

Fauna Survey



**Lot 298 Winthrop Avenue, Lot 790
Oriel Court &
Lot 938 Somerville Drive**

College Grove

FEBRUARY 2015
VERSION 1

On behalf of:

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Acronyms/Abbreviations:

BA: Birdlife Australia (Formerly RAOU, Birds Australia).

CALM: Department of Conservation and Land Management (now DPaW), WA Government.

CAMBA: China Australia Migratory Bird Agreement 1998.

CBD: Central Business District.

CoB: City of Bunbury

DEC: Department of Environment and Conservation (now DPaW), WA Government.

DEH: Department of Environment and Heritage (now DoE), Australian Government.

DEP: Department of Environment Protection (now DER), WA Government.

DEWHA: Department of the Environment, Water, Heritage and the Arts (now DoE), Australian Government

DER: Department of Environment Regulation (formerly DEC, DoE), WA Government.

DMP: Department of Mines and Petroleum (formerly DoIR), WA Government.

DoE: Department of Environment (now DER/DPaW), WA Government.

DoIR: Department of Industry and Resources (now DMP), WA Government.

DoL: Department of Lands, WA Government.

DotE: Department of the Environment (formerly SEWPaC, DWEHA, DEH), Australian Government.

DPaW: Department of Parks and Wildlife (formerly DEC, CALM, DoE), WA Government.

EP Act: *Environmental Protection Act 1986*, WA Government.

EPA: Environmental Protection Authority, WA Government.

EPBC Act: *Environment Protection and Biodiversity Conservation Act 1999*, Australian Government.

EPP: Environmental Protection Policy.

ha: Hectare (10,000 square metres).

IBRA: Interim Biogeographic Regionalisation for Australia.

IUCN: International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union.

JAMBA: Japan Australia Migratory Bird Agreement 1981.

km: Kilometre (1,000 metres).

RAOU: Royal Australia Ornithologist Union.

ROKAMBA: Republic of Korea-Australia Migratory Bird Agreement 2007.

SEWPaC: Department of Sustainability, Environment, Water, Population and Communities (now DoE, formerly DEH, DEWHA), Australian Government.

SRE: Short Range Endemic

SSC: Species Survival Commission, International.

VSA: Vegetation and substrate associations.

WA: Western Australia.

WAM: Western Australian Museum, WA Government.

WC Act: *Wildlife Conservation Act 1950*, WA Government.

SUMMARY

This report details the results of a fauna survey of Lot 298 Winthrop Avenue, Lot 790 Oriel Court and Lot 938 Somerville Drive, College Grove, Bunbury (the study area). The study area covers a total of 3.9 ha with each individual lot contributing to the total as follows:

- Lot 298 Winthrop Avenue (2.3ha);
- Lot 790 Oriel Court (0.6ha); and
- Lot 938 Somerville Drive (1.6ha).

The City of Bunbury (the City) recently entered into a joint venture agreement with the state government in order to investigate development options for several lots in College Grove, centred around Lot 70 Winthrop Avenue and Lot 298 Winthrop Avenue/938 Somerville Drive. As part of these investigations, the City has commissioned a series of ecological surveys in order to support anticipated state and federal government environmental approvals requirements

This report details the results of the fauna survey carried out at Lot 298, Lot 790 and Lot 938. A separate report has been prepared for the other proposed development areas (i.e. Lot 70).

To fulfil the anticipated requirements of regulatory authorities the following was carried out:

- Literature review for the purpose of compiling a list of expected fauna species;
- Use of a camera trap, bird surveys and opportunistic observations of fauna in general;
- Western Ringtail Possum Survey. Day and night time surveys aimed at finding evidence of this species within the study area; and
- Black Cockatoo Habitat Survey. A survey to record potential and existing breeding habitat (using DotE criteria), foraging habitat and roosting habitat.

A list of expected fauna species likely to occur in the study area was compiled from information obtained during the literature review and is presented in Appendix C. The list of potential fauna takes into consideration that firstly the species in question is not known to be locally extinct and secondly that suitable habitat for each species, as identified during the site inspection, is present within the study area.

Despite the omission of some species It should be noted that the list provided is very likely still an over estimation of the fauna species utilising the site (either on a regular or infrequent basis) as a result of the precautionary approach adopted for the assessment. The study area is relatively small and it is likely that only a small subset of the potential species would be present at any one time.

With respect to native vertebrate fauna, 19 mammal (includes nine bats species), 70 bird, 25 reptile and three frog species have the potential to occur in or utilise at times, the study area. Of the 117 native animals that could occur, six are considered to be threatened (vulnerable, endangered, rare or in need of special protection), with an additional four DPaW priority species being present or likely to be present. One migratory bird species also has the potential to utilise the study area at times.

Twenty five fauna species (21 native and four introduced) were positively identified as using the study area for some purpose during the fauna survey period, these being:

- Bobtail (*Tiliqua rugosa*);
- Laughing Kookaburra (*Dacelo novaeguinea*);
- Tawny Frogmouth (*Podargus strigoides*);
- Grey Butcherbird (*Cracticus torquatus*);
- Australian Magpie (*Cracticus tibicen*);
- Australian Raven (*Corvus coronoides*);
- Australian Ringneck Parrot (*Platycercus zonarius*);
- Baudin`s Black-Cockatoo (*Calyptorhynchus baudinii*) (foraging evidence);
- Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*) (foraging evidence);
- Galah (*Cacatua roseicapilla*);
- Red-capped Parrot (*Platycercus spurius*);
- Brown Honeyeater (*Lichmera indistincta*);
- Grey Fantail (*Rhipidura fuliginosa*);
- Red Wattlebird (*Anthochaera carunculata*);
- Silvereye (*Zosterops lateralis*);
- Weebill (*Smicrornis brevirostris*);
- Western Spinebill (*Acanthorhynchus superciliosus*);
- Willie Wagtail (*Rhipidura leucophrys*);
- Western Ringtail Possum (*Pseudocheirus occidentalis*);
- Common Brushtail Possum (*Trichosurus vulpecular*);
- Western Brush Wallaby (*Macropus irma*);

- Western Grey Kangaroo (*Macropus fuliginosus*);
- Rabbit (*Oryctolagus cuniculus*).
- Red Fox (*Vulpes vulpes*); and
- Cat (*Felis catus*).

A single western ringtail possum was located within Lot 298 during the nocturnal survey (see Figure 5). No other evidence of western ringtail possums utilising the study area was found suggesting a low population density in this specific area, at least at the time of the survey.

Much of the study area appears suitable for western ringtail possums to use though most areas are totally dominated by banksia which, while suitable as refuge and dispersal habitat, lacks value as foraging habitat, a factor possibly limiting numbers in the area.

The black cockatoo potential breeding habitat assessment identified 23 trees within the study area that had a DBH of >50cm. None of the trees observed had hollows considered by the Author to be currently suitable for cockatoo to use for nesting purposes. Additional details on each black cockatoo potential breeding tree observed can be found in Appendix F.

The single vegetation community present with the study area contains plant species known to be utilised by black cockatoos as foraging habitat (mainly *banksia* but also jarrah and a small number of marri specimens). Almost all this area (3.9 ha) can be considered to represent quality black cockatoo foraging habitat given the presence of at least one plant species documented as foraging habitat for one or more of the three black cockatoo species known to frequent the area.

Evidence of black cockatoos foraging within the survey area was found in the form of chewed banksia cones and chewed marri fruits. This evidence was attributed to Carnaby's black-cockatoo (*banksia*) and Baudin's black-cockatoos (*banksia* and marri).

No evidence of black cockatoos roosting onsite was observed.

Based on the survey results, habitats present and documented distributions it is considered possible that 11 of those species identified during the literature review may use the study area for some purpose at times. The presence of some species was confirmed during the field survey work. Other species have been omitted from the potential list for the site (Appendix C), principally due to lack of suitable habitat on-site (including extent or quality) or known local/regional extinction. Species that may occasionally occur as vagrants/transients have also not been list as potential species.

The conservation significant species considered most likely to be present either as residents or on a temporary basis (e.g. seasonal, foraging or dispersing) are:

- *Ctenotus ora* Coastal Plains Skink – P3 (DPaW Priority species)
Current status onsite and in the general area is difficult to determine. May be present as habitat appears suitable though limited in extent, which may make it difficult for a population to persist.
- *Calyptorhynchus banksii naso* Forest Red-tailed Black-Cockatoo – S1 (WC Act), Vulnerable (EPBC Act)
Known to inhabit the area. Several of the plant species present within the study area represent potential foraging habitat (e.g. jarrah, marri). No existing or potential nest hollows and no roosting activity seen.
- *Calyptorhynchus baudinii* Baudin's Black-Cockatoo - S1 (WC Act), Vulnerable (EPBC Act)
This species is likely to be a relatively frequent visitor the area and may reside in bushland in the general vicinity during parts of the year. Some foraging evidence observed (chewed marri fruits in addition to *Banksia* – caused by Baudin's or Carnaby's or both). No existing or potential nest hollows and no roosting activity seen.
- *Calyptorhynchus latirostris* Carnaby's Black-Cockatoo – S1 (WC Act), Endangered (EPBC Act)
This species is likely to be a relatively frequent visitor the area and may reside in bushland in the general vicinity during parts of the year. Some foraging evidence observed (chewed *Banksia* – caused by Baudin's or Carnaby's or both) and several of the plant species present within the study area represent potential foraging habitat (e.g. jarrah, marri spp.). No existing or potential nest hollows and no roosting activity seen.
- *Falco peregrinus* Peregrine Falcon - S4 (WC Act)
Uncommon so unlikely to be resident in area but study site may form part of larger home range. No potential nest sites observed.
- *Merops ornatus* Rainbow Bee-eater – S3 (WC Act), Migratory (EPBC Act)
Common seasonal visitor to south west. During summer months a small number of individuals of this species may occasionally forage and roost onsite.
- *Pseudocheirus occidentalis* Western Ringtail Possum - S1 (WC Act), Vulnerable (EPBC Act)
One individual observed during the nocturnal survey. Results suggest it is present in some areas at low densities.
- *Phascogale tapoatafa* ssp. Southern Brush-tailed Phascogale - S1 (WC Act)
No evidence of this species using the site was found but given a population exists in the general area and habitat appears suitable it may occur despite not being detected.

