidentalis (Western Ringtail Possum, ngwayir)*		T	
Psittacidae					
153.		*Barnardius zonarius*			
154.	24721	*Cacatua galerita subsp. galerita (Sulphur-crested Cockatoo)*	Y		
155.	25715	*Cacatua roseicapilla (Galah)*			
156.	25716	*Cacatua sanguinea (Little Corella)*			
157.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
158.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black Cockatoo)*		T	
159.	24733	*Calyptorhynchus baudinii (Baudin's Cockatoo, White-tailed Long-billed Black Cockatoo)*		T	
160.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
161.	48400	*Calyptorhynchus sp. (white-tailed black cockatoo)*		T	
162.	24738	*Neophema elegans (Elegant Parrot)*			
163.	24747	*Platycercus spurius (Red-capped Parrot)*			
164.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
165.	25722	*Polytelis anthopeplus (Regent Parrot)*			
166.		*Purpureicephalus spurius*			
Pygopodidae					
167.	25005	*Lialis burtonis*			
Rallidae					
168.	25727	*Fulica atra (Eurasian Coot)*			
169.	24761	*Fulica atra subsp. australis (Eurasian Coot)*			
170.	25729	*Gallinula tenebrosa (Dusky Moorhen)*			
171.	24763	*Gallinula tenebrosa subsp. tenebrosa (Dusky Moorhen)*			
172.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
173.	24767	*Porphyrio porphyrio subsp. bellus (Purple Swamphen)*			
Recurvirostridae					
174.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
175.	25734	*Himantopus himantopus (Black-winged Stilt)*			
176.	24776	*Recurvirostra novaehollandiae (Red-necked Avocet)*			
Salticidae					
177.		*Maratus pavonis*			
Scincidae					
178.	42368	*Acritoscincus trilineatus (Western Three-lined Skink)*			
179.	30893	*Cryptoblepharus buchananii*			
180.	25047	*Ctenotus impar*			
181.	41641	*Ctenotus ora (Coastal Plains Skink)*		P3	
182.	25100	*Egernia napoleonis*			
183.	25119	*Hemiergis quadrilineata*			
184.	25133	*Lerista elegans*			
185.	25147	*Lerista lineata (Perth Slider, Lined Skink)*		P3	
186.	25184	*Menetia greyii*			
187.	25191	*Morethia lineoocellata*			
188.	25519	*Tiliqua rugosa*			
189.	25207	*Tiliqua rugosa subsp. rugosa*			
Scolopacidae					
190.	41323	*Actitis hypoleucos (Common Sandpiper)*		IA	
191.	25736	*Arenaria interpres (Ruddy Turnstone)*		IA	
192.	24779	*Calidris acuminata (Sharp-tailed Sandpiper)*		IA	
193.	24784	*Calidris ferruginea (Curlew Sandpiper)*		T	
194.	24788	*Calidris ruficollis (Red-necked Stint)*		IA	
195.	24790	*Calidris tenuirostris (Great Knot)*		T	
196.	24798	*Numenius madagascariensis (Eastern Curlew)*		T	
197.	24803	*Tringa brevipes (Grey-tailed Tattler)*		P4	
198.	24808	*Tringa nebularia (Common Greenshank, greenshank)*		IA	
Simuliidae					
199.		*Simuliidae sp.*			
Sphaeriidae					
200.		*Sphaeriidae sp.*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Spheniscidae					
201.	25746	*Eudyptula minor (Little Penguin)*			
202.	24818	*Eudyptula minor subsp. novaehollandiae (Little Penguin)*			
Suidae					
203.	24259	*Sus scrofa (Pig)*	Y		
Sylviidae					
204.	25758	*Megalurus gramineus (Little Grassbird)*			
Threskiornithidae					
205.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
206.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
Triaenonychidae					
207.		*Nunciella aspera*			
Trombidiformes					
208.		*Acariformes sp.*			
Varanidae					
209.	25218	*Varanus gouldii (Bungarra or Sand Monitor)*			
210.	25225	*Varanus rosenbergi (Heath Monitor)*			
Vespertilionidae					
211.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
212.	24189	*Falsistrellus mackenziei (Western False Pipistrelle, Western Falsistrelle)*		P4	
213.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
214.	24206	*Vespadelus regulus (Southern Forest Bat)*			
Zodariidae					
215.		*Pentasteron intermedium*			
Zosteropidae					
216.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			

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

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely 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 Threatened fauna evaluation

Table 1) below provides an evaluation of the presence of habitat and the likelihood of occurrence for conservation significant (target) fauna species. The species list was derived species lists from database searches (Naturemap and PMST reporting tool, 2020), literature and expert consultation, assessed against habitat observed within the study area. The potential to be impacted depends on the final nature of the final impacts proposed, habitat utilised by the target species and the likelihood of occurrence.

In the evaluation, the presence of habitat is given three categories:

- **Present:** Potential or known habitat is present within the project area.
- **Marginal:** Habitat present is not typical but may be suitable, or habitat is typical, but condition and microhabitat requirements of species are not present.
- **Absent:** No potential or known habitat is present within the project area.

There are four categories for likelihood of occurrence:

- **Nil:** Species known or predicted to occur within the locality but no suitable habitat within the project area.
- **Unlikely:** Species known or predicted within the locality. Suitable habitat may be present in the project area, but the proximity of nearest records suggests it is unlikely to occur.
- **Possible:** Suitable habitat present and the species could occur in the project area based on the proximity of nearest records.
- **Present:** Species was recorded during the field investigations

The following have been excluded from the tables as they are not relevant to the proposal or would not be impacted:

- Marine (e.g. seals, dolphins, whales, penguins).
- Marine migratory species (e.g. Albatrosses) or where breeding is in the northern hemisphere, e.g. those from the family Scolopacidae: Sandpipers and other shorebirds and waders.
- Species considered regionally extinct (e.g. Malleefowl).

Conservation status is as per the (federal) EPBC Act and (WA) DBCA Parks and Wildlife Service's Threatened and Priority Fauna List last updated 10/04/2019, under the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* made by the Minister for Environment under *section 14(4)* Part 2 of *Biodiversity Conservation Regulations 2018*.

Refer to Appendix E for Conservation Codes.

Table 1) Evaluation of the presence of habitat and the likelihood of occurrence for conservation fauna significant species within the study area

Class	Family Genus species	Vernacular	Status Federal	Stat. WA	Requirements	Presence of habitat	Likelihood of occurrence
AVES	**Ardeidae** *Ardea ibis*	Cattle Egret	IA	-	Waders that occur in stock paddocks, pastures, crop lands, wetlands, mudflats, drains, irrigation areas and estuaries (Pizzey and Knight 2007).	Present	Possible visitor – foraging
	Ardea modesta	Great Egret	IA	-			
	Botaurus poiciloptilus	Australasian Bittern	EN	EN	The Australasian Bittern occurs in terrestrial freshwater wetlands and, rarely, estuarine habitats. In the south-west it is found in beds of tall rush mixed with, or near, short fine sedge or open pools. The species also occurs around swamps, lakes, pools, rivers and channels fringed with lignum (*Muehlenbeckia* sp.), canegrass (*Eragrostis* sp.) or other dense vegetation. The species occasionally ventures into areas of open water or onto banks. In the SW WA, it is confined to a relatively small number of regularly occupied locations. These locations probably number less than 70, including: less than five north of Perth; less than 10 in the greater Perth metropolitan area; less than 10 south to Busselton; less than 10 in the Lake Muir district; less than 10 from Augusta to Walpole; less than 10 around Albany; and less than 10 around Esperance and Cape Arid. Most of these sites are discrete basin/sumpland wetlands with local catchments, and many depend on the surface expression of groundwater (SPRAT 2017).	Absent	Unlikely
	Ixobrychus flavicollis	Black Bittern		P2	Found in both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation, e.g. shadowy leafy waterside trees: casurinas, eucalypts, paperbarks, tidal creeks and mudflats. In the case that permanent water is present, the species may also occur in flooded grassland or adjacent forest and woodland. It nests on a sheltered horizontal branch over water (Pizzey and Knight 2007).	Marginal	Unlikely
	Cacatuidae *Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo	VU	VU	The Forest Red-tailed Black Cockatoo inhabits the dense Jarrah, Karri and Marri forests receiving more than 600 mm rainfall annually (SPRAT 2018). The FRTBC occurs within the same habitat as the Baudin's Cockatoo. FRTBC nest in Jarrah, Karri, Marri and Wandoo favouring large top entry hollows with entrances ranging from 12–14 cm in	Present	Present, breeding and foraging

Class	Family Genus species	Vernacular	Status Federal	Stat. WA	Requirements	Presence of habitat	Likelihood of occurrence
					diameter and hollow depth one to five metres) (SEWPaC, 2012) (Johnson and Kirkby, Undated). It breeds between February to December (with a peak between October and December, also a peak in some years in April–May) probably every two years – on the Swan Coastal Plain breeding has been recorded in November–December (Johnson and Kirkby, Undated). The species predominately feeds on seeds from Marri and Jarrah fruits and Blackbutt, Albany Blackbutt, Forest Sheoak, Snottygobble and the non-indigenous native Spotted Gum and Cape Lilac within its home range of about 116-187 ha (SPRAT 2018).		
AVES	*Calyptorhynchus baudinii*	Baudin's Cockatoo	EN	EN	Baudin's Cockatoo is mainly found in eucalypt forests, especially Jarrah -Marri forest, Karri forest, and less frequently in woodlands of Wandoo, Blackbutt, Flooded Gum Yate, partly cleared farmlands and urban areas including roadside trees and house gardens. This cockatoo forages at all levels of the forest from the canopy to the ground, often feeding in the understorey on proteaceous trees and shrubs, especially Banksia, and in orchards both in trees and on dropped or fallen fruit on the ground (Johnson and Kirkby, Undated). Preferred roosts are in areas with a dense canopy close to permanent sources of water (SPRAT 2018). The range of the species during the non-breeding season (breeds in August though to late December) may be determined by the distribution of Marri, and that nesting might be confined to areas in which Karri occurs (SPRAT 2018). It is known to nest in hollows of Eucalypts usually at some height (Pizzey and Knight 2007), often 30-50m above ground (Jupp 2000). Tree hollows usually have an entrance of 30-40cm, >30cm deep and are mostly vertical (SPRAT 2018) (Johnson and Kirkby, Undated).	Present	Possible visitor – foraging/ breeding
	Calyptorhynchus latirostris	Carnaby's Cockatoo	EN	EN	This species is a postnuptial nomad, moving west after breeding. Carnaby's Cockatoo mainly occurs in or near eucalypt woodlands, especially those dominated by Wandoo or Salmon Gum, and sometimes reported in forests of Marri, Jarrah, Karri and Tuart. Nesting hollows may be located anywhere from 2 m to >10 m from ground, mainly in the Wheatbelt (Cale 2003, SPRAT 2009, WA Museum 2010).	Present	Present, breeding and foraging