- *Isoodon obesulus fusciventer* Southern Brown Bandicoot – P5 (DPaW Priority Species)
No evidence (individuals/diggings/scats) of this species was found within the study area during the site survey despite some areas containing dense groundcover, possibly suitable for the species to use for daytime refuge being present. May occur despite no being detected.
- *Macropus Irma* Western Brush Wallaby – P4 (DPaW Priority Species)
Recorded on a camera trap during the survey period. Western brush wallaby's occur at relatively low densities and utilise large tracts of bushland. It is therefore considered unlikely this individual resides within the study area alone but is more likely to range across many sections of bushland in the area, in particular areas east of Somerville Drive, away from most human activity.
- *Falsistrellus mackenziei* Western False Pipistrelle - P4 (DPaW Priority Species)
Current status onsite is difficult to determine but given it was recorded nearby during other associated surveys and the presence of tree hollows it must be assumed to be present if only occasionally while foraging.

The most likely potential impacts of the proposed development within the study area are:

- Loss of vegetation/fauna habitat that may be used for foraging, breeding, roosting, or dispersal; and
- Death or injury of fauna during clearing and construction.

Under the assumption at all of the native vegetation currently remaining within the study area will require clearing to allow any future development (i.e. ~3.9 ha), possible impacts on species of conservation significance previously recorded in the general area have been assessed and a summary provided in the table below.

Likelihood of Occurrence and Possible Impacts – Fauna Species of Conservation Significance (continues on following pages).

Species	Conservation Status (see Appendix A for codes)	Likelihood of Occurrence	Potential Impact on Habitat	Degree of Impact	Justification
Pouched Lamprey <i>Geotria australis</i>	P1	Unlikely	None	Nil	Preferred habitat absent.
Coastal Plains Ctenotus <i>Ctenotus ora</i>	P3	Possible	Loss of a small area of habitat.	Very Low	Small impact area. If present will persist in adjoining areas
Southern Carpet Python <i>Morelia spilota imbricata</i>	S4	Possible but only rarely	None	Nil	Locally extinct?
Great Egret <i>Ardea alba</i>	S3, Mig	Unlikely	None	Nil	Preferred habitat absent.

Species	Conservation Status (see Appendix A for codes)	Likelihood of Occurrence	Potential Impact on Habitat	Degree of Impact	Justification
Cattle Egret <i>Ardea ibis</i>	S3, Mig	Unlikely	None	Nil	Preferred habitat absent.
Australasian Bittern <i>Botaurus poiciloptilus</i>	S1, EN	Unlikely	None	Nil	Preferred habitat absent.
Black Bittern <i>Ixobrychus flavicollis</i>	P1	Unlikely	None	Nil	Preferred habitat absent.
Little Bittern <i>Ixobrychus minutus</i>	P4	Unlikely	None	Nil	Preferred habitat absent.
Osprey <i>Pandion haliaetus</i>	Ma	Unlikely	None	Nil	Preferred habitat absent.
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	S3, Mig	Unlikely	None	Nil	Preferred habitat absent.
Peregrine Falcon <i>Falco peregrinus</i>	S4	Possible	None Likely.	Nil	Will continue to utilise area for foraging despite any development. No potential nest sites.
Migratory Shorebirds/Seabirds	Various	Unlikely	None	Nil	Preferred habitat absent.
Glossy Ibis <i>Plegadis falcinellus</i>	S3, Mig	Unlikely	None	Nil	Preferred habitat absent.
Carnaby's Black Cockatoo <i>Calyptrorhynchus latirostris</i>	S1, EN	Known To Occur	Loss of areas of habitat.	Low	Small impact area. Large areas of suitable habitat nearby.
Baudin's Black Cockatoo <i>Calyptrorhynchus baudinii</i>	S1, VU	Known To Occur	Loss of areas of habitat.	Low	Small impact area. Large areas of suitable habitat nearby.
Forest Red-tailed Black Cockatoo <i>Calyptrorhynchus banksii naso</i>	S1, VU	Possible	Loss of areas of habitat.	Low	Small impact area. Large areas of suitable habitat nearby.
Masked Owl (SW population) <i>Tyto n. novaehollandia</i>	P3	Possible but only rarely.	None	Nil	Preferred habitat absent. May occur very occasionally.
Fork-tailed Swift <i>Apus pacificus</i>	S3, Mig	Flyover Only	None	Nil	Aerial species.
Western Whip Bird <i>Psophodes nigrogularis. nigrogularis</i>	S1, EN	Unlikely	None	Nil	Locally/Regionally extinct.
Rainbow Bee-eater <i>Merops ornatus</i>	S3, Mig	Possible	None Likely.	Nil	Utilises disturbed habitats. Species will continue to utilise the area as it does now despite proposed development.
Chuditch <i>Dasyurus geoffroii</i>	S1, VU	Unlikely	None	Nil	Locally extinct.

Species	Conservation Status (see Appendix A for codes)	Likelihood of Occurrence	Potential Impact on Habitat	Degree of Impact	Justification
Southern Brush-tailed Phascogale <i>Phascogale tapoatafa ssp</i>	S1	Possible	Loss of a small area of habitat.	Very Low	Not detected during survey period. Small impact area. Areas of similar habitat nearby
Southern Brown Bandicoot <i>Isodon obesulus fusciventer</i>	P5	Possible	Loss of a small area of habitat.	Very Low	Not detected during survey period. Small impact area. Areas of similar habitat nearby. If present will persist in adjoining areas
Western Ringtail Possum <i>Pseudocheirus occidentalis</i>	S1, VU	Known To Occur	Loss of a small area of habitat.	Low	Small impact area. Areas of similar habitat nearby
Western Brush Wallaby <i>Macropus irma</i>	P4	Known To Occur	Loss of a small area of habitat.	Very Low	Preferred habitat absent. Areas of similar habitat nearby.
Quokka <i>Setonix brachyurus</i>	S1, VU	Unlikely	None	Nil	Preferred habitat absent.
Western False Pipistrelle <i>Falsistrellus mackenziei</i>	P4	Possible	Loss of a small area of habitat.	Very Low	Small impact area. Areas of similar habitat nearby.
Water Rat <i>Hydromys chrysogaster</i>	P4	Unlikely	None	Nil	Preferred habitat absent.

The assessment suggests that impacts on fauna, in particular those of conservation significance will be in most instances low or very low. This conclusion is based on the relatively small area of clearing likely to be required and the extent of similar habitat in adjoining areas, much of which is within secured reserves. It can be expected that all the species currently utilising the study area as habitat will persist in the vicinity despite any development proceeding.

Subsequent to approval, any future development at the site will necessarily require the clearing of existing fauna habitat. Planning should take into account the potential presence of some species of conservation significance and fauna in general so that any impacts can be minimised or offset. Management plans and protocols that aim to minimise impact on fauna and fauna habitat should be employed where relevant with specific attention being paid to those aspects highlighted in Section 6.2, when considered reasonable and practical to implement.

Given the presence of *EPBC Act* listed threatened fauna and their habitat (mainly black cockatoo and to a lesser extent western ringtail possum habitat) within the study area it is considered highly likely that referral of the project to the DotE to ensure compliance with the *EPBC Act* will also be required.

1. INTRODUCTION

This report details the results of a fauna survey of Lot 298 Winthrop Avenue, Lot 790 Oriel Court and Lot 938 Somerville Drive, College Grove, Bunbury (the study area). The site is located about 5 km south east of the Bunbury CBD in south west Western Australia and is centred at approximately 33.373020°S and 115.657614°E (Figures 1 & 2). The study area covers a total of 3.9 ha with each individual lot contributing to the total as follows:

- Lot 298 Winthrop Avenue (2.3ha);
- Lot 790 Oriel Court (0.6ha); and
- Lot 938 Somerville Drive (1.6ha).

The City of Bunbury (the City) recently entered into a joint venture agreement with the state government in order to investigate development options for several lots in College Grove, centred around Lot 70 Winthrop Avenue and Lot 298 Winthrop Avenue/938 Somerville Drive.

As part of these investigations, the City has commissioned a series of ecological surveys in order to support anticipated state and federal government environmental approvals requirements in the future, including a WA Clearing Permit and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* assessment.

This report details the results of the fauna survey carried out at Lot 298, Lot 790 and Lot 938. A separate report has been prepared for the other proposed development areas (i.e. Lot 70).

2. SURVEY SCOPE

The project scope included but was not limited to:

- Part A: provision of advice and recommendations to the City of Bunbury Project Manager on the design of a fauna survey for the proposed development sites that satisfies the state and federal government Clearing Permit and *EPBC Act* assessment processes respectively.
- Part B: Implementation of the fauna survey recommended under Part A.
- Preparation of final reports documenting the methodology and findings of Parts A and B.
- Provision of recommendations to the City of Bunbury regarding how impacts on the identified species could be reduced during and post-construction of the proposed developments in general.



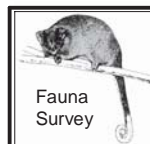
Legend

- Lot 298, 790 & 938
- Camera Trap

0 50 100

Metres

MGA Zone 50



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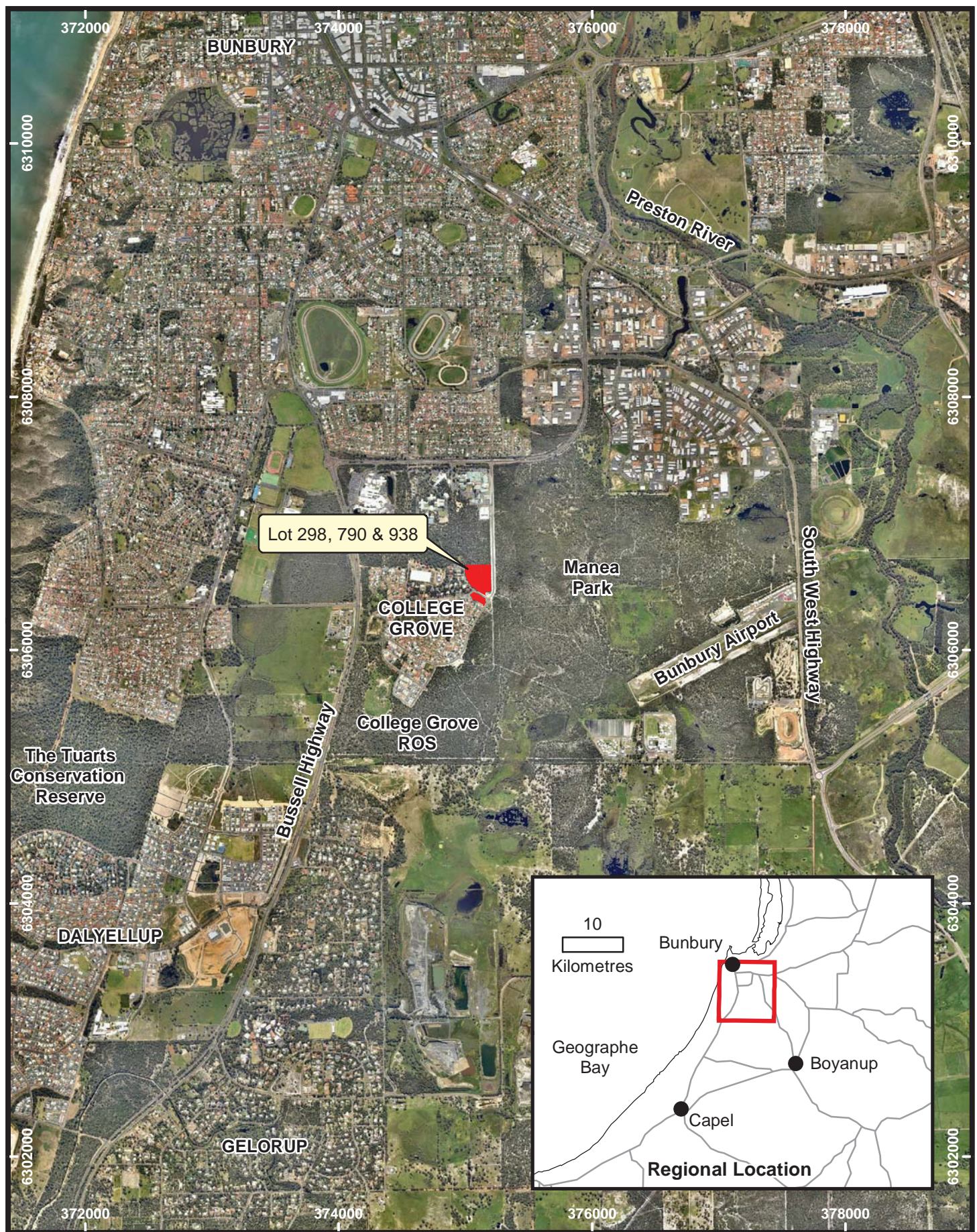
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Lot 298, 790 & 938
College Grove

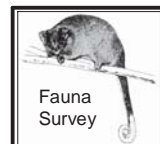
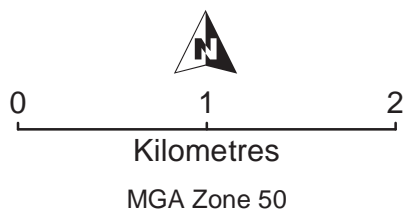
**Study Area
Air Photo &
Camera Trap Sites**

Figure: 2



Legend

Lot 298, 790 & 938



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Lot 298, 790 & 938
College Grove

Study Area and Surrounds

The fauna assessment has also been carried out to provide information anticipated to be required by state and federal environmental regulatory authorities namely the Western Australian Environmental Protection Authority (EPA), the Department of Parks and Wildlife (DPaW), Department of Environment Regulation (DER) and the Commonwealth Department of the Environment (DotE).

To comply with the scope of works and the likely requirements of environmental regulatory authorities the survey documented in this report was planned and implemented in accordance with:

- EPA Position Statement No. 3 “Terrestrial Biological Surveys as an Element of Biodiversity Protection” (EPA 2002); and
- EPA Guidance Statement No. 56 “Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia” (EPA 2004).

3. BIOGEOGRAPHIC SETTING

3.1 BIOGEOGRAPHY

The study area is situated within the south west margin of the Swan Coastal Plain. The Swan Coastal Plain Bioregion (SWA) is classified as part of the Interim Biogeographical Regionalisation for Australia and is described as being a:

“Low lying coastal plain mainly covered with Woodlands. It is dominated by Banksia or Tuart on sandy soils, Allocasuarina obesa on outwash plains, and paperbark in swampy areas. In the east, the plain rises to duricrusted Mesozoic sediments dominated by Jarrah Woodland. Warm Mediterranean. Three phases of marine sand dune development provide relief. The outwash plains, once dominated by A. obesa – Marri Woodlands and Melaleuca shrublands, are extensive only in the south.” (Thackway and Cresswell, 1996; IBRA, 2000).

The study area itself is within a further defined subregion of the SWA referred to as the Swan Coastal Plan subregion or the Perth subregion (SWA2). This is defined as:

“Colluvial and aeolian sands, alluvial river flats, coastal limestone. Heath and/or Tuart woodlands on limestone, Banksia and Jarrah - Banksia woodlands on Quaternary marine dunes of various ages, Marri on colluvial and alluvials. Includes a complex series of seasonal wetlands and also includes Rottnest, Carnac and Garden Islands etc. Rainfall ranges between 600 and 1000 mm annually and the climate is Mediterranean”. The subregion has an area of about 1, 333,900 ha (Mitchell et al. 2002).

The area falls within the Drummond Botanical Subdistrict of the Southwest Botanical Province (Beard 1990). This subdistrict is mainly *Banksia* low woodland on leached sands with *Melaleuca* swamps in areas that are poorly drained. Woodlands of *Eucalyptus gomphocephala* (tuart), *Eucalyptus marginata* (jarrah) and *Corymbia calophylla* (marri) occur on less leached soils.

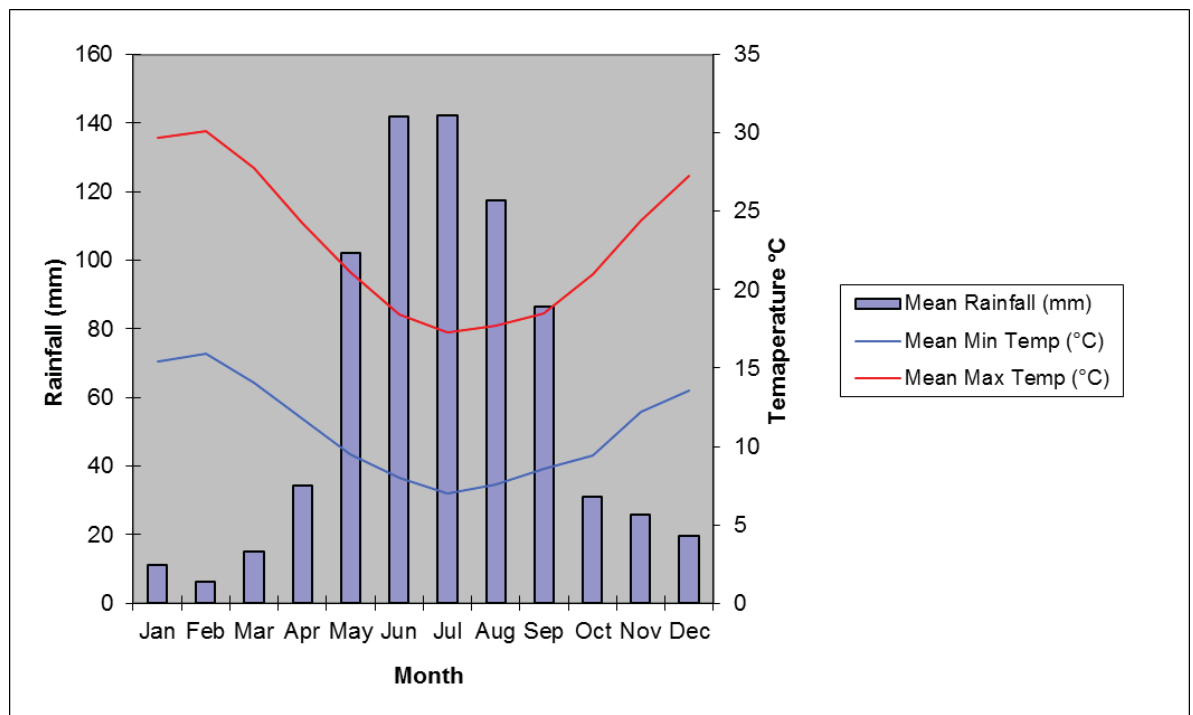
More detailed mapping by Heddle *et al.* (1980) places the study area on the eastern boundary of the Karrakatta Vegetation Complex (Central and South). This complex is defined in general terms as consisting of vegetation that ranges between open forests of *Eucalyptus gomphocephala* (tuart), *Eucalyptus marginata* (jarrah) and *Corymbia calophylla* (marri) and woodlands of *Eucalyptus marginata* (jarrah) and *Banksia* species.