Class	Family Genus species	Vernacular	Status Federal	Stat. WA	Requirements	Presence of habitat	Likelihood of occurrence
					It is known to forage in native shrubland, kwongan heathland and woodland dominated by proteaceous plant species such as Banksia spp. (including Dryandra spp.), Hakea spp. and Grevillea spp. Forages in pine plantations, eucalypt woodland and forest that contains foraging species. Also individual trees and small stands of these species (SEWPAC 2012). This species is currently expanding its breeding range westward and south into the Jarrah-Marri forests of the Darling Scarp and into the Tuart forests of the Swan Coastal Plain. This may be due to climate change. Breeding occurs mainly from early July to mid-December. Breeding success is largely dependent on suitable feeding habitat adjacent to the nest site to provide the necessary food for the survival of the chick, for example adjacent pine forest or remnant vegetation (Johnson and Kirkby, Undated).		
	Falconidae *Falco peregrinus*	Peregrine Falcon	-	OS	Peregrine Falcons occur in woodland, plains, gorges, wetlands but tend to breed either in stick-nests in trees or nest on cliff ledges. It appears that hollows and large abandoned nests of other birds may be used where cliff ledges are limited. Breeds Aug-Dec. Where good habitat occurs, and the density of Peregrine Falcons is high, active nests may occur within 2.5km of each other. The diet of the Peregrine Falcon includes wood duck, pigeons and doves, galahs, rosellas and cockatoo, starlings and larks (Olsen et al. 2006).	Present	Possible visitor – foraging/ breeding
	Strigidae *Ninox connivens connivens*	Barking Owl (SW pop.)	-	P3	Occurs in forest, woodlands, dense scrub, foothills, river red gums and other large trees near water courses penetrating open country. Nests in large hollows (Pizzey and Knight 2007). A late winter breeder with most eggs laid July to September, the young are fledged in about 35 days. There are no local records (within 10km).	Present	Possible visitor – foraging/ breeding
	Tyto novaehollandiae subsp. novaehollandiae	Masked Owl (southern subsp)	-	P3	Inhabits forests, open woodlands and farmlands with large trees, including timber watercourses paperbark woodlands. Widespread but very sparse, they breed any time of the year when conditions are favourable with a nesting period of about three months (Pizzey and Knight 2007).	Present	Possible visitor – foraging/ breeding

Class	Family Genus species	Vernacular	Status Federal	Stat. WA	Requirements	Presence of habitat	Likelihood of occurrence
MAMMALS	**Dasyuridae** *Dasyurus geoffroii*	Chuditch	VU	VU	Quolls may occupy a range of habitats including forest, woodland and desert, though in the SW they are largely restricted to Jarrah forest or scattered through the southern and eastern wheat belt (DEC 2010). Current records indicated that this only represents approximately 5% of their former range. Habitat critical to Western Quoll are large areas of undisturbed habitat which a sufficient variety of key food and other resources such as large hollow logs, burrows or small caves at ground level for denning. To be suitable as den sites, logs must have a diameter of at least 30 cm but usually greater than 50 cm, a hollow diameter of 7–20 cm and generally 1m long (Orell & Morris 1994). Annually, an adult female Chuditch will utilise an estimated average of 66 logs and 110 burrows within her home range. A large amount of den sites is required for both sexes. They occupy relatively large home ranges, with males utilizing over 15 km^2 and females, 3-4 km^2 (Orell & Morris 1994).	Unlikely due to small patch size, lack of cover and quality den habitat	Unlikely
	Phascogale tapoatafa	Southern Brush-tailed Phascogale	-	S	This arboreal species is found in a variety of forest types. Ideal habitat for this species consists of dry sclerophyll forest and open woodland (Jarrah, Marri, and mixed Jarrah Karri) that contain hollow bearing trees and sparse ground cover. Their many nesting sites include hollow tree limbs, rotten stumps and even birds' nests. Lactating females prefer a large tree cavity with a small entrance with a nest made of bark, feathers and fur. A female's home range covers 20 to 70 hectares, a male's home ranges over laps females and increases during breeding season. It is predominantly carnivorous, foraging on arthropods, invertebrates, small vertebrates and nectar (Strahan 1995).	Present	Possible – foraging/ breeding
	Muridae *Hydromys chrysogaster*	Water Rat	-	P4	The Water rat is usually found in permanent fresh or brackish water but can be found in marine environments. Fresh water habitats include swamps, lakes, dams even urban drainage swamps. Typically forages close to the shoreline, restricting its movements to shallow water (up to 2 m in depth) (CSIRO, 2004).	Absent	Unlikely

Class	Family Genus species	Vernacular	Status Federal	Stat. WA	Requirements	Presence of habitat	Likelihood of occurrence
	Peramelidae *Isoodon obesulus fusciventer*	Southern Brown Bandicoot	-	P4	Bandicoot habitat consists of dense scrubby, often swampy vegetation with a dense cover up to one metre high particularly near watercourses/wetlands. It often feeds in adjacent forest (Jarrah and Wandoo) and woodlands that are burnt on a regular basis. Nests can be concealed next to or under old logs, shrubs or piles of debris and are made up of ground litter piled up over a shallow depression providing internal chambers. Home ranges vary with population density and range from 5-8.6 ha for males and 1-6 ha for females (DEC 2010). Feed on a variety of ground-dwelling invertebrates and the fruit-bodies of hypogeous fungi. Their searches for food often create distinctive conical holes in the soil (DECC 2010).	Absent. No understorey available.	Unlikely
	Pseudocheiridae *Pseudocheirus occidentalis*	Western Ringtail Possum	CR	CR	Present populations mostly inhabit Peppermint and Peppermint-Tuart associations from Bunbury to Albany (SPRAT 2018). In dense, coastal Peppermint forest, home ranges are about 0.5 hectares to 1.5 ha and in eucalypt forests about 2.5 ha. In the northern jarrah forests, home ranges are larger and have been recorded to at least 5.6 ha. Peppermint leaves form the basis of the WRP diet in coastal areas (between 79-100% based on a study of WRP near Busselton by Jones et al. 1994), but when unavailable, the dominant myrtaceous species are preferred. In the inland forest, Jarrah and Marri the main food source. Garden plant varieties are also exploited in urban areas. WRP use a range of nest and shelter sites to avoid predators and exposure to the weather. Dreys are constructed in the canopy if hollows are not available. Adequate nest and shelter sites are necessary components of good quality habitat (Jones 1994, Shedley and Williams 2014).	Present	Present in Lot 8 – foraging/ breeding
	Vespertilionidae *Falsistrellus mackenziei*	Western False Pipistrelle	-	P4	It occurs in wet sclerophyll forest dominated by Karri (*Eucalyptus diversicolor*), and in the high rainfall zones of the Jarrah (*E. marginata*) and Tuart (*E. gomphocephala*) forests. It has also been recorded in mixed Tuart-Jarrah tall woodlands on the adjacent coastal plain. Marri (*E. calophylla*), Sheoak (*Casuarina heugeliana*) and Peppermint (*Agonis flexuosa*) trees are often co-dominant	Present	Possible – foraging/ breeding

Class	Family Genus species	Vernacular	Status Federal	Stat. WA	Requirements	Presence of habitat	Likelihood of occurrence
					at its collection localities (DotEE, 2018). This species roosts in tree hollows (Phillips & Inwards 1985) in colonies of 5 to 30 bats (Aust Museum, 2009). The species feed on flying insects between below the forest canopy.		
REPTILES	**Scincidae** *Ctenotus ora*	Coastal Plains Skink	-	P3	*Ctenotus ora* is a recently described species of medium sized (6cm) skink with a restricted range within the southern Swan Coastal Plain and Cape Naturaliste area, as far north as Pinjarra and south as far as Yallingup (Kay & Keogh 2012) and in Dunsborough (Ecoscape 2012). It has previously been recorded in areas with sandy substrates and low vegetation (including heath) in open Eucalyptus/Corymbia woodland over Banksia in the sandy coastal plain and coastal dunes (Kay & Keogh 2012).	Marginal due to the degraded condition of the study area	Unlikely
	Lerista lineata	Perth Slider	-	P3	Occurs from Perth to Mandurah with a historic record in Busselton (Wilson and Swan 2008). The species generally occurs within Banksia woodland, sandy coastal heath and low shrubland. Along the Swan Coastal Plain, its geographic range is restricted to white or pale sands which support Banksia associated woodlands, heathlands and shrublands on the Bassendean and Spearwood dune vegetation complexes. This species prefers areas supporting a low percentage of clay and does not occur in areas of heavily waterlogged soils, such as dampland and swamp areas (Phoenix Environmental Sciences 2011).	Marginal due to the degraded condition of the study area	None
FISH	**Galaxiidae** *Galaxiella munda*	Mud minnow, Western dwarf galaxias	-	EN	Occur in slow-running, tea-colored streams usually in sandy areas. Also found in swamps, small ponds and roadside ditches. Also lives in the vegetated shallows of some freshwater lakes. Water is typically acidic (pH 4.5-6.5) and darkly tannin-stained. An inhabitant of temporary waters, capable of aestivating in damp bottom sediments over summer (Allen et al 2002) (Smith et al 2002).	Absent	None

Class	Family Genus species	Vernacular	Status Federal	Stat. WA	Requirements	Presence of habitat	Likelihood of occurrence
	Percichthyidae *Nannatherina balstoni*	Balston's Pygmy Perch	VU	VU	Balston's Pygmy Perch is a small freshwater fish that grows to a maximum length of around 90 mm (commonly 60 mm). This species is brownish dorsally and silver below, usually with a prominent brown mid-lateral stripe and a series of vertical brown bars on sides giving a cross-hatched pattern Balston's Pygmy Perch inhabits acidic, tannin-stained freshwater pools, streams and lakes in peat flats within 30 km of the coast of south-west Western Australia, preferring shallow water, and commonly associated with tall sedge thickets and inundated riparian vegetation (SPRAT 2018). There are no local records (within 10km).	Absent	None
INVERTEBRATES	**Hyriidae** *Westralunio carteri*	Carters Freshwater Mussel	VU	VU	Carters Freshwater Mussel is the only freshwater mussel found in southwest WA. It is a bivalve found in freshwater streams, rivers, billabongs, ponds, wetlands and lakes inland from the coast mostly areas with muddy, silty and sandy bottoms and flowing permanent water. Tracks can be seen along banks and sandy/muddy patches of stream bed where they are present (http://www.musselwatchwa.com). Native fish are critical to the Mussel's lifecycle - larval mussels attach themselves to native fish to spread their population and develop into juvenile mussels. Mussels move along the bottom using a muscular tongue-like appendage known as a foot. Unlike their marine and estuarine cousins, they do not attach to structures. This allows them to move with receding water levels and position themselves to the best feeding spots (Murdoch University, 2010).	Absent	None
	Idiopidae *Idiosoma sigillatum*	Swan Coastal Plain Trapdoor Spider	-	P3	Lives in remnant woodland on the Swan Coastal Plan, using sheoak needles to make a rim around the burrow (Rix et al 2018). There are no local records (within 10km).	Absent	None