3.2 CLIMATE

The study area is situated in the Mediterranean climate zone of Western Australia with wet, mild winters and hot dry summers. Mean monthly maximum and minimum temperatures for Bunbury range from 17.3°C to 30.1°C and 7.0°C to 15.9°C respectively (Bureau of Meteorology 2015).

The mean annual rainfall (1995 – 2015) for Bunbury is 731.7 millimetres with rainfall occurring predominantly during the May to September period (Bureau of Meteorology 2015).

Figure 3: Mean Monthly Rainfall and Maximum and Minimum Temperatures (Bunbury - Bureau of Meteorology 2015)




The summer wind pattern of the region is dominated by high pressure cells that create local onshore (sea breezes) and offshore (land breezes) winds, with light south-easterlies in the early hours of the morning and at night and stronger

south-westerlies present during the day. The winter wind pattern is dominated by the eastward progression of rain-bearing low pressure systems and associated cold fronts with north-westerly storms.

3.3 VEGETATION COMMUNITIES

Vegetation community mapping of Lot 298 Lot 790 and Lot 938 has been undertaken by the CoB (CoB 2015). The extent of the single vegetation community identified is shown in Figure 4. Table 1 below provides a description and estimation of the total area covered by the unit within the study area.

Table 1: Vegetation Communities (from CoB 2015)

Unit Code	Description	Example Image
COLL 7	<p>Jarrah Woodland over <i>Banksia attenuata</i>, Woody Pear Low Woodland over <i>Kunzea glabrescens</i> Tall Open Shrubland over Shrubland over Open Low Heath over white grey sand over pale yellow sand.</p> <p>Vegetation Condition: Variable, ranging from Excellent to Degraded.</p> <p>Total Area = ~3.9 ha (~100%)</p>	

4. METHODS

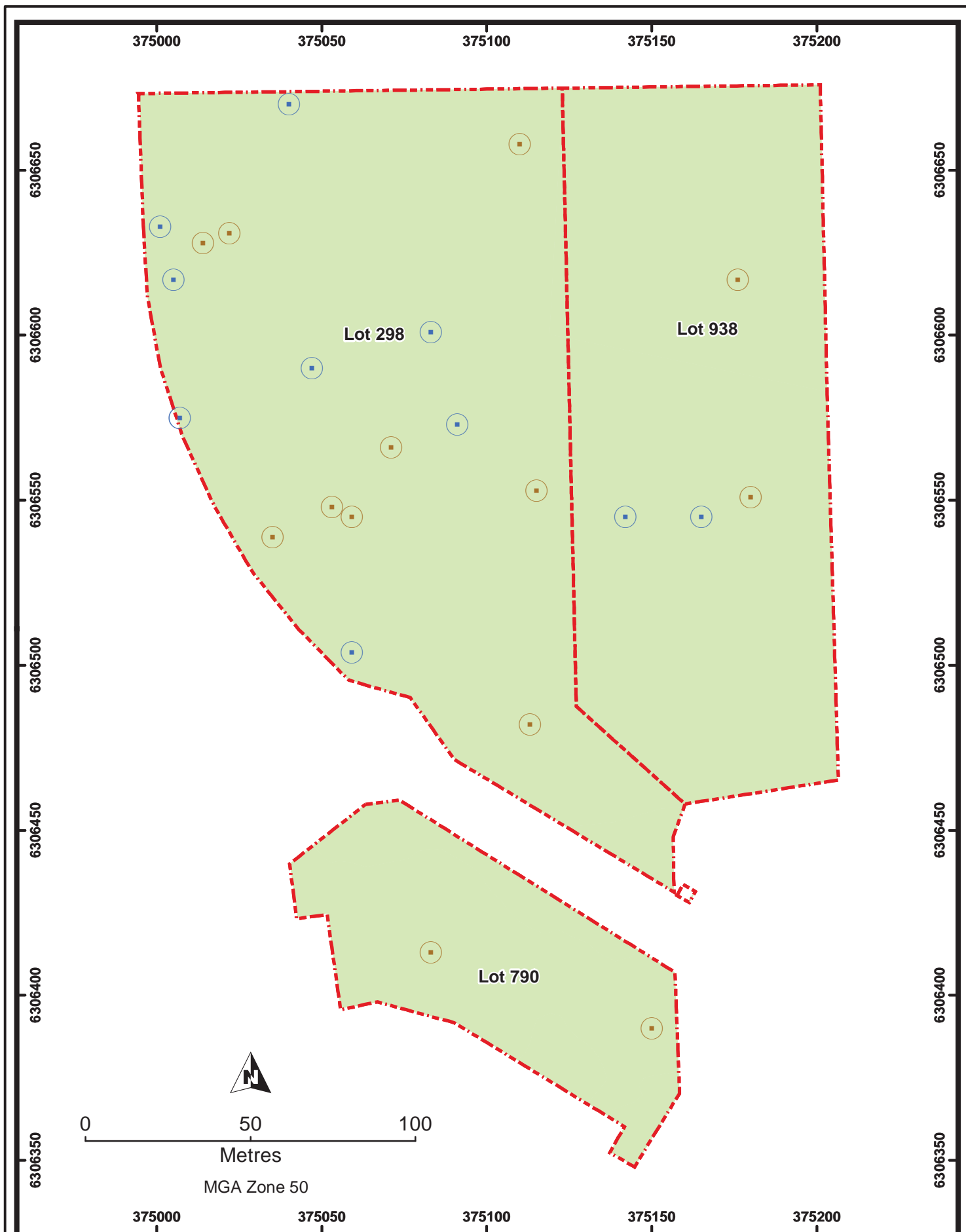
4.1 FAUNA INVENTORY – LITERATURE REVIEW

4.1.1 Database Searches

Searches of the following databases have been undertaken to aid in the compilation of a list of vertebrate fauna potentially occurring within the study area:

- DPaW's NatureMap Database Search (combined data from DPaW, WAM, BA and consultants reports) (DPaW 2015): and
- Protected matters search tool (Department of the Environment – DotE 2015).

It should be noted that these lists are based on observations from a broader area than the study site and therefore may include species that would only ever occur as vagrants in the actual study area due to a lack of suitable habitat or the presence of only marginal habitat. The databases also often included very old

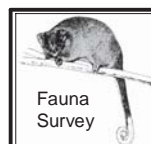


Legend

Jarrah Woodland over *Banksia attenuata*, Woody Pear Low woodland over *Kunzea glabrescens* Tall Open Shrubland over Shrubland over Open Low Heath over white grey sand over pale yellow sand

Tree >50cm DBH, no hollows seen

Tree >50cm DBH, one or more small hollows seen



Fauna
Survey

DRAWN: G Harewood

DATE: Jan 2015

SCALE: 1:1,500

Lot 298, 790 & 938
College Grove
**Plant
Communities**
(Courtesy CoB 2015)
and Habitat Trees

Figure: 4

records and in some cases the species in question have become locally or regionally extinct.

Information from these sources should therefore be taken as indicative only and local knowledge and information needs also to be taken into consideration when determining what actual species may be present within the specific area being investigated.

4.1.2 Previous Fauna Surveys in the Area

Fauna surveys, assessments and reviews have been undertaken in nearby areas in the past, though not all are publically available and could not be referenced. The most significant of those available have been used as the primary reference material for compiling the potential fauna assemblage for the general area. Those reports referred to included, but were not limited to:

- ATA Environmental (1998). Vertebrate Fauna Dalyellup Beach Estate Shire of Capel, Unpublished report for Homeswest/Home Building Society and Satterley Real Estate.
- Bow, B. (1999). The biogeography of the ground vertebrate fauna of the southern Swan Coastal Plain, Bunbury, W.A. B.Sc (Hons) Thesis, Curtin University of Technology.
- ENV Australia (2006). Western Ringtail Possum Assessment, Manea College. Unpublished report for Manea College.
- ENV Australia (2006). Fauna Assessment (Level 1), Manea College. Unpublished report for Manea College.
- ENV Australia (2008). Edith Cowan University, South West Campus. Fauna Assessment (Level 2). Unpublished report for ECU.
- HGM (2002). Natural Values of 12 Sites of the Greater Bunbury Region Scheme. Tasks 1, 2 and 3. Unpublished report for WAPC (Muddy Lakes Level 2 fauna survey results).
- Harewood, G. (2007). Western Ringtail Possum Assessment Survey, College Grove Stage 2 (Lot 9000). Unpublished report for RPS Bowman Bishaw Gorham.
- Harewood, G. (2008). Western Ringtail Possum Assessment Survey, College Grove Stage 2 (Lot 9000). Unpublished report for RPS Bowman Bishaw Gorham.
- Harewood, G. (2009). Western Ringtail Possum Assessment Survey, College Grove Stage 3 (Lot 9000). Unpublished report for RPS Environment Pty Ltd.

- Harewood, G. (2008a). Western Ringtail Possum Assessment Survey, Somerville Drive Extension, College Grove. Unpublished report for RPS Environmental/City of Bunbury.
- Harewood, G. (2008b). Fauna Assessment Survey (Level 2) Lot 187 Stratham. Unpublished report for MBS Environmental.
- Harewood, G. (2010). Terrestrial Fauna Survey (Level1) of Lot 930 (part) College Grove Bunbury. Unpublished report for ENV.
- Harewood, G. (2011). Fauna Assessment of Somerville Drive Extension, College Grove. Unpublished report for RPS.
- Harewood, G. (2012). Fauna Assessment of the Bunbury Clay Target Club, Davenport. Unpublished report for the City of Bunbury.
- Harewood, G. (2013). Western Ringtail Possum Survey of Somerville Drive Extension, College Grove. Unpublished letter report for Bark Environmental Consulting.
- Harewood, G. (2013). Western Ringtail Possum Survey. Bunbury Regional Airport Proposed Offset Site. Unpublished letter report for Opus International Consultants (PCA) Pty Ltd.
- McNee, S (1987). Avifauna Surveys of Ludlow Tuart Forests, Minninup and the old Yoganup Mine Site Capel, Western Australia. Report for Westralian Sands Ltd.

As with the databases searches some reports refer to species that would not occur in the project area due to a lack of suitable habitat (extent and/or quality) and this fact was taken into consideration when compiling the potential fauna species list for the study area. It should also be noted that the NatureMap database is likely to include some records from previous fauna surveys in the area including some of those listed above.

4.1.3 Existing Publications

The following represent the main publications used to identify and refine the potential fauna species list for the study area:

- Anstis, M. (2013). Tadpoles and Frogs of Australia. New Holland Publishers, Sydney.
- Barrett, G., Silcocks, A., Barry, S., Cunningham, R. and Poulter, R. (2003). The New Atlas of Australian Birds. Royal Australasian Ornithologists Union, Victoria.
- Churchill, S. (2008). Australian Bats. Second Edition, Allen & Unwin.

- Cogger, H.G. (2014). Reptiles and Amphibians of Australia. 7th Edition. CSIRO Publishing.
- Johnstone, R.E. and Storr, G.M. (1998). Handbook of Western Australian Birds: Volume 1 – Non-passerines (Emu to Dollarbird). Western Australian Museum, Perth Western Australia.
- Johnstone, R.E. and Storr, G.M. (2004). Handbook of Western Australian Birds: Volume 2 – Passerines (Blue-winged Pitta to Goldfinch). Western Australian Museum, Perth Western Australia.
- Menkhorst, P. and Knight, F. (2011). A Field Guide to the Mammals of Australia. Third Edition, Oxford University Press, Melbourne.
- Morgan, D. & Beatty, S. (2006). Fish and freshwater crayfish communities of the Brunswick and Preston Rivers. Freshwater Fish Research, Murdoch University report to the Leschenault Catchment Council.
- Morgan, D.L., Beatty, S.J., Klunzinger, M.W, Allen, M.G. and Burnham, Q.E (2011). Field Guide to the Freshwater Fishes, Crayfishes and Mussels of South Western Australia. Published by SERCUL.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1983). Lizards of Western Australia II: Dragons and Monitors. WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1990). Lizards of Western Australia III: Geckos and Pygopods. WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1999). Lizards of Western Australia I: Skinks. Revised Edition, WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (2002). Snakes of Western Australia. Revised Edition, WA Museum, Perth.
- Tyler M.J. & Doughty P. (2009). Field Guide to Frogs of Western Australia, Fourth Edition, WA Museum, Perth.
- Van Dyck, S. & Strahan, R. Eds (2008). The Mammals of Australia. Third edition. Queensland Museum.
- Wilson, S. and Swan, G. (2013). A Complete Guide to Reptiles of Australia. Third Edition, Reed, New Holland, Sydney.

4.1.4 Fauna Conservation Categories

The conservation significance of fauna species has been assessed using data from the following sources:

- *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. Administered by the Australian Government Department of the Environment (DotE);
- *Wildlife Conservation Act 1950 (WC Act)*. Administered by the Western Australian Department of Park & Wildlife (DPaW) (Govt. of WA 2014);
- Red List produced by the Species Survival Commission (SSC) of the World Conservation Union (also known as the IUCN Red List - the acronym derived from its former name of the International Union for Conservation of Nature and Natural Resources). The Red List has no legislative power in Australia but is used as a framework for State and Commonwealth categories and criteria; and the
- DPaW Priority Fauna list. A non-legislative list maintained by the DPaW for management purposes (DPaW 2014).

The *EPBC Act* also requires the compilation of a list of migratory species that are recognised under international treaties including the:

- Japan Australia Migratory Bird Agreement 1981 (JAMBA);
- China Australia Migratory Bird Agreement 1998 (CAMBA);
- Republic of Korea-Australia Migratory Bird Agreement 2007 (ROKAMBA); and
- Bonn Convention 1979 (The Convention on the Conservation of Migratory Species of Wild Animals).

(Note - Species listed under JAMBA are also protected under Schedule 3 of the *WC Act*.)

All migratory bird species listed in the annexes to these bilateral agreements are protected in Australia as matters of national environmental significance (NES) under the *EPBC Act*.

The conservation status of all vertebrate fauna species listed as occurring or possibly occurring in the vicinity of the study area has been assessed using the most recent lists published in accordance with the above-mentioned instruments and is indicated as such in the fauna listings of this report. A full listing of conservation codes are provided in Appendix A.

A number of other species not listed in official lists can also be considered of local or regional conservation significance. These include species that have a restricted range, those that occur in breeding colonies and those at the limit of their range.

While not classified as rare, threatened or vulnerable under any State or Commonwealth legislation, a number of bird species have been listed as of significance on the Swan Coastal portion of the Perth Metropolitan Region (Bush Forever - Government of Western Australia 1998 and 2000). The bird species are often referred to as Bush Forever Decreaser Species. The three categories used for birds within the Bush Forever documents are:

- Habitat specialists with reduced distribution on the Swan Coastal Plain (code Bh)
- Wide ranging Species with reduced population's on the Swan Coastal Plain. (code Bp)
- Extinct in the Perth region (code Be)

Other fauna species of regional significance due to declining populations on the Swan Coastal Plain, especially between Mandurah and Busselton, include the honey possum and pygmy possum (Dell 2000).

The presence of Bush Forever species should be taken into consideration when determining the fauna values. Bush Forever decreaser species are indicated as such within the species list held in Appendix C.

4.1.5 Likelihood of Occurrence – Vertebrate Fauna of Conservation Significance

For vertebrate fauna of conservation significance identified during the literature review as previously being recorded in the general area, each was assessed and ranked for their likelihood of occurrence within the survey area itself. The rankings and criteria used were:

- Unlikely: Survey area is outside of the currently documented distribution for the species in question or the species is generally accepted as being locally/regionally extinct (supported by a lack of recent records), or no suitable habitat (type, quality and extent) was identified as being likely to be present during the desktop review. Individuals of some species may occur occasionally as vagrants/transients especially if suitable habitat is located nearby but the survey area itself would not support a population or part population of the species.
 - Locally Extinct: Populations no longer occur within a small part of the species natural range, in this case within 10 or 20km of the study area. Populations do however persist outside of this area.

- Regionally Extinct: Populations no longer occur in a large part of the species natural range, in this case within the southern Swan Coastal Plain region, Populations do however persist outside of this area.
- Possible: Survey area is within the known distribution of the species in question and habitat of at least marginal quality was identified as being likely to be present during the desktop review, supported in some cases by recent records being documented in literature from within or near the survey area. In some cases, while a species may be classified as possibly being present at times, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.
- Known to Occur: The species in question was positively identified as being present (for sedentary species) or as using the site as habitat for some other purpose (for non-sedentary/mobile species) during the field survey. This information may have been obtained by direct observation of individuals or by way of secondary evidence (e.g. foraging debris, scats). In some cases, while a species may be classified as known to occur, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.

4.1.6 Taxonomy and Nomenclature

Taxonomy and nomenclature for fauna species used in this report is generally taken from the DPAW's WA Fauna Census Database which is assumed to follow Aplin and Smith (2001) for amphibians and reptiles, How *et al.* (2001) for mammals and Johnstone (2001) for birds.

Common names are taken from the Western Australia Museum (WAM) recognised primary common name listings when specified, though where common names are not provided they have been acquired from other publications. Sources include Cogger (2014), Wilson and Swan (2013), Van Dyck *et al.* (2013), Christidis and Boles (2008), Bush *et al.* (2007), Bush *et al.* (2002), Tyler *et al.* (2000) and Glauret (1961). Not all common names are generally accepted.

4.2 DETAILED FAUNA SURVEYS

The fauna assessment was be carried out to comply with requirements of a detailed Level 2 terrestrial fauna survey as defined in EPA Guidance Statement 56 (EPA 2004) and used methods based on those detailed in the EPA Technical guide (EPA 2010).

4.2.1 Survey Team

The field survey was carried out by Greg Harewood.

4.2.2 Camera Traps

Two motion sensing, infrared “camera trap” (Acorn model LTI 5210A) were placed at separate locations within the study area. The camera traps were set to take three consecutive pictures when triggered, with a 15 second time lapse before any subsequent trigger event.

The location of each camera trap is shown in Figure 2. The camera trap site coordinates (MGA Zone 50), start and end dates, total days of deployment and the number of photographs taken are presented in Appendix B.

A total of 60 “camera trap days” were achieved and 618 pictures taken, though it should be noted that a high percentage of photos taken were caused by moving vegetation. All pictures were examined and fauna species, where possible, identified. Only one image of each species taken on any one day was documented as a record unless it could be identified as a different individual to previous photos taken on the same day.

4.2.3 Western Ringtail Possum Survey

The WRP survey included:

- One daytime survey to locate and record dreys, obvious tree hollows, scats and individual WRPs; and
- One night time survey to locate and record the distribution and abundance of WRPs.