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Appendix E Representative site photos

Typical habitat in Lot 6

Typical habitat in Lot 6

Typical habitat in Lot 8

Typical habitat in Lot 8

Appendix F Potential fauna list and fauna recorded

Class	Family	Scientific Name	Vernacular Name	Observed
AMPHIBIA	HYLIDAE	*Litoria adelaidensis*	Slender Tree Frog	
AMPHIBIA	HYLIDAE	*Litoria moorei*	Moore's Frog	
AMPHIBIA	LIMNODYNASTIDAE	*Heleioporus eyrei*	Moaning Frog	
AMPHIBIA	LIMNODYNASTIDAE	*Limnodynastes dorsalis*	Bullfrog	
AMPHIBIA	MYOBATRACHIDAE	*Crinia georgiana*	Quacking Froglet	
AMPHIBIA	MYOBATRACHIDAE	*Crinia glauerti*	Glauert's Froglet	
AMPHIBIA	MYOBATRACHIDAE	*Crinia insignifera*	Squelching Froglet	
AMPHIBIA	MYOBATRACHIDAE	*Crinia pseudinsignifera*	False Western Froglet	
AMPHIBIA	MYOBATRACHIDAE	*Geocrinia leai*	Ticking Frog	
AMPHIBIA	MYOBATRACHIDAE	*Metacrinia nichollsi*	Nicholl's Toadlet	
AMPHIBIA	MYOBATRACHIDAE	*Pseudophryne guentheri*	Gunther's Toadlet	
AVES	ACANTHIZIDAE	*Acanthiza apicalis*	Inland Thornbill	
AVES	ACANTHIZIDAE	*Acanthiza chrysorrhoa*	Yellow-Rumped Thornbill	x
AVES	ACANTHIZIDAE	*Acanthiza inornata*	Western Thornbill	
AVES	ACANTHIZIDAE	*Gerygone fusca*	Western Gerygone	
AVES	ACANTHIZIDAE	*Sericornis frontalis*	White-Browed Scrubwren	
AVES	ACANTHIZIDAE	*Smicrornis brevirostris*	Weebill	x
AVES	ACCIPITRIDAE	*Accipiter cirrocephalus*	Collared Sparrowhawk	
AVES	ACCIPITRIDAE	*Accipiter fasciatus*	Brown Goshawk	
AVES	ACCIPITRIDAE	*Aquila audax*	Wedge-Tailed Eagle	x
AVES	ACCIPITRIDAE	*Circus approximans*	Swamp Harrier	
AVES	ACCIPITRIDAE	*Circus assimilis*	Spotted Harrier	
AVES	ACCIPITRIDAE	*Elanus axillaris*	Black-Shouldered Kite	
AVES	ACCIPITRIDAE	*Haliaeetus leucogaster*	White-Bellied Sea-Eagle	
AVES	ACCIPITRIDAE	*Haliastur sphenurus*	Whistling Kite	
AVES	ACCIPITRIDAE	*Hamirostra isura*	Square-Tailed Kite	
AVES	ACCIPITRIDAE	*Hieraaetus morphnoides*	Little Eagle	
AVES	ACCIPITRIDAE	*Pandion haliaetus*	Osprey	
AVES	ACROCEPHALIDAE	*Acrocephalus australis*	Australian Reed Warbler	
AVES	AEGOTHELIDAE	*Aegotheles cristatus*	Australian Owlet-Nightjar	
AVES	ALCEDINIDAE	*Dacelo novaeguineae*	Kookaburra*	
AVES	ALCEDINIDAE	*Todiramphus sanctus*	Sacred Kingfisher	
AVES	ANATIDAE	*Anas castanea*	Chestnut Teal	
AVES	ANATIDAE	*Anas gracilis*	Grey Teal	
AVES	ANATIDAE	*Anas platyrhynchos*	Mallard Duck	
AVES	ANATIDAE	*Anas rhynchotis*	Australian Shoveler	
AVES	ANATIDAE	*Anas superciliosa*	Pacific Black Duck	x
AVES	ANATIDAE	*Aythya australis*	Hardhead	
AVES	ANATIDAE	*Biziura lobata*	Musk Duck	
AVES	ANATIDAE	*Chenonetta jubata*	Australian Wood Duck	x
AVES	ANATIDAE	*Cygnus atratus*	Black Swan	x
AVES	ANATIDAE	*Malacorhynchus membranaceus*	Pink-Eared Duck	
AVES	ANATIDAE	*Oxyura australis*	Blue-Billed Duck	
AVES	ANATIDAE	*Stictonetta naevosa*	Freckled Duck	
AVES	ANATIDAE	*Tadorna tadornoides*	Australian Shelduck	

AVES	ANHINGIDAE	*Anhinga novaehollandiae*	Australasian Darter	
AVES	ARDEIDAE	*Ardea ibis*	Cattle Egret	
AVES	ARDEIDAE	*Ardea modesta*	Eastern Great Egret	
AVES	ARDEIDAE	*Ardea novaehollandiae*	White-Faced Heron	
AVES	ARDEIDAE	*Ardea pacifica*	White-Necked Heron	
AVES	ARDEIDAE	*Botaurus poiciloptilus*	Australasian Bittern	
AVES	ARDEIDAE	*Egretta garzetta*	Little Egret	
AVES	ARDEIDAE	*Nycticorax caledonicus*	Nankeen Night-Heron	
AVES	ARTAMIDAE	*Artamus cinereus*	Black-faced Woodswallow	
AVES	ARTAMIDAE	*Artamus cyanopterus*	Dusky Woodswallow	
AVES	ARTAMIDAE	*Cracticus nigrogularis*	Pied Butcherbird	
AVES	ARTAMIDAE	*Cracticus tibicen*	Australian Magpie	
AVES	ARTAMIDAE	*Cracticus torquatus*	Grey Butcherbird	
AVES	ARTAMIDAE	*Strepera versicolor*	Grey Currawong	
AVES	CACATUIDAE	*Cacatua galerita*	Sulphur-crested Cockatoo	
AVES	CACATUIDAE	*Cacatua pastinator*	Western Corella	
AVES	CACATUIDAE	*Cacatua roseicapilla*	Galah	x
AVES	CACATUIDAE	*Cacatua sanguinea*	Little Corella	x
AVES	CACATUIDAE	*Calyptorhynchus banksii*	Red-Tailed Black Cockatoo	x
AVES	CACATUIDAE	*Calyptorhynchus baudinii*	Baudin's Black-Cockatoo	
AVES	CACATUIDAE	*Calyptorhynchus latirostris*	Carnaby's Black-Cockatoo	x
AVES	CAMPEPHAGIDAE	*Coracina novaehollandiae*	Black-Faced Cuckoo-Shrike	
AVES	CAMPEPHAGIDAE	*Lalage sueurii*	White-Winged Triller	
AVES	CAPRIMULGIDAE	*Eurostopodus argus*	Spotted Nightjar	
AVES	CASUARIIDAE	*Dromaius novaehollandiae*	Emu	
AVES	CHARADRIIDAE	*Vanellus (Lobivanellus) tricolor*	Banded Lapwing	
AVES	COLUMBIDAE	*Columba livia*	Rock Pigeon	
AVES	COLUMBIDAE	*Ocyphaps lophotes*	Crested Pigeon	
AVES	COLUMBIDAE	*Phaps chalcoptera*	Common Bronzewing	
AVES	COLUMBIDAE	*Phaps elegans*	Brush Bronzewing	
AVES	COLUMBIDAE	*Streptopelia chinensis*	Spotted Dove	
AVES	COLUMBIDAE	*Streptopelia senegalensis*	Laughing Turtle-Dove*	
AVES	CORVIDAE	*Corvus bennetti*	Little Crow	
AVES	CORVIDAE	*Corvus coronoides*	Australian Raven	x
AVES	CUCULIDAE	*Cacomantis flabelliformis*	Fan-Tailed Cuckoo	
AVES	CUCULIDAE	*Cacomantis pallidus*	Pallid Cuckoo	
AVES	CUCULIDAE	*Chrysococcyx basalis*	Horsfield's Bronze-Cuckoo	
AVES	CUCULIDAE	*Chrysococcyx lucidus*	Shining Bronze-Cuckoo	
AVES	ESTRILDIDAE	*Stagonopleura oculata*	Red-Eared Firetail	
AVES	FALCONIDAE	*Falco berigora*	Brown Falcon	
AVES	FALCONIDAE	*Falco cenchroides*	Nankeen Kestrel	x
AVES	FALCONIDAE	*Falco longipennis*	Little Falcon	
AVES	FALCONIDAE	*Falco peregrinus*	Peregrine Falcon	
AVES	HIRUNDINIDAE	*Hirundo neoxena*	Welcome Swallow	x
AVES	HIRUNDINIDAE	*Petrochelidon ariel*	Fairy Martin	
AVES	HIRUNDINIDAE	*Petrochelidon nigricans*	Tree Martin	x
AVES	MALURIDAE	*Malurus elegans*	Red-Winged Fairy-Wren	
AVES	MALURIDAE	*Malurus lamberti*	Variegated Fairy-Wren	
AVES	MALURIDAE	*Malurus splendens*	Splendid Fairy-Wren	
AVES	MALURIDAE	*Stipiturus malachurus*	Southern Emu-Wren	
AVES	MEGALURIDAE	*Cincloramphus cruralis*	Brown Songlark	
AVES	MEGALURIDAE	*Cincloramphus mathewsi*	Rufous Songlark	
AVES	MEGALURIDAE	*Megalurus gramineus*	Little Grassbird	