A diurnal inspection of the site was carried out along close spaced traverses across the study area on the 11 January 2015 (concurrent with the black cockatoo habitat survey). The principal aim was to map and characterise potential WRP habitat within the site while also recording the location of scats, dreys, tree hollows or other potential day time refuge sites.

The nocturnal survey was carried out on the 29 January 2015 and involved a systematic search of the entire study area along close spaced traverses, on foot using a high powered LED head torch.

4.2.4 Black Cockatoo Habitat Survey

The black cockatoo targeted assessment, carried out on the 11 January 2015 included:

- Potential breeding habitat survey. This involved the identification and recording of all suitable tree species within the study area that have a Diameter at Breast Height (DBH) of over 50cm (DotE criteria –

SEWPaC 2012). The location of each tree identified was recorded with a GPS and details on tree species, number and size of hollows noted;

- Black cockatoo foraging habitat assessment. An assessment of the nature of potential black cockatoo foraging habitat within the study area was made and included the recording of the location and type of actual foraging evidence (e.g. chewed fruits around base of trees) observed during the field survey; and
- Roosting habitat survey. Direct and indirect evidence (e.g. branch clippings, droppings or moulted feathers) of black cockatoos roosting within trees on site was noted if observed.

4.2.5 Opportunistic Observations

During the course of all the survey work non-systematic opportunistic observations of fauna species were made and recorded. Secondary evidence of fauna such as tracks, diggings and scats were also noted if found.

Some active searching was undertaken in specific areas with the aim of locating the more elusive frog and reptile species that may inhabit the site.

5. SURVEY LIMITATIONS

The fauna assessment was designed and carried out to conform with a Level 2 survey as defined in EPA Guidance statement No. 56 (EPA 2004). The assessment has included a literature review aimed at providing a list of expected species, targeted assessments of western ringtail possums and black cockatoos, opportunistic observations and the use of camera traps.

No seasonal sampling has been carried out as part of this fauna assessment. The conclusions presented are based upon field data and the environmental monitoring and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of the field assessments. Also it should be recognised that site conditions can change with time.

Fauna species are indicated as potentially present within this report based on there being suitable (quality and extent) habitat within the study area. With respect to trapping and opportunistic observations, the possibility exists that certain species may not have been detected during field investigations due to:

- seasonal inactivity during field survey;
- species present within micro habitats not surveyed;

- cryptic species able to avoid detection;
- transient wide-ranging species not present during survey period.

The lack of observational data on some species should therefore not be taken as necessarily indicating that a species is absent from the site.

The habitat requirements and ecology of many of the species known to occur in the wider area are often not well understood or documented. It can therefore be difficult to include/exclude species from the potential list based on the apparent presence or absence of a specific habitats or microhabitats within the study area. As a consequence of this limitation the potential fauna list produced for this report is most likely an overestimation of those species that actually utilise the study area for some purpose. Some species may be present in the general area but may only use the study area itself on rare occasions or as vagrants.

In recognition of survey limitations, a precautionary approach has been adopted for this assessment. Any fauna species that would possibly occur within the study area (or immediately adjacent), as identified through ecological databases, publications, discussions with local experts/residents and the habitat knowledge of the Author, has been assumed to potentially occur in the study area.

6. RESULTS

6.1 FAUNA INVENTORY – LITERATURE REVIEW

A list of expected fauna species likely to occur in the study area was compiled from information obtained during the literature review and is presented in Appendix C. The results of some previous fauna surveys carried out in the general area are summarised in this species listing as are the DPaW NatureMap database search results. The raw database search results from NatureMap (DPaW 2015) and the Protected Matters Search Tool (DotE 2015) is contained within Appendix D.

The list of potential fauna takes into consideration that firstly the species in question is not known to be locally extinct and secondly that suitable habitat for each species, as identified during the site inspection, is present within the study area, though compiling an accurate list has limitations (see Section 5 above).

6.2 DETAILED FAUNA SURVEY

6.2.1 Camera Traps

A listing of the fauna species photographed is held in Appendix E. In total six native and three introduced species of fauna were recorded, these being:

- Bobtail (*Tiliqua rugosa*);
- Laughing Kookaburra (*Dacelo novaeguinea*);
- Tawny Frogmouth (*Podargus strigoides*);
- Grey Butcherbird (*Cracticus torquatus*);
- Australian Magpie (*Cracticus tibicen*);
- Western Brush Wallaby (*Macropus irma*);
- Western Grey Kangaroo (*Macropus fuliginosus*);
- Red Fox (*Vulpes vulpes*); and
- Cat (*Felis catus*).

Of most significance was the identification of the western brush wallaby (DPaW Priority 4 species) on site. The location of this record is shown in Figure 5. Western brush wallaby's occur at relatively low densities and utilise large tracts of bushland. It is therefore considered unlikely this individual resides within the study area alone but is more likely to range across many sections of bushland in the area, in particular areas east of Somerville Drive, away from most human activity.

6.2.2 Western Ringtail Possum Survey

A single western ringtail possum was located within Lot 298 during the nocturnal survey (see Figure 5). No other evidence of western ringtail possums utilising the study area was found suggesting a low population density in this specific area, at least at the time of the survey. A single common brushtail possum (*Trichosurus vulpecular*) was also observed.

Much of the study area appears suitable for western ringtail possums to use though most areas are totally dominated by *banksia* which, while suitable as refuge and dispersal habitat, lacks value as foraging habitat, a factor possibly limiting numbers in the area. This conclusion is consistent with observations made along Somerville Drive in the past where no WRPs were recorded in this general area despite several repeated surveys (Harewood 2008a, 2011 and 2013).

6.2.3 Black Cockatoo Habitat Survey

The black cockatoo potential breeding habitat assessment identified 23 trees within the study area that had a DBH of >50cm. None of the trees observed had hollows considered by the Author to be currently suitable for cockatoo to use for nesting purposes. A summary of the habitat trees recorded is provided in Table 2 below.

Table 2: Summary of Potential Black Cockatoo Habitat Trees (DBH >50cm) within the Study Area

Lot Number	Total Number of Habitat Trees	Number of Trees with No Hollows Observed	Number of Trees with Hollows Considered Unsuitable for Nesting Black Cockatoos	Number of Trees with Hollows Considered <u>Possibly</u> Suitable for Nesting Black Cockatoos	Tree Species		
					Jarrah	Marri	Unknown (Dead)
298	17	9	8	0	11	2	4
790	2	2	0	0	2	0	0
938	4	3	1	0	4	0	0
Total	23	14	9	0	17	2	4

Additional details on each black cockatoo potential breeding tree observed can be found in Appendix F.

The single vegetation community present within the study area contains plant species known to be utilised by black cockatoos as foraging habitat (mainly *banksia* but also jarrah and a small number of marri specimens). Almost all this area (3.9 ha) can be considered to represent quality black cockatoo foraging habitat given the presence of at least one plant species documented as foraging habitat for one or more of the three black cockatoo species known to frequent the area.

Evidence of black cockatoos foraging within the survey area was found in the form of chewed banksia cones and chewed marri fruits. This evidence was attributed to Carnaby's black-cockatoo (*banksia*) and Baudin's black-cockatoos (*banksia* and marri).

No evidence of black cockatoos roosting onsite was observed.



Legend

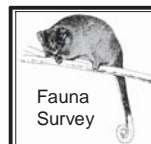
- Lot 298, 790 & 938
- Western Ringtail Possum
- Western Brush Wallaby



0 50 100

Metres

MGA Zone 50



DRAWN: G Harewood

DATE: Jan 2015

SCALE: 1:1,500

Lot 298, 790 & 938
College Grove

Significant Fauna Observations

Figure: 5

6.2.4 Opportunistic Observations

Opportunistic observations made of fauna species within the study area during the survey period are summarised in Appendix E. In total 15 native and one introduced species of fauna were recorded, these being:

- Australian Magpie (*Cracticus tibicen*);
- Australian Raven (*Corvus coronoides*);
- Australian Ringneck Parrot (*Platycercus zonarius*);
- Baudin's Black-Cockatoo (*Calyptorhynchus baudinii*) (foraging evidence);
- Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*) (foraging evidence);
- Galah (*Cacatua roseicapilla*);
- Red-capped Parrot (*Platycercus spurius*);
- Brown Honeyeater (*Lichmera indistincta*);
- Grey Fantail (*Rhipidura fuliginosa*);
- Red Wattlebird (*Anthochaera carunculata*);
- Silvereye (*Zosterops lateralis*);
- Weebill (*Smicrornis brevirostris*);
- Western Spinebill (*Acanthorhynchus superciliosus*);
- Willie Wagtail (*Rhipidura leucophrys*);
- Western Grey Kangaroo (*Macropus fuliginosus*); and
- Rabbit (*Oryctolagus cuniculus*).

7. FAUNA INVENTORY – SUMMARY

7.1 POTENTIAL FAUNA

Table 3 summarises the numbers of potential species based on vertebrate class. A complete list of vertebrate fauna recorded or possibly inhabiting/frequenting the study area is held in Appendix C.

As previously discussed not all species listed in existing databases and publications as potentially occurring within the general area are shown in the expected listing in Appendix C. Some species have been excluded from this list based largely on the lack of suitable or known local/regional extinction. Species that may very occasionally occur as vagrants/transients have also not been listed as potential species.

Table 3: Summary of Potential Vertebrate Fauna Species (As listed in Appendix C)

Group	Total number of potential species	Potential number of <u>Specially Protected</u> species	Potential number of <u>Migratory</u> species	Potential number of <u>Priority</u> species	Number of species recorded this survey
Amphibians	3	0		0	0
Reptiles	25	0	0	1	1
Birds	75 ⁵	4	1	0	17 ¹
Non Volant Mammals	16 ⁶	2	0	2	6 ³
Volant Mammals (Bats)	9	0	0	1	0
Total	128 ¹¹	6	1	4	24 ⁴

Superscript = number of introduced species included in total.