AVES	MEGAPODIIDAE	*Leipoa ocellata*	Malleefowl	
AVES	MELIPHAGIDAE	*Acanthorhynchus superciliosus*	Western Spinebill	
AVES	MELIPHAGIDAE	*Anthochaera carunculata*	Red Wattlebird	x
AVES	MELIPHAGIDAE	*Anthochaera chrysoptera*	Little Wattlebird	x
AVES	MELIPHAGIDAE	*Anthochaera lunulata*	Western Wattlebird	
AVES	MELIPHAGIDAE	*Epthianura albifrons*	White-Fronted Chat	
AVES	MELIPHAGIDAE	*Gavicalis virescens*	Singing Honeyeater	
AVES	MELIPHAGIDAE	*Gliciphila melanops*	Tawny-Crowned Honeyeater	
AVES	MELIPHAGIDAE	*Lichmera indistincta*	Brown Honeyeater	
AVES	MELIPHAGIDAE	*Melithreptus brevirostris*	Brown-Headed Honeyeater	
AVES	MELIPHAGIDAE	*Melithreptus chloropsis*	Gilbert's Honeyeater	
AVES	MELIPHAGIDAE	*Melithreptus lunatus*	White-Naped Honeyeater	
AVES	MELIPHAGIDAE	*Phylidonyris niger*	White-Cheeked Honeyeater	
AVES	MELIPHAGIDAE	*Phylidonyris novaehollandiae*	New Holland Honeyeater	
AVES	MEROPIDAE	*Merops ornatus*	Rainbow Bee-Eater	
AVES	MONARCHIDAE	*Grallina cyanoleuca*	Magpie-Lark	x
AVES	MONARCHIDAE	*Myiagra inquieta*	Restless Flycatcher	
AVES	MOTACILLIDAE	*Anthus australis*	Australian Pipit	
AVES	NECTARINIIDAE	*Dicaeum (Dicaeum) hirundinaceum*	Mistletoebird	
AVES	NEOSITTIDAE	*Daphoenositta (Neositta) chrysoptera*	Varied Sittella	
AVES	PACHYCEPHALIDAE	*Colluricincla harmonica*	Grey Shrike-Thrush	
AVES	PACHYCEPHALIDAE	*Pachycephala occidentalis*	Western Whistler	
AVES	PACHYCEPHALIDAE	*Pachycephala pectoralis*	Golden Whistler	
AVES	PACHYCEPHALIDAE	*Pachycephala rufiventris*	Rufous Whistler	
AVES	PARDALOTIDAE	*Pardalotus punctatus*	Spotted Pardalote	
AVES	PARDALOTIDAE	*Pardalotus striatus*	Striated Pardalote	x
AVES	PELECANIDAE	*Pelecanus conspicillatus*	Australian Pelican	
AVES	PETROICIDAE	*Eopsaltria georgiana*	White-Breasted Robin	
AVES	PETROICIDAE	*Eopsaltria griseogularis*	Western Yellow Robin	
AVES	PETROICIDAE	*Melanodryas cucullata*	Hooded Robin	
AVES	PETROICIDAE	*Petroica boodang*	Scarlet Robin	
AVES	PETROICIDAE	*Petroica goodenovii*	Red-Capped Robin	
AVES	PHAETHONTIDAE	*Phaethon rubricauda*	Red-Tailed Tropicbird	
AVES	PHALACROCORACIDAE	*Microcarbo melanoleucos*	Little Pied Cormorant	
AVES	PHALACROCORACIDAE	*Phalacrocorax carbo*	Great Cormorant	
AVES	PHALACROCORACIDAE	*Phalacrocorax melanoleucos*	Little Cormorant	
AVES	PHALACROCORACIDAE	*Phalacrocorax sulcirostris*	Little Black Cormorant	
AVES	PHALACROCORACIDAE	*Phalacrocorax varius*	Pied Cormorant	x
AVES	PHASIANIDAE	*Coturnix pectoralis*	Stubble Quail	
AVES	PHASIANIDAE	*Coturnix ypsilophora*	Brown Quail	
AVES	PODARGIDAE	*Podargus strigoides*	Tawny Frogmouth	
AVES	PODICIPEDIDAE	*Podiceps cristatus*	Great Crested Grebe	
AVES	PODICIPEDIDAE	*Poliocephalus poliocephalus*	Hoary-Headed Grebe	x
AVES	PODICIPEDIDAE	*Tachybaptus novaehollandiae*	Australasian Grebe	
AVES	PSITTACIDAE	*Neophema elegans*	Elegant Parrot	
AVES	PSITTACIDAE	*Parvipsitta porphyrocephala*	Purple-Crowned Lorikeet	
AVES	PSITTACIDAE	*Platycercus icterotis*	Western Rosella	
AVES	PSITTACIDAE	*Platycercus spurius*	Red-Capped Parrot	
AVES	PSITTACIDAE	*Platycercus zonarius*	Australian Ringneck	x
AVES	PSITTACIDAE	*Polytelis anthopeplus*	Regent Parrot	x
AVES	RALLIDAE	*Fulica atra*	Eurasian Coot	
AVES	RALLIDAE	*Gallinula tenebrosa*	Dusky Moorhen	x

AVES	RALLIDAE	*Gallirallus philippensis*	Banded Rail	
AVES	RALLIDAE	*Porphyrio melanotus*	Australasian swamphen	
AVES	RALLIDAE	*Porphyrio porphyrio*	Purple Swamphen	
AVES	RALLIDAE	*Porzana fluminea*	Australian Spotted Crake	
AVES	RALLIDAE	*Porzana pusilla*	Baillon's Crake	
AVES	RALLIDAE	*Porzana tabuensis*	Spotless Crake	
AVES	RALLIDAE	*Tribonyx ventralis*	Black-Tailed Native-Hen	
AVES	RHIPIDURIDAE	*Rhipidura albiscapa*	Grey Fantail	x
AVES	RHIPIDURIDAE	*Rhipidura leucophrys*	Willie Wagtail	x
AVES	STRIGIDAE	*Ninox novaeseelandiae*	Southern Boobook	x
AVES	SULIDAE	*Morus serrator*	Australasian Gannet	
AVES	THRESKIORNITHIDAE	*Platalea flavipes*	Yellow-Billed Spoonbill	
AVES	THRESKIORNITHIDAE	*Platalea regia*	Royal Spoonbill	
AVES	THRESKIORNITHIDAE	*Plegadis falcinellus*	Glossy Ibis	
AVES	THRESKIORNITHIDAE	*Threskiornis molucca*	Australian White Ibis	x
AVES	THRESKIORNITHIDAE	*Threskiornis spinicollis*	Straw-Necked Ibis	
AVES	TIMALIIDAE	*Zosterops lateralis*	Silvereye	
AVES	TURNICIDAE	*Turnix varius*	Painted Button-Quail	
AVES	TYTONIDAE	*Tyto alba*	Barn Owl	
AVES	TYTONIDAE	*Tyto novaehollandiae*	Masked Owl	
MAMMALIA	BOVIDAE	*Bos taurus*	Cattle*	x
MAMMALIA	BURRAMYIDAE	*Cercartetus concinnus*	Western Pygmy-Possum	
MAMMALIA	CANIDAE	*Vulpes vulpes*	Fox*	x
MAMMALIA	DASYURIDAE	*Dasyurus geoffroii*	Chuditch	
MAMMALIA	DASYURIDAE	*Phascogale tapoatafa*	Brush-Tailed Phascogale	
MAMMALIA	DASYURIDAE	*Sminthopsis gilberti*	Gilbert's Dunnart	
MAMMALIA	DASYURIDAE	*Sminthopsis griseoventer*	Grey-Bellied Dunnart	
MAMMALIA	FELIDAE	*Felis catus*	Cat*	
MAMMALIA	LEPORIDAE	*Oryctolagus cuniculus*	Rabbit*	x
MAMMALIA	MACROPODIDAE	*Macropus fuliginosus*	Western Grey Kangaroo	x
MAMMALIA	MACROPODIDAE	*Setonix brachyurus*	Quokka	
MAMMALIA	MURIDAE	*Hydromys chrysogaster*	Water-Rat	
MAMMALIA	MURIDAE	*Mus musculus*	House Mouse*	
MAMMALIA	MURIDAE	*Rattus rattus*	Black Rat*	
MAMMALIA	PERAMELIDAE	*Isoodon fusciventer*	Southern Brown Bandicoot	
MAMMALIA	PHALANGERIDAE	*Trichosurus vulpecula*	Common Brushtail Possum	
MAMMALIA	POTOROIDAE	*Bettongia penicillata ogilbyi*	Woylie	
MAMMALIA	PSEUDOCHEIRIDAE	*Pseudocheirus occidentalis*	Western Ringtail Possum	x
MAMMALIA	SUIDAE	*Sus scrofa*	Pig*	
MAMMALIA	TARSIPEDIDAE	*Tarsipes rostratus*	Honey Possum	
MAMMALIA	VESPERTILIONIDAE	*Chalinolobus gouldii*	Gould's Wattled Bat	
MAMMALIA	VESPERTILIONIDAE	*Falsistrellus mackenziei*	Western False Pipistrelle	
MAMMALIA	VESPERTILIONIDAE	*Nyctophilus geoffroyi*	Lesser Long-eared Bat	
MAMMALIA	VESPERTILIONIDAE	*Vespadelus regulus*	Southern Forest Bat	
REPTILIA	AGAMIDAE	*Pogona minor*	Western Bearded Dragon	
REPTILIA	CHELIDAE	*Chelodina colliei*	Oblong Turtle	
REPTILIA	ELAPIDAE	*Echiopsis curta*	Bardick	
REPTILIA	ELAPIDAE	*Elapognathus coronatus*	Western Crowned Snake	
REPTILIA	ELAPIDAE	*Notechis scutatus*	Tiger Snake	
REPTILIA	ELAPIDAE	*Parasuta gouldii*	Gould's hooded Snake	
REPTILIA	ELAPIDAE	*Parasuta nigriceps*	Mitchell's Short-Tailed Snake	
REPTILIA	ELAPIDAE	*Pseudonaja affinis*	Dugite	
REPTILIA	ELAPIDAE	*Simoselaps bertholdi*	Jan's Banded Snake	

REPTILIA	GEKKONIDAE	*Christinus marmoratus*	Marbled Gecko	**x**
REPTILIA	PYGOPODIDAE	*Aprasia pulchella*	Pretty Worm-Lizard	
REPTILIA	PYGOPODIDAE	*Aprasia repens*	Sedgelands Worm-Lizard	
REPTILIA	PYGOPODIDAE	*Lialis burtonis*	Burton's Snake-Lizard	
REPTILIA	PYGOPODIDAE	*Pygopus lepidopodus*	Common Scaly-Foot	
REPTILIA	SCINCIDAE	*Acritoscincus trilineatus*	Western Three-Lined Skink	
REPTILIA	SCINCIDAE	*Cryptoblepharus buchananii*	Buchanans Snake-Eyed Skink	
REPTILIA	SCINCIDAE	*Ctenotus impar*	Odd-Striped Ctenotus	
REPTILIA	SCINCIDAE	*Ctenotus labillardieri*	Common South-West Ctenotus	
REPTILIA	SCINCIDAE	*Ctenotus ora*	Coastal Plains Skink	
REPTILIA	SCINCIDAE	*Egernia kingii*	King's Skink	
REPTILIA	SCINCIDAE	*Egernia napoleonis*	South-Western Crevice-Skink	
REPTILIA	SCINCIDAE	*Hemiergis gracilipes*	South-Western Mulch-Skink	
REPTILIA	SCINCIDAE	*Hemiergis peronii*	Lowlands Earless Skink	
REPTILIA	SCINCIDAE	*Hemiergis quadrilineata*	Two-Toed Earless Skink	
REPTILIA	SCINCIDAE	*Lerista distinguenda*	South-Western Orange-Tailed Slider	
REPTILIA	SCINCIDAE	*Lerista elegans*	Elegant Slider	
REPTILIA	SCINCIDAE	*Lerista lineata*	Perth Slider	
REPTILIA	SCINCIDAE	*Menetia greyii*	Common Dwarf Skink	
REPTILIA	SCINCIDAE	*Morethia lineoocellata*	West Coast Morethia Skink	
REPTILIA	SCINCIDAE	*Tiliqua rugosa*	Bobtail	
REPTILIA	TYPHLOPIDAE	*Anilios australis*	Southern Blind Snake	
REPTILIA	TYPHLOPIDAE	*Anilios pinguis*	Rotund Blind Snake	
REPTILIA	VARANIDAE	*Varanus gouldii*	Gould's Goanna	
REPTILIA	VARANIDAE	*Varanus rosenbergi*	Heath Monitor	

*Naturalised or introduced fauna

Appendix G Suitable DBH Trees and breeding survey results

Table 7-1 Hollow descriptions updated following black cockatoo breeding survey (spring 2020)

ID	East	North	Trunk DBH (m)	Tree	BC use
8	381458	6337767	2	Tuart	Suitable no chews
12	381387	6337786	2	Tuart	Suitable with chews
27	381379	6337873	1.5	Tuart	Unlikely
38	381368	6337998	2	Tuart	Unlikely
44	381365	6338122	1.5	Tuart	Suitable old chews
54	381436	6337906	2	Tuart	Suitable with chews
71	381502	6338042	1.5	Tuart	Unlikely
90	381627	6337993	2	Tuart	Suitable probable wood duck
95	381622	6338083	2	Tuart	Suitable with chews
96	381619	6338097	2	Dead	Unlikely
0	381565	6338131	1.8	Tuart	Suitable with chews
99	381552	6338100	2	Tuart	Suitable no chews
124	381754	6338090	2	Tuart	Suitable with chews
126	381777	6338065	1.5	Tuart	Unlikely
842	381482	6337973	1	Tuart	Suitable with chews
ACTIVE	381591	6338139	0	Dead	Active Carnabys

Table 7-2 Hollow descriptions based on black cockatoo breeding habitat requirements based on ground and drone survey

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
8	381458	6337767	2	Tuart	3	Hollow	Suitable	Possible with evidence
12	381387	6337786	2	Tuart	2	Hollow	Suitable	Possible with evidence
18	381468	6337823	2	Tuart		Not hollow	Unsuitable	Nil
27	381379	6337873	1.5	Tuart	1	Hollow	Marginal	Unlikely
38	381368	6337998	2	Tuart	2	Hollow	Marginal	Unlikely

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
41	381365	6338111	2	Tuart		Not hollow	Unsuitable	Nil
44	381365	6338122	1.5	Tuart	1	Hollow	Suitable	Possible
45	381393	6338095	1.5	Tuart	1	Not hollow	Unsuitable	Nil
52	381399	6337998	1.5	Tuart	1	Not droned	Marginal	Unlikely
54	381436	6337906	2	Tuart	1	Hollow	Suitable	Possible
58	381468	6337877	1.8	Tuart	1			
62	381452	6338011	2	Tuart		Not hollow	Unsuitable	Nil
71	381502	6338042	1.5	Tuart	1	Hollow	Suitable	Unlikely
74	381514	6337907	2	Tuart	1	Not droned	Marginal	Unlikely
81	381628	6337891	1.5	Tuart	1			
90	381627	6337993	2	Tuart	2	Hollow	Suitable	Possible with evidence
91	381624	6338004	1	Tuart	1	Not droned	Marginal	Unlikely
95	381622	6338083	2	Tuart	1	Hollow	Marginal	Unlikely
96	381619	6338097	2	Dead	2	Hollow	Marginal	Unlikely
99	381552	6338100	2	Tuart	1	Hollow	Suitable	Possible
100	381559	6338079	2	Tuart	1	Not droned	Marginal	Unlikely
103	381544	6337974	2	Tuart	2	Not droned	Marginal	Unlikely
109	381689	6337874	1.5	Tuart	1	Not droned	Marginal	Unlikely
116	381688	6338099	1.5	Jarrah	1	Not droned	Marginal	Unlikely
124	381754	6338090	2	Tuart	3	Hollow	Suitable	Possible
126	381777	6338065	1.5	Tuart	1	Hollow	Marginal	Unlikely
127	381778	6338059	2	Tuart	2	Not droned	Marginal	Unlikely
166	381856	6338137	2.5	Tuart	1	Not droned	Marginal	Unlikely
529	382222	6337557	1.8	Marri		Not hollow	Unsuitable	Nil
556	382153	6337617	1.2	Marri	1			
588	382334	6337755	1	Jarrah		Not hollow	Unsuitable	Nil

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
604	382225	6337734	1.2	Marri		Not hollow	Unsuitable	Nil
610	382210	6337691	1	Marri	1			
613	382201	6337660	1.2	Marri		Not hollow	Unsuitable	Nil
620	382185	6337682	2	Marri		Not hollow	Unsuitable	Nil
623	382100	6337650	1.5	Marri	1			
625	382105	6337679	1.5	Marri		Not hollow	Marginal	Unlikely
673	382328	6337517	1.8	Marri	1	Not droned	Marginal	Unlikely
676	382346	6337447	1.3	Marri		Not hollow	Marginal	Unlikely
684	382387	6337419	1.5	Marri		Not hollow	Unsuitable	Nil
840	381601	6338036	0.8	Tuart				
841	381490	6337997	0.1	Tuart		Not hollow	Unsuitable	Nil
842	381482	6337973	1	Tuart	1	Hollow	Suitable	Possible
1	381639	6337788	1.6	Tuart				
2	381607	6337712	0.5	Flooded gum				
3	381570	6337734	0.5	Jarrah				
4	381570	6337734	0.5	Jarrah				
5	381506	6337768	2.8	Tuart				
6	381497	6337756	1	Tuart				
7	381473	6337764	2	Tuart				
9	381439	6337751	2.8	Tuart				
10	381425	6337780	1	Tuart				
11	381434	6337793	1.5	Tuart				
13	381381	6337774	1.5	Tuart				
14	381371	6337781	2	Tuart				
15	381360	6337751	1	Other				
16	381394	6337802	0.6	Other				

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
17	381394	6337782	0.4	Other				
19	381471	6337815	1.8	Tuart				
20	381505	6337831	1.5	Tuart				
21	381519	6337834	1.5	Tuart				
22	381520	6337843	2	Tuart				
23	381488	6337851	1	Tuart				
24	381463	6337841	2.5	Tuart				
25	381415	6337851	1.5	Tuart				
26	381421	6337851	1.5	Tuart				
28	381380	6337857	1.5	Tuart				
29	381370	6337851	2	Tuart				
30	381357	6337859	0.5	Jarrah				
31	381355	6337872	1.5	Tuart				
32	381355	6337888	1.5	Tuart				
33	381354	6337889	1.5	Tuart				
34	381377	6337923	1	Jarrah				
35	381387	6337924	1	Jarrah				
36	381389	6337929	1.8	Tuart				
37	381375	6337952	2	Tuart				
39	381368	6338021	1	Jarrah				
40	381363	6338037	2	Tuart				
42	381366	6338113	1	Tuart				
43	381366	6338113	1	Tuart				
46	381401	6338087	1.5	Tuart				
47	381413	6338095	1.5	Tuart				
48	381386	6338051	1.5	Tuart				

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
49	381389	6338035	1.5	Tuart				
50	381389	6338032	1.5	Tuart				
51	381396	6338001	1.5	Tuart				
53	381424	6337922	1.8	Tuart				
55	381442	6337881	2	Tuart				
56	381453	6337875	1	Tuart				
57	381462	6337872	0.8	Tuart				
59	381459	6337902	1.5	Tuart				
60	381441	6337960	1.2	Tuart				
61	381445	6337968	2	Tuart				
63	381429	6338003	1.5	Tuart				
64	381440	6338044	1.2	Tuart				
65	381447	6338043	1.5	Tuart				
66	381461	6338043	1.5	Tuart				
67	381456	6338076	2	Tuart				
68	381498	6338129	2	Tuart				
69	381503	6338090	1.5	Tuart				
70	381507	6338072	1.5	Other				
72	381496	6338040	1.5	Tuart				
73	381511	6337972	1	Tuart				
75	381526	6337879	1	Tuart				
76	381526	6337876	1	Tuart				
77	381525	6337871	1	Tuart				
78	381518	6337843	1.5	Tuart				
79	381606	6337820	1.5	Tuart				
80	381629	6337853	2	Tuart				

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
82	381636	6337902	1	Jarrah				
83	381619	6337900	1.5	Tuart				
84	381596	6337903	1.5	Tuart				
85	381603	6337916	1.5	Dead				
86	381610	6337931	1.5	Dead				
87	381610	6337929	1.5	Marri				
88	381626	6337932	1.5	Marri				
89	381626	6337929	1.5	Marri				
92	381659	6337995	1	Other				
93	381629	6338032	1.5	Tuart				
94	381654	6338058	0.8	Tuart				
97	381565	6338131	1.8	Tuart				
98	381545	6338136	1	Peppermint				
101	381572	6338030	1.5	Tuart				
102	381590	6338012	2	Tuart				
104	381559	6337868	1.5	Jarrah				
105	381677	6337773	1	Tuart				
106	381682	6337768	1	Jarrah				
107	381682	6337770	1.5	Jarrah				
108	381709	6337775	2	Jarrah				
110	381685	6337966	1.5	Tuart				
111	381716	6337958	1.5	Jarrah				
112	381718	6337955	1	Jarrah				
113	381679	6338054	2	Jarrah				
114	381675	6338054	1	Jarrah				
115	381682	6338079	1.5	Peppermint				

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
117	381699	6338116	1.5	Jarrah				
118	381702	6338135	1.2	Jarrah				
119	381723	6338134	1.5	Jarrah				
120	381725	6338135	0.5	Peppermint				
121	381726	6338134	0.5	Peppermint				
122	381734	6338135	0.5	Peppermint				
123	381738	6338123	1.5	Jarrah				
125	381772	6338083	1.5	Tuart				
128	381767	6338041	1.5	Tuart				
129	381806	6338049	1.5	Tuart				
130	381795	6338132	1.5	Tuart				
131	381804	6338137	1	Peppermint				
132	381802	6338136	1	Peppermint				
133	381809	6338135	1	Peppermint				
134	381814	6338137	1	Peppermint				
135	381816	6338134	1	Peppermint				
136	381814	6338132	1	Peppermint				
137	381831	6338136	1	Peppermint				
138	381806	6338124	1	Peppermint				
139	381805	6338119	1	Peppermint				
140	381807	6338115	1	Peppermint				
141	381795	6338113	0.8	Peppermint				
142	381784	6338110	0.8	Peppermint				
143	381773	6338122	0.8	Peppermint				
144	381772	6338121	0.8	Peppermint				
145	381769	6338113	0.8	Peppermint				