Despite the omission of some species It should be noted that the list provided is very likely still an over estimation of the fauna species utilising the site (either on a regular or infrequent basis) as a result of the precautionary approach adopted for the assessment. The study area is relatively small and it is likely that only a small subset of the potential species would be present at any one time.

7.2 VERTEBRATE FAUNA OF CONSERVATION SIGNIFICANCE

The literature review identified about 55 specially protected, priority or migratory fauna species as potentially occurring in the general vicinity of the study area. A significant proportion of these are migratory shorebirds which frequent nearby beaches and estuaries but would not utilise the study area under any circumstances. These and other conservation significant species that have no potential whatsoever (under normal circumstances) to utilise the study area for any purpose are not listed or discussed, despite appearing in the DPaW or EPBC Act database searches (Appendix D – e.g. seabirds, sea turtles and waders).

Based on the survey results, habitats present and documented distributions it is considered possible that 11 of those species identified during the literature

review may use the study area for some purpose at times. The presence of some species was confirmed during the field survey work. Other species have been omitted from the potential list for the site (Appendix C), principally due to lack of suitable habitat on-site (including extent or quality) or known local/regional extinction. Species that may occasionally occur as vagrants/transients have also not been list as potential species.

The conservation significant species considered most likely to be present either as residents or on a temporary basis (e.g. seasonal, foraging or dispersing) are:

- *Ctenotus ora* Coastal Plains Skink – P3 (DPaW Priority species)
Current status onsite and in the general area is difficult to determine. May be present as habitat appears suitable though limited in extent, which may make it difficult for a population to persist.
- *Calyptorhynchus banksii naso* Forest Red-tailed Black-Cockatoo – S1 (WC Act), Vulnerable (EPBC Act)
Known to inhabit the area. Several of the plant species present within the study area represent potential foraging habitat (e.g. jarrah, marri). No existing or potential nest hollows and no roosting activity seen.
- *Calyptorhynchus baudinii* Baudin's Black-Cockatoo - S1 (WC Act), Vulnerable (EPBC Act)
This species is likely to be a relatively frequent visitor the area and may reside in bushland in the general vicinity during parts of the year. Some foraging evidence observed (chewed marri fruits in addition to *Banksia* – caused by Baudin's or Carnaby's or both). No existing or potential nest hollows and no roosting activity seen.
- *Calyptorhynchus latirostris* Carnaby's Black-Cockatoo – S1 (WC Act), Endangered (EPBC Act)
This species is likely to be a relatively frequent visitor the area and may reside in bushland in the general vicinity during parts of the year. Some foraging evidence observed (chewed *Banksia* – caused by Baudin's or Carnaby's or both) and several of the plant species present within the study area represent potential foraging habitat (e.g. jarrah, marri spp.). No existing or potential nest hollows and no roosting activity seen.
- *Falco peregrinus* Peregrine Falcon - S4 (WC Act)
Uncommon so unlikely to be resident in area but study site may form part of larger home range. No potential nest sites observed.
- *Merops ornatus* Rainbow Bee-eater – S3 (WC Act), Migratory (EPBC Act)
Common seasonal visitor to south west. During summer months a small number of individuals of this species may occasionally forage and roost onsite.
- *Pseudocheirus occidentalis* Western Ringtail Possum - S1 (WC Act), Vulnerable (EPBC Act)

One individual observed during the nocturnal survey. Results suggest it is present in some areas at low densities.

- *Phascogale tapoatafa* ssp. Southern Brush-tailed Phascogale - S1 (WC Act)
No evidence of this species using the site was found but given a population exists in the general area and habitat appears suitable it may occur despite not being detected.
- *Isodon obesulus fusciventer* Southern Brown Bandicoot – P5 (DPaW Priority Species)
No evidence (individuals/diggings/scats) of this species was found within the study area during the site survey despite some areas containing dense groundcover, possibly suitable for the species to use for daytime refuge being present. May occur despite no being detected.
- *Macropus irma* Western Brush Wallaby – P4 (DPaW Priority Species)
Recorded on a camera trap during the survey period. Western brush wallaby's occur at relatively low densities and utilise large tracts of bushland. It is therefore considered unlikely this individual resides within the study area alone but is more likely to range across many sections of bushland in the area, in particular areas east of Somerville Drive, away from most human activity.
- *Falsistrellus mackenziei* Western False Pipistrelle - P4 (DPaW Priority Species)
Current status onsite is difficult to determine but given it was recorded nearby during other associated surveys and the presence of tree hollows it must be assumed to be present if only occasionally while foraging.

8. POTENTIAL IMPACTS AND RECOMMENDATIONS

8.1 POTENTIAL IMPACTS

In general the most significant potential impacts to fauna of any development include:

- Loss of vegetation/fauna habitat that may be used for foraging, breeding, roosting, or dispersal (includes loss of hollow bearing trees);
- Fragmentation of vegetation/fauna habitat which may restrict the movement of some fauna species;
- Modifications to surface hydrology, siltation of creek lines/wetlands;
- Changes to fire regimes;
- Pollution (e.g. oil spills);

- Noise/Light/Dust;
- Spread of plant pathogens (e.g. dieback) and weeds;
- Potential increase in the number of predatory introduced species (e.g. cats);
- Death or injury of fauna during clearing and construction; and
- An increase in fauna road kills due to increased traffic flow.

The most likely potential impacts of the proposed development within the study area are:

- Loss of vegetation/fauna habitat that may be used for foraging, breeding, roosting, or dispersal; and
- Death or injury of fauna during clearing and construction.

Under the assumption that all of the native vegetation currently remaining within the study area will require clearing to allow any future development (i.e. ~3.9 ha), possible impacts on species of conservation significance previously recorded in the general area have been assessed and a summary provided in Table 4 below.

Table 4: Likelihood of Occurrence and Possible Impacts – Fauna Species of Conservation Significance (continues on following pages).

Species	Conservation Status (see Appendix A for codes)	Likelihood of Occurrence	Potential Impact on Habitat	Degree of Impact	Justification
Pouched Lamprey <i>Geotria australis</i>	P1	Unlikely	None	Nil	Preferred habitat absent.
Coastal Plains Ctenotus <i>Ctenotus ora</i>	P3	Possible	Loss of a small area of habitat.	Very Low	Small impact area. If present will persist in adjoining areas
Southern Carpet Python <i>Morelia spilota imbricata</i>	S4	Possible but only rarely	None	Nil	Locally extinct?
Great Egret <i>Ardea alba</i>	S3, Mig	Unlikely	None	Nil	Preferred habitat absent.
Cattle Egret <i>Ardea ibis</i>	S3, Mig	Unlikely	None	Nil	Preferred habitat absent.
Australasian Bittern <i>Botaurus poiciloptilus</i>	S1, EN	Unlikely	None	Nil	Preferred habitat absent.
Black Bittern <i>Ixobrychus flavicollis</i>	P1	Unlikely	None	Nil	Preferred habitat absent.

Species	Conservation Status (see Appendix A for codes)	Likelihood of Occurrence	Potential Impact on Habitat	Degree of Impact	Justification
Little Bittern <i>Ixobrychus minutus</i>	P4	Unlikely	None	Nil	Preferred habitat absent.
Osprey <i>Pandion haliaetus</i>	Ma	Unlikely	None	Nil	Preferred habitat absent.
White-bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	S3, Mig	Unlikely	None	Nil	Preferred habitat absent.
Peregrine Falcon <i>Falco peregrinus</i>	S4	Possible	None Likely.	Nil	Will continue to utilise area for foraging despite any development. No potential nest sites.
Migratory Shorebirds/Seabirds	Various	Unlikely	None	Nil	Preferred habitat absent.
Glossy Ibis <i>Plegadis falcinellus</i>	S3, Mig	Unlikely	None	Nil	Preferred habitat absent.
Carnaby's Black Cockatoo <i>Calyptorhynchus latirostris</i>	S1, EN	Known To Occur	Loss of areas of habitat.	Low	Small impact area. Large areas of suitable habitat nearby.
Baudin's Black Cockatoo <i>Calyptorhynchus baudinii</i>	S1, VU	Known To Occur	Loss of areas of habitat.	Low	Small impact area. Large areas of suitable habitat nearby.
Forest Red-tailed Black Cockatoo <i>Calyptorhynchus banksii naso</i>	S1, VU	Possible	Loss of areas of habitat.	Low	Small impact area. Large areas of suitable habitat nearby.
Masked Owl (SW population) <i>Tyto n. novaehollandia</i>	P3	Possible but only rarely.	None	Nil	Preferred habitat absent. May occur very occasionally.
Fork-tailed Swift <i>Apus pacificus</i>	S3, Mig	Flyover Only	None	Nil	Aerial species.
Western Whip Bird <i>Psophodes nigrogularis. nigrogularis</i>	S1, EN	Unlikely	None	Nil	Locally/Regionally extinct.
Rainbow Bee-eater <i>Merops ornatus</i>	S3, Mig	Possible	None Likely.	Nil	Utilises disturbed habitats. Species will continue to utilise the area as it does now despite proposed development.
Chuditch <i>Dasyurus geoffroii</i>	S1, VU	Unlikely	None	Nil	Locally extinct.
Southern Brush-tailed Phascogale <i>Phascogale tapoatafa ssp</i>	S1	Possible	Loss of a small area of habitat.	Very Low	Not detected during survey period. Small impact area. Areas of similar habitat nearby

Species	Conservation Status (see Appendix A for codes)	Likelihood of Occurrence	Potential Impact on Habitat	Degree of Impact	Justification
Southern Brown Bandicoot <i>Isodon obesulus fusciventer</i>	P5	Possible	Loss of a small area of habitat.	Very Low	Not detected during survey period. Small impact area. Areas of similar habitat nearby. If present will persist in adjoining areas
Western Ringtail Possum <i>Pseudocheirus occidentalis</i>	S1, VU	Known To Occur	Loss of a small area of habitat.	Low	Small impact area. Areas of similar habitat nearby
Western Brush Wallaby <i>Macropus irma</i>	P4	Known To Occur	Loss of a small area of habitat.	Very Low	Preferred habitat absent. Areas of similar habitat nearby.
Quokka <i>Setonix brachyurus</i>	S1, VU	Unlikely	None	Nil	Preferred habitat absent.
Western False Pipistrelle <i>Falsistrellus mackenziei</i>	P4	Possible	Loss of a small area of habitat.	Very Low	Small impact area. Areas of similar habitat nearby.
Water Rat <i>Hydromys chrysogaster</i>	P4	Unlikely	None	Nil	Preferred habitat absent.