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
146	381769	6338104	0.8	Peppermint				
147	381776	6338098	0.8	Peppermint				
148	381777	6338086	0.8	Peppermint				
149	381772	6338074	0.8	Peppermint				
150	381763	6338080	0.8	Peppermint				
151	381763	6338081	0.8	Peppermint				
152	381764	6338082	0.8	Peppermint				
153	381763	6338070	0.8	Peppermint				
154	381753	6338073	0.8	Peppermint				
155	381751	6338069	0.8	Peppermint				
156	381745	6338067	0.8	Peppermint				
157	381751	6338059	0.8	Peppermint				
158	381752	6338045	0.8	Peppermint				
159	381747	6338048	0.8	Peppermint				
160	381752	6338039	0.8	Peppermint				
161	381749	6338037	0.8	Peppermint				
162	381766	6338031	0.8	Peppermint				
163	381764	6338012	0.8	Peppermint				
164	381762	6338011	0.8	Peppermint				
165	381788	6338014	0.5	Jarrah				
167	381890	6338135	0.5	Jarrah				
168	381895	6338134	1	Jarrah				
169	381902	6338136	1.2	Tuart				
170	381899	6338138	1.2	Tuart				
171	381953	6338122	0.8	Peppermint				
172	381923	6338022	1.2	Peppermint				

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
173	381925	6338027	1.2	Jarrah				
174	381919	6337902	1	Peppermint				
175	381916	6337901	1	Peppermint				
176	381911	6337880	1	Peppermint				
177	381770	6337832	0.5	Peppermint				
178	381761	6337842	1	Flooded gum				
179	381801	6337729	0.8	Peppermint				
180	381795	6337694	1.5	Peppermint				
181	381857	6337625	1.5	Peppermint				
182	381721	6337583	1.5	Flooded gum				
183	381655	6337597	1	Peppermint				
184	381645	6337635	1	Peppermint				
185	381625	6337655	1	Peppermint				
186	381614	6337651	1	Peppermint				
187	381617	6337665	1	Peppermint				
188	381616	6337660	1	Peppermint				
189	381619	6337697	1	Peppermint				
190	381658	6337674	1.5	Unknown				
191	381662	6337699	1.5	Peppermint				
192	381652	6337719	1	Peppermint				
193	381675	6337744	1	Peppermint				
500	382209	6337376	1.5	Marri				
501	382134	6337364	1.5	Marri				
502	382074	6337382	1	Marri				
503	382045	6337398	1	Marri				
504	382069	6337427	1.2	Marri				

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
505	382035	6337447	1.5	Marri				
506	382040	6337462	1	Marri				
507	382035	6337478	1.5	Marri				
508	382035	6337478	0.3	Peppermint				
509	382036	6337478	0.3	Peppermint				
510	382034	6337487	1	Dead				
511	382056	6337512	1	Marri				
512	382101	6337493	1	Marri				
513	382147	6337483	1.5	Marri				
514	382147	6337483	0.3	Marri				
515	382179	6337484	1.8	Marri				
516	382220	6337485	1.2	Marri				
517	382256	6337487	1.5	Marri				
518	382268	6337493	1	Marri				
519	382299	6337465	1.6	Marri				
520	382295	6337458	0.3	Marri				
521	382296	6337458	0.3	Marri				
522	382308	6337440	0.4	Marri				
523	382311	6337453	0.3	Marri				
524	382311	6337512	1	Marri				
525	382319	6337570	1.2	Marri				
526	382293	6337560	1.2	Marri				
527	382241	6337559	0.5	Marri				
528	382232	6337551	1	Marri				
530	382222	6337518	1	Marri				
531	382196	6337568	1	Peppermint				

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
532	382166	6337574	1.2	Dead				
533	382165	6337574	0.3	Marri				
534	382167	6337575	0.3	Marri				
535	382144	6337572	1.5	Marri				
536	382141	6337594	1	Marri				
537	382122	6337569	1.2	Marri				
538	382125	6337559	0.8	Marri				
539	382109	6337566	0.8	Peppermint				
540	382096	6337572	0.6	Peppermint				
541	382093	6337577	0.6	Peppermint				
542	382095	6337576	1	Peppermint				
543	382070	6337568	1	Dead				
544	382061	6337569	1	Peppermint				
545	382061	6337570	1	Marri				
548	382047	6337589	1	Peppermint				
549	382057	6337585	1	Peppermint				
550	382068	6337587	1	Peppermint				
551	382091	6337607	1.2	Marri				
552	382117	6337609	1.2	Marri				
553	382138	6337629	1	Peppermint				
554	382145	6337638	1	Marri				
555	382148	6337621	1	Marri				
557	382209	6337629	0.8	Marri				
558	382208	6337631	0.5	Marri				
559	382218	6337633	0.8	Marri				
560	382230	6337632	1	Marri				

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
561	382229	6337625	1	Marri				
562	382234	6337619	1	Marri				
563	382250	6337623	1.2	Marri				
564	382252	6337637	1	Marri				
565	382276	6337640	1	Marri				
566	382278	6337641	0.8	Marri				
567	382276	6337633	1	Marri				
568	382306	6337623	1.8	Jarrah				
569	382313	6337621	1	Marri				
570	382313	6337633	1	Marri				
571	382302	6337635	0.8	Marri				
572	382290	6337647	1	Marri				
573	382288	6337657	0.7	Marri				
574	382291	6337663	0.8	Marri				
575	382294	6337663	0.7	Marri				
576	382296	6337672	1	Marri				
577	382306	6337659	0.8	Marri				
578	382312	6337664	0.8	Marri				
579	382315	6337658	0.4	Marri				
580	382320	6337655	0.4	Marri				
581	382317	6337650	0.5	Marri				
582	382313	6337648	0.5	Marri				
583	382314	6337653	0.8	Marri				
584	382320	6337692	1.2	Marri				
585	382321	6337705	0.8	Jarrah				
586	382326	6337735	1	Marri				

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
587	382331	6337739	0.8	Marri				
589	382296	6337758	1	Marri				
590	382292	6337757	0.3	Marri				
591	382283	6337739	1.5	Marri				
592	382288	6337723	1.2	Marri				
593	382288	6337724	1	Marri				
594	382267	6337725	1.2	Jarrah				
595	382296	6337693	1.2	Marri				
596	382294	6337686	1	Marri				
597	382286	6337677	1.5	Peppermint				
598	382254	6337655	1.2	Marri				
599	382262	6337668	1.2	Peppermint				
600	382259	6337686	1	Marri				
601	382243	6337683	1.2	Marri				
602	382242	6337710	1	Jarrah				
603	382231	6337719	1	Marri				
605	382253	6337730	0.5	Unknown				
606	382255	6337754	0.7	Peppermint				
607	382260	6337757	0.5	Marri				
608	382201	6337756	0.7	Jarrah				
609	382205	6337715	1	Marri				
611	382223	6337689	1	Jarrah				
612	382235	6337665	1	Marri				
614	382201	6337659	0.3	Marri				
615	382195	6337679	0.4	Marri				
616	382197	6337681	0.4	Marri				

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
617	382198	6337686	0.4	Marri				
618	382191	6337686	0.4	Marri				
619	382190	6337686	0.4	Marri				
621	382165	6337655	1.2	Marri				
622	382118	6337642	1	Marri				
624	382100	6337672	1.5	Marri				
626	382091	6337676	0.8	Marri				
627	382103	6337704	1.3	Marri				
628	382116	6337702	1.5	Marri				
629	382120	6337721	1	Marri				
630	382122	6337720	0.5	Peppermint				
631	382131	6337723	1.5	Peppermint				
632	382156	6337717	1.5	Peppermint				
633	382154	6337746	1	Tuart				
634	382164	6337754	1	Jarrah				
635	382147	6337754	1	Jarrah				
636	382137	6337752	1	Jarrah				
637	382125	6337743	0.5	Peppermint				
638	382098	6337753	0.5	Peppermint				
639	382088	6337753	0.5	Peppermint				
640	382078	6337754	0.5	Peppermint				
641	382094	6337748	1	Paperbark				
642	382074	6337727	1.2	Flooded gum				
643	382071	6337719	0	Peppermint				
644	382070	6337714	0.3	Marri				
645	382070	6337713	0.3	Marri				

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
646	382084	6337696	1	Flooded gum				
647	382083	6337694	1	Flooded gum				
648	382075	6337645	1.2	Marri				
649	382072	6337650	1.2	Marri				
650	382069	6337670	1.2	Marri				
651	382060	6337676	0.6	Marri				
652	382054	6337686	1	Flooded gum				
653	382042	6337677	1	Flooded gum				
654	382036	6337679	1	Flooded gum				
655	382042	6337713	1	Marri				
656	382030	6337625	0.8	Flooded gum				
657	382038	6337640	1	Flooded gum				
658	382040	6337643	1	Flooded gum				
659	382049	6337628	1	Flooded gum				
660	382043	6337627	1	Paperbark				
661	382033	6337591	1	Marri				
662	382038	6337585	1	Marri				
674	382343	6337511	1.5	Marri				
675	382359	6337477	1.3	Marri				
677	382348	6337405	1.3	Marri				
678	382352	6337385	1	Marri				
679	382365	6337381	1.2	Marri				
680	382371	6337374	0.5	Marri				
681	382396	6337391	1.2	Marri				
682	382401	6337401	0.5	Marri				
683	382403	6337398	0.3	Peppermint				

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
685	382400	6337432	1.2	Marri				
686	382407	6337452	1.2	Marri				
687	382397	6337455	1	Marri				
688	382404	6337469	0.5	Marri				
689	382403	6337477	0.5	Marri				
690	382395	6337487	1.5	Marri				
691	382394	6337487	0.8	Peppermint				
692	382394	6337497	0.8	Peppermint				
693	382395	6337500	1	Marri				
694	382398	6337508	1.3	Marri				
695	382355	6337543	1.5	Peppermint				
696	382413	6337527	1.2	Marri				
697	382428	6337545	0.6	Marri				
698	382456	6337552	1.5	Flooded gum				
699	382463	6337532	2	Flooded gum				
700	382461	6337513	1.2	Flooded gum				
701	382460	6337472	0.5	Peppermint				
702	382427	6337427	1.5	Peppermint				
703	382430	6337432	0.5	Peppermint				
704	382410	6337573	1.5	Marri				
705	382406	6337569	0.3	Marri				
706	382392	6337567	1.5	Peppermint				
707	382373	6337568	1	Marri				
708	382368	6337575	0.3	Peppermint				
709	382367	6337576	0.3	Peppermint				
710	382367	6337576	0.3	Peppermint				

ID	Easting	Northing	Trunk DBH (m)	Tree	Hollows	Hollow	BC suitability	BC use
711	382368	6337577	1.5	Marri				
712	382365	6337580	0.5	Marri				
713	382345	6337595	1	Marri				
714	382337	6337607	1.5	Jarrah				
715	382331	6337666	0.8	Marri				
716	382339	6337683	1.2	Jarrah				
717	382347	6337698	1.2	Jarrah				
718	382351	6337749	0.8	Jarrah				
719	382360	6337747	0.5	Jarrah				
720	382367	6337679	0.4	Jarrah				
721	382364	6337669	0.6	Jarrah				
722	382379	6337644	1.8	Jarrah				
723	382381	6337623	1.2	Peppermint				
724	382396	6337615	0.3	Flooded gum				
725	382402	6337606	1	Unknown				
726	382418	6337595	1	Peppermint				
727	381480	6338012	0.9	Tuart				
743	381565	6337888	0.9	Tuart				

Table 7-3 Suitable DBH trees within the study area

ID	Easting	Northing	Trunk DBH (m)	Canopy spread (m)	Tree Type	Hollows
1	381639	6337788	1.6	20	Tuart	
2	381607	6337712	0.5	5	Flooded gum	
3	381570	6337734	0.5	6	Jarrah	
4	381570	6337734	0.5	6	Jarrah	
5	381506	6337768	2.8	32	Tuart	
6	381497	6337756	1	20	Tuart	
7	381473	6337764	2	15	Tuart	
8	381458	6337767	2	20	Tuart	3
9	381439	6337751	2.8	26	Tuart	
10	381425	6337780	1	20	Tuart	
11	381434	6337793	1.5	26	Tuart	
12	381387	6337786	2	18	Tuart	2
13	381381	6337774	1.5	16	Tuart	
14	381371	6337781	2	20	Tuart	
15	381360	6337751	1	5	Other	
16	381394	6337802	0.6	0	Other	
17	381394	6337782	0.4	8	Other	
18	381468	6337823	2	26	Tuart	1
19	381471	6337815	1.8	20	Tuart	
20	381505	6337831	1.5	24	Tuart	
21	381519	6337834	1.5	16	Tuart	
22	381520	6337843	2	16	Tuart	
23	381488	6337851	1	20	Tuart	
24	381463	6337841	2.5	30	Tuart	
25	381415	6337851	1.5	20	Tuart	
26	381421	6337851	1.5	20	Tuart	
27	381379	6337873	1.5	20	Tuart	1
28	381380	6337857	1.5	20	Tuart	
29	381370	6337851	2	20	Tuart	
30	381357	6337859	0.5	10	Jarrah	
31	381355	6337872	1.5	20	Tuart	
32	381355	6337888	1.5	20	Tuart	
33	381354	6337889	1.5	20	Tuart	
34	381377	6337923	1	15	Jarrah	
35	381387	6337924	1	15	Jarrah	
36	381389	6337929	1.8	20	Tuart	
37	381375	6337952	2	30	Tuart	
38	381368	6337998	2	30	Tuart	2
39	381368	6338021	1	20	Jarrah	
40	381363	6338037	2	30	Tuart	

ID	Easting	Northing	Trunk DBH (m)	Canopy spread (m)	Tree Type	Hollows
41	381365	6338111	2	30	Tuart	1
42	381366	6338113	1	20	Tuart	
43	381366	6338113	1	20	Tuart	
44	381365	6338122	1.5	20	Tuart	1
45	381393	6338095	1.5	15	Tuart	1
46	381401	6338087	1.5	20	Tuart	
47	381413	6338095	1.5	20	Tuart	
48	381386	6338051	1.5	20	Tuart	
49	381389	6338035	1.5	20	Tuart	
50	381389	6338032	1.5	20	Tuart	
51	381396	6338001	1.5	20	Tuart	
52	381399	6337998	1.5	20	Tuart	1
53	381424	6337922	1.8	25	Tuart	
54	381436	6337906	2	25	Tuart	1
55	381442	6337881	2	25	Tuart	
56	381453	6337875	1	20	Tuart	
57	381462	6337872	0.8	10	Tuart	
58	381468	6337877	1.8	20	Tuart	1
59	381459	6337902	1.5	20	Tuart	
60	381441	6337960	1.2	20	Tuart	
61	381445	6337968	2	25	Tuart	
62	381452	6338011	2	25	Tuart	1
63	381429	6338003	1.5	20	Tuart	
64	381440	6338044	1.2	20	Tuart	
65	381447	6338043	1.5	20	Tuart	
66	381461	6338043	1.5	20	Tuart	
67	381456	6338076	2	25	Tuart	
68	381498	6338129	2	25	Tuart	
69	381503	6338090	1.5	25	Tuart	
70	381507	6338072	1.5	10	Other	
71	381502	6338042	1.5	20	Tuart	1
72	381496	6338040	1.5	20	Tuart	
73	381511	6337972	1	20	Tuart	
74	381514	6337907	2	25	Tuart	1
75	381526	6337879	1	20	Tuart	
76	381526	6337876	1	20	Tuart	
77	381525	6337871	1	20	Tuart	
78	381518	6337843	1.5	25	Tuart	
79	381606	6337820	1.5	20	Tuart	
80	381629	6337853	2	20	Tuart	
81	381628	6337891	1.5	20	Tuart	1
82	381636	6337902	1	20	Jarrah	

ID	Easting	Northing	Trunk DBH (m)	Canopy spread (m)	Tree Type	Hollows
83	381619	6337900	1.5	20	Tuart	
84	381596	6337903	1.5	20	Tuart	
85	381603	6337916	1.5	0	Dead	
86	381610	6337931	1.5	0	Dead	
87	381610	6337929	1.5	20	Marri	
88	381626	6337932	1.5	20	Marri	
89	381626	6337929	1.5	20	Marri	
90	381627	6337993	2	25	Tuart	2
91	381624	6338004	1	20	Tuart	1
92	381659	6337995	1	20	Other	
93	381629	6338032	1.5	20	Tuart	
94	381654	6338058	0.8	10	Tuart	
95	381622	6338083	2	25	Tuart	1
96	381619	6338097	2	0	Dead	2
97	381565	6338131	1.8	20	Tuart	
98	381545	6338136	1	15	Peppermint	
99	381552	6338100	2	20	Tuart	1
100	381559	6338079	2	20	Tuart	1
101	381572	6338030	1.5	25	Tuart	
102	381590	6338012	2	20	Tuart	
103	381544	6337974	2	20	Tuart	2
104	381559	6337868	1.5	20	Jarrah	
105	381677	6337773	1	10	Tuart	
106	381682	6337768	1	15	Jarrah	
107	381682	6337770	1.5	20	Jarrah	
108	381709	6337775	2	20	Jarrah	
109	381689	6337874	1.5	20	Tuart	1
110	381685	6337966	1.5	20	Tuart	
111	381716	6337958	1.5	15	Jarrah	
112	381718	6337955	1	15	Jarrah	
113	381679	6338054	2	20	Jarrah	
114	381675	6338054	1	15	Jarrah	
115	381682	6338079	1.5	10	Peppermint	
116	381688	6338099	1.5	15	Jarrah	1
117	381699	6338116	1.5	15	Jarrah	
118	381702	6338135	1.2	15	Jarrah	
119	381723	6338134	1.5	20	Jarrah	
120	381725	6338135	0.5	10	Peppermint	
121	381726	6338134	0.5	10	Peppermint	
122	381734	6338135	0.5	10	Peppermint	
123	381738	6338123	1.5	15	Jarrah	
124	381754	6338090	2	15	Tuart	3

ID	Easting	Northing	Trunk DBH (m)	Canopy spread (m)	Tree Type	Hollows
125	381772	6338083	1.5	15	Tuart	
126	381777	6338065	1.5	20	Tuart	1
127	381778	6338059	2	20	Tuart	2
128	381767	6338041	1.5	15	Tuart	
129	381806	6338049	1.5	15	Tuart	
130	381795	6338132	1.5	15	Tuart	
131	381804	6338137	1	10	Peppermint	
132	381802	6338136	1	10	Peppermint	
133	381809	6338135	1	10	Peppermint	
134	381814	6338137	1	10	Peppermint	
135	381816	6338134	1	10	Peppermint	
136	381814	6338132	1	10	Peppermint	
137	381831	6338136	1	10	Peppermint	
138	381806	6338124	1	10	Peppermint	
139	381805	6338119	1	10	Peppermint	
140	381807	6338115	1	10	Peppermint	
141	381795	6338113	0.8	10	Peppermint	
142	381784	6338110	0.8	10	Peppermint	
143	381773	6338122	0.8	10	Peppermint	
144	381772	6338121	0.8	10	Peppermint	
145	381769	6338113	0.8	10	Peppermint	
146	381769	6338104	0.8	10	Peppermint	
147	381776	6338098	0.8	10	Peppermint	
148	381777	6338086	0.8	10	Peppermint	
149	381772	6338074	0.8	10	Peppermint	
150	381763	6338080	0.8	10	Peppermint	
151	381763	6338081	0.8	10	Peppermint	
152	381764	6338082	0.8	10	Peppermint	
153	381763	6338070	0.8	10	Peppermint	
154	381753	6338073	0.8	10	Peppermint	
155	381751	6338069	0.8	10	Peppermint	
156	381745	6338067	0.8	10	Peppermint	
157	381751	6338059	0.8	10	Peppermint	
158	381752	6338045	0.8	10	Peppermint	
159	381747	6338048	0.8	10	Peppermint	
160	381752	6338039	0.8	10	Peppermint	
161	381749	6338037	0.8	10	Peppermint	
162	381766	6338031	0.8	10	Peppermint	
163	381764	6338012	0.8	10	Peppermint	
164	381762	6338011	0.8	10	Peppermint	
165	381788	6338014	0.5	4	Jarrah	
166	381856	6338137	2.5	20	Tuart	1

ID	Easting	Northing	Trunk DBH (m)	Canopy spread (m)	Tree Type	Hollows
167	381890	6338135	0.5	10	Jarrah	
168	381895	6338134	1	10	Jarrah	
169	381902	6338136	1.2	20	Tuart	
170	381899	6338138	1.2	15	Tuart	
171	381953	6338122	0.8	10	Peppermint	
172	381923	6338022	1.2	10	Peppermint	
173	381925	6338027	1.2	10	Jarrah	
174	381919	6337902	1	10	Peppermint	
175	381916	6337901	1	10	Peppermint	
176	381911	6337880	1	10	Peppermint	
177	381770	6337832	0.5	5	Peppermint	
178	381761	6337842	1	15	Flooded gum	
179	381801	6337729	0.8	5	Peppermint	
180	381795	6337694	1.5	5	Peppermint	
181	381857	6337625	1.5	10	Peppermint	
182	381721	6337583	1.5	10	Flooded gum	
183	381655	6337597	1	5	Peppermint	
184	381645	6337635	1	5	Peppermint	
185	381625	6337655	1	5	Peppermint	
186	381614	6337651	1	5	Peppermint	
187	381617	6337665	1	5	Peppermint	
188	381616	6337660	1	5	Peppermint	
189	381619	6337697	1	5	Peppermint	
190	381658	6337674	1.5	10	Unknown	
191	381662	6337699	1.5	15	Peppermint	
192	381652	6337719	1	10	Peppermint	
193	381675	6337744	1	10	Peppermint	
500	382209	6337376	1.5	20	Marri	
501	382134	6337364	1.5	20	Marri	
502	382074	6337382	1	15	Marri	
503	382045	6337398	1	15	Marri	
504	382069	6337427	1.2	15	Marri	
505	382035	6337447	1.5	20	Marri	
506	382040	6337462	1	10	Marri	
507	382035	6337478	1.5	20	Marri	
508	382035	6337478	0.3	10	Peppermint	
509	382036	6337478	0.3	10	Peppermint	
510	382034	6337487	1	0	Dead	
511	382056	6337512	1	15	Marri	
512	382101	6337493	1	15	Marri	
513	382147	6337483	1.5	20	Marri	
514	382147	6337483	0.3	10	Marri	

ID	Easting	Northing	Trunk DBH (m)	Canopy spread (m)	Tree Type	Hollows
515	382179	6337484	1.8	22	Marri	
516	382220	6337485	1.2	22	Marri	
517	382256	6337487	1.5	25	Marri	
518	382268	6337493	1	15	Marri	
519	382299	6337465	1.6	25	Marri	
520	382295	6337458	0.3	5	Marri	
521	382296	6337458	0.3	5	Marri	
522	382308	6337440	0.4	10	Marri	
523	382311	6337453	0.3	5	Marri	
524	382311	6337512	1	20	Marri	
525	382319	6337570	1.2	20	Marri	
526	382293	6337560	1.2	15	Marri	
527	382241	6337559	0.5	10	Marri	
528	382232	6337551	1	5	Marri	
529	382222	6337557	1.8	20	Marri	1
530	382222	6337518	1	20	Marri	
531	382196	6337568	1	15	Peppermint	
532	382166	6337574	1.2	0	Dead	
533	382165	6337574	0.3	5	Marri	
534	382167	6337575	0.3	5	Marri	
535	382144	6337572	1.5	22	Marri	
536	382141	6337594	1	15	Marri	
537	382122	6337569	1.2	20	Marri	
538	382125	6337559	0.8	15	Marri	
539	382109	6337566	0.8	15	Peppermint	
540	382096	6337572	0.6	10	Peppermint	
541	382093	6337577	0.6	10	Peppermint	
542	382095	6337576	1	10	Peppermint	
543	382070	6337568	1	0	Dead	
544	382061	6337569	1	15	Peppermint	
545	382061	6337570	1	15	Marri	
548	382047	6337589	1	10	Peppermint	
549	382057	6337585	1	10	Peppermint	
550	382068	6337587	1	10	Peppermint	
551	382091	6337607	1.2	15	Marri	
552	382117	6337609	1.2	20	Marri	
553	382138	6337629	1	10	Peppermint	
554	382145	6337638	1	15	Marri	
555	382148	6337621	1	15	Marri	
556	382153	6337617	1.2	15	Marri	1
557	382209	6337629	0.8	15	Marri	
558	382208	6337631	0.5	10	Marri	

ID	Easting	Northing	Trunk DBH (m)	Canopy spread (m)	Tree Type	Hollows
559	382218	6337633	0.8	15	Marri	
560	382230	6337632	1	15	Marri	
561	382229	6337625	1	15	Marri	
562	382234	6337619	1	10	Marri	
563	382250	6337623	1.2	10	Marri	
564	382252	6337637	1	15	Marri	
565	382276	6337640	1	20	Marri	
566	382278	6337641	0.8	15	Marri	
567	382276	6337633	1	10	Marri	
568	382306	6337623	1.8	15	Jarrah	
569	382313	6337621	1	12	Marri	
570	382313	6337633	1	12	Marri	
571	382302	6337635	0.8	18	Marri	
572	382290	6337647	1	15	Marri	
573	382288	6337657	0.7	15	Marri	
574	382291	6337663	0.8	15	Marri	
575	382294	6337663	0.7	10	Marri	
576	382296	6337672	1	20	Marri	
577	382306	6337659	0.8	10	Marri	
578	382312	6337664	0.8	10	Marri	
579	382315	6337658	0.4	5	Marri	
580	382320	6337655	0.4	5	Marri	
581	382317	6337650	0.5	10	Marri	
582	382313	6337648	0.5	10	Marri	
583	382314	6337653	0.8	10	Marri	
584	382320	6337692	1.2	20	Marri	
585	382321	6337705	0.8	5	Jarrah	
586	382326	6337735	1	15	Marri	
587	382331	6337739	0.8	10	Marri	
588	382334	6337755	1	10	Jarrah	1
589	382296	6337758	1	10	Marri	
590	382292	6337757	0.3	5	Marri	
591	382283	6337739	1.5	15	Marri	
592	382288	6337723	1.2	15	Marri	
593	382288	6337724	1	10	Marri	
594	382267	6337725	1.2	10	Jarrah	
595	382296	6337693	1.2	15	Marri	
596	382294	6337686	1	10	Marri	
597	382286	6337677	1.5	15	Peppermint	
598	382254	6337655	1.2	18	Marri	
599	382262	6337668	1.2	15	Peppermint	
600	382259	6337686	1	15	Marri	

ID	Easting	Northing	Trunk DBH (m)	Canopy spread (m)	Tree Type	Hollows
601	382243	6337683	1.2	18	Marri	
602	382242	6337710	1	10	Jarrah	
603	382231	6337719	1	15	Marri	
604	382225	6337734	1.2	15	Marri	1
605	382253	6337730	0.5	10	Unknown	
606	382255	6337754	0.7	10	Peppermint	
607	382260	6337757	0.5	10	Marri	
608	382201	6337756	0.7	10	Jarrah	
609	382205	6337715	1	18	Marri	
610	382210	6337691	1	15	Marri	1
611	382223	6337689	1	15	Jarrah	
612	382235	6337665	1	10	Marri	
613	382201	6337660	1.2	10	Marri	1
614	382201	6337659	0.3	5	Marri	
615	382195	6337679	0.4	5	Marri	
616	382197	6337681	0.4	5	Marri	
617	382198	6337686	0.4	5	Marri	
618	382191	6337686	0.4	5	Marri	
619	382190	6337686	0.4	5	Marri	
620	382185	6337682	2	20	Marri	1
621	382165	6337655	1.2	20	Marri	
622	382118	6337642	1	15	Marri	
623	382100	6337650	1.5	15	Marri	1
624	382100	6337672	1.5	20	Marri	
625	382105	6337679	1.5	10	Marri	1
626	382091	6337676	0.8	5	Marri	
627	382103	6337704	1.3	16	Marri	
628	382116	6337702	1.5	15	Marri	
629	382120	6337721	1	10	Marri	
630	382122	6337720	0.5	10	Peppermint	
631	382131	6337723	1.5	10	Peppermint	
632	382156	6337717	1.5	10	Peppermint	
633	382154	6337746	1	10	Tuart	
634	382164	6337754	1	10	Jarrah	
635	382147	6337754	1	10	Jarrah	
636	382137	6337752	1	10	Jarrah	
637	382125	6337743	0.5	10	Peppermint	
638	382098	6337753	0.5	10	Peppermint	
639	382088	6337753	0.5	10	Peppermint	
640	382078	6337754	0.5	10	Peppermint	
641	382094	6337748	1	10	Paperbark	
642	382074	6337727	1.2	10	Flooded gum	

ID	Easting	Northing	Trunk DBH (m)	Canopy spread (m)	Tree Type	Hollows
643	382071	6337719	0	10	Peppermint	
644	382070	6337714	0.3	10	Marri	
645	382070	6337713	0.3	10	Marri	
646	382084	6337696	1	10	Flooded gum	
647	382083	6337694	1	10	Flooded gum	
648	382075	6337645	1.2	20	Marri	
649	382072	6337650	1.2	15	Marri	
650	382069	6337670	1.2	15	Marri	
651	382060	6337676	0.6	10	Marri	
652	382054	6337686	1	15	Flooded gum	
653	382042	6337677	1	15	Flooded gum	
654	382036	6337679	1	15	Flooded gum	
655	382042	6337713	1	15	Marri	
656	382030	6337625	0.8	10	Flooded gum	
657	382038	6337640	1	15	Flooded gum	
658	382040	6337643	1	15	Flooded gum	
659	382049	6337628	1	15	Flooded gum	
660	382043	6337627	1	10	Paperbark	
661	382033	6337591	1	15	Marri	
662	382038	6337585	1	15	Marri	
673	382328	6337517	1.8	20	Marri	1
674	382343	6337511	1.5	20	Marri	
675	382359	6337477	1.3	25	Marri	
676	382346	6337447	1.3	15	Marri	1
677	382348	6337405	1.3	20	Marri	
678	382352	6337385	1	20	Marri	
679	382365	6337381	1.2	20	Marri	
680	382371	6337374	0.5	8	Marri	
681	382396	6337391	1.2	15	Marri	
682	382401	6337401	0.5	10	Marri	
683	382403	6337398	0.3	5	Peppermint	
684	382387	6337419	1.5	15	Marri	2
685	382400	6337432	1.2	18	Marri	
686	382407	6337452	1.2	18	Marri	
687	382397	6337455	1	15	Marri	
688	382404	6337469	0.5	15	Marri	
689	382403	6337477	0.5	10	Marri	
690	382395	6337487	1.5	20	Marri	
691	382394	6337487	0.8	12	Peppermint	
692	382394	6337497	0.8	12	Peppermint	
693	382395	6337500	1	15	Marri	
694	382398	6337508	1.3	18	Marri	

ID	Easting	Northing	Trunk DBH (m)	Canopy spread (m)	Tree Type	Hollows
695	382355	6337543	1.5	15	Peppermint	
696	382413	6337527	1.2	18	Marri	
697	382428	6337545	0.6	15	Marri	
698	382456	6337552	1.5	20	Flooded gum	
699	382463	6337532	2	25	Flooded gum	
700	382461	6337513	1.2	15	Flooded gum	
701	382460	6337472	0.5	8	Peppermint	
702	382427	6337427	1.5	15	Peppermint	
703	382430	6337432	0.5	10	Peppermint	
704	382410	6337573	1.5	20	Marri	
705	382406	6337569	0.3	5	Marri	
706	382392	6337567	1.5	15	Peppermint	
707	382373	6337568	1	12	Marri	
708	382368	6337575	0.3	5	Peppermint	
709	382367	6337576	0.3	5	Peppermint	
710	382367	6337576	0.3	5	Peppermint	
711	382368	6337577	1.5	25	Marri	
712	382365	6337580	0.5	10	Marri	
713	382345	6337595	1	15	Marri	
714	382337	6337607	1.5	18	Jarrah	
715	382331	6337666	0.8	18	Marri	
716	382339	6337683	1.2	18	Jarrah	
717	382347	6337698	1.2	15	Jarrah	
718	382351	6337749	0.8	12	Jarrah	
719	382360	6337747	0.5	8	Jarrah	
720	382367	6337679	0.4	8	Jarrah	
721	382364	6337669	0.6	12	Jarrah	
722	382379	6337644	1.8	25	Jarrah	
723	382381	6337623	1.2	15	Peppermint	
724	382396	6337615	0.3	5	Flooded gum	
725	382402	6337606	1	10	Unknown	
726	382418	6337595	1	12	Peppermint	
727	381480	6338012	0.9	20	Tuart	
728	381490	6337997	0.1	20	Tuart	1
740	381601	6338036	0.8	10	Tuart	
742	381482	6337973	1	20	Tuart	1
743	381565	6337888	0.9	8	Marri	