The assessment suggests that impacts on fauna, in particular those of conservation significance will be in most instances low or very low. This conclusion is based on the relatively small area of clearing likely to be required and the extent of similar habitat in adjoining areas, much of which is within secured reserves. It can be expected that all the species currently utilising the study area as habitat will persist in the vicinity despite any development proceeding.

8.2 PLANNING AND MANAGEMENT RECOMMENDATIONS

The following recommendations are provided for guidance for ongoing planning and the formulation of management plans that should aim to reduce the impact on fauna and fauna habitat as much as reasonable and practicable. This listing is not exhaustive and management plans and possible offsets will need to be finalised after liaison with relevant regulatory authorities. It is recommended that:

- The results of the fauna assessment reported on here suggest that several species listed under the federally administered *EPBC Act* potentially utilise the study site to some degree and/or that habitat of listed threatened species will be affected. In particular the study area was found to contain a number of trees that can be regarded as potential black cockatoo breeding trees and foraging habitat using DotE criteria and the removal of this habitat maybe considered likely to constitute a “significant impact” under the *EPBC Act*. The project should

therefore be referred to the DotE for approval to ensure it is conducted in a manner that does not breach the *EPBC Act*.

- During site works, areas requiring clearing should be clearly marked and access to other areas restricted to prevent accidental clearing of areas to be retained (if any).
- During clearing operations a suitably experienced “fauna spotter” should be employed to inspect vegetation before clearing to reduce likelihood fauna being injured. The fauna spotter should follow standard DPaW clearing protocols. Any fauna encountered should be relocated to suitable habitat in nearby reserved areas.
- Native fauna injured during clearing or normal site operations should be taken to a designated veterinary clinic or a DPaW nominated wildlife carer.

9. CONCLUSION

The fauna survey within the study area was undertaken for the purposes of delineating and characterising the fauna habitats and faunal assemblages present in the target area and to identify potential impacts which may occur as a consequence of proposed development.

With respect to native vertebrate fauna, 19 mammal (includes nine bats species), 70 bird, 25 reptile and three frog species have the potential to occur in or utilise at times, the study area. Of the 117 native animals that could occur, six are considered to be threatened (vulnerable, endangered, rare or in need of special protection), with an additional four DPaW priority species being present or likely to be present. One migratory bird species also have the potential to utilise the study area at times.

Evidence of 21 species of native vertebrate fauna was obtained during the survey (sighted, heard, recorded, signs). Four introduced species were also observed.

Subsequent to approval, any future development at the site will necessarily require the clearing of existing fauna habitat. Planning should take into account the potential presence of some species of conservation significance and fauna in general so that any impacts can be minimised or offset. Management plans and protocols that aim to minimise impact on fauna and fauna habitat should be employed where relevant with specific attention being paid to those aspects highlighted in Section 6.2, when considered reasonable and practical to implement.

Given the presence of *EPBC Act* listed threatened fauna and their habitat (mainly black cockatoo and to a lesser extent western ringtail possum habitat) within the study area it is considered highly likely that referral of the project to the DotE to ensure compliance with the *EPBC Act* will also be required.

10. BIBLIOGRAPHY

(not necessarily cited)

Allen, G.R., Midgley, S.H., Allen, M. (2003). Freshwater Fishes of Australia. Western Australian Museum, Perth, Western Australia.

Anstis, M. (2013). Tadpoles and Frogs of Australia. New Holland Publishers, Sydney.

Aplin, K.P. and Smith, L.A. (2001). Checklist of the frogs and reptiles of Western Australia, Records of the Western Australian Museum Supplement No. 63, 51-74.

ATA Environmental (2006). Environmental Management Plan Implementation Schedule, ECU South West Campus. Unpublished report for ECU.

Atlas of Living Australia (ALA) (2015). www.ala.org.au . Accessed January 2015.

Barrett, G., Silcocks, A., Barry, S., Cunningham, R. and Poulter, R. (2003). The New Atlas of Australian Birds. Royal Australasian Ornithologists Union, Victoria.

Burbidge A.A, & de Tores P. (1997). Western Ringtail Possum Interim Recovery Plan 1997-1999. Department of Conservation and Land Management, Perth Western Australia.

Burbidge, A. (1997-98). Endangered: Western Ringtail Possum. LANDSCOPE 13(2): 49.

Burbidge, A. (2004). Threatened Animals of Western Australia.

Bush, B., Maryan, B., Browne-Cooper, R. & Robinson, D. (2002). Reptiles and Frogs of the Perth Region. UWA Press, Nedlands.

Bush, B., Maryan, B., Browne-Cooper, R. & Robinson, D. (2007). Reptiles and Frogs in the Bush: Southwestern Australia. UWA Press, Nedlands.

Cale, B. (2003). Carnaby's Black Cockatoo (*Calyptrorhynchus latirostris*) Recovery Plan 2002-2012. CALM, Wanneroo.

CALM (2005). Fauna Note No. 05/2005 Carnaby's Cockatoo, Written by Tamra Chapman, Belinda Cale and Marion Massam. CALM, Wanneroo.

Centre for Ecosystem Management (CEM) (2009). Black Cockatoo Study of the ECU South West Campus in Bunbury (August-September 2009) Marieke Weerheim & William Stock CEM Report No. 2009-13. Unpublished report for ECU.

- Christidis, I. and Boles, W.E. (1994). The Taxonomy and Species of Birds of Australia and its Territories. RAOU, Monograph 2.
- Christidis, L. and Boles, W.E. (2008). Systematics and Taxonomy of Australian Birds. CSIRO Publishing, Melbourne.
- Christensen, P., Annels, A., Liddelow, G. and Skinner, P. (1985). Vertebrate Fauna in The Southern Forests of Western Australia, A Survey. Forest Dept. of Western Australia, Bull. No. 94. Perth.
- Churchill, S. (2008). Australian Bats. Second Edition, Allen & Unwin.
- Churchward, H. M. and McArthur, W.M. (1980). 'Darling System, Landforms and Soils' in The Atlas of the Natural Resources of the Darling Range System, WA. Department of Conservation and Land Management, Perth.
- City of Bunbury (2015). Amended College Grove Joint Venture Project - Plant Community Descriptions. Draft.
- Cogger, H.G. (2014). Reptiles and Amphibians of Australia. 7th Edition. CSIRO Publishing.
- de Tores, P. (2008). Western Ringtail Possum *Pseudocheirus occidentalis* pp 253-255 in Van Dyck, S. & Strahan R. (eds). (2008). The Mammals of Australia. Queensland Museum / Reed Books.
- de Tores, P., Rosier, S. & Paine, G. (1998). Conserving the Western Ringtail Possum. LANDSCOPE 13(4): 28.
- de Tores, P., Hayward, M. W. & Rosier, S.M. (2004). The western ringtail possum *Pseudocheirus occidentalis* and the quokka, *Setonix brachyurus*, case studies: Western Shield review- February 2003. Conservation Science W. Aust 5 (2): 235-257.
- de Tores, P., Rosier, S. Jackson, J., Clarke, J & Aravidis, L. (2008). Working to Conserve the Western Ringtail Possum. LANDSCOPE 25(4): 55-60.
- Dell, J. (2000). A draft summary assessment of the fauna values of the Kemerton Bushland. Unpublished report for the Conservation Branch, Policy Division, Department of Environmental Protection.
- Dell, J., & Hyder-Griffiths, B. (2002). A Description of the Fauna Values of the Muddy Lakes Area of the South Bunbury to Capel Coastal Corridor. Department of Environmental Protection, Perth.
- Department of Conservation and Land Management (CALM) (1994). Chuditch Recovery Plan 1992-2001, by Peter Orell and Keith Morris for the Chuditch Recovery Team.

Department of Environment and Conservation (DEC) (2007a). Karrak-watch: A summary of information about the Forest red-tailed black cockatoo, <http://www.dec.wa.gov.au/our-environment/science-and-research/animal-conservation-research/2384-karrak-watch-the-forest-red-tailed-black-cockatoo.html>

Department of Environment and Conservation (DEC) (2007b). Forest Black Cockatoo (Baudin's Cockatoo - *Calyptorhynchus baudinii*) and Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) Recovery Plan. DEC.

Department of Environment and Conservation (DEC) (2012). Chuditch (*Dasyurus geoffroii*) Recovery Plan. Wildlife Management Program No. 54. Department of Environment and Conservation, Perth, Western Australia.

Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008). Background Paper to the *EPBC Act* Policy Statement 3.10 – Nationally Threatened Species and Ecological Communities. "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). Environment Protection and Biodiversity Conservation Act 1999 (*EPBC Act*) Policy Statement 3.10 "Significant Impact Guidelines for the vulnerable western ringtail possum (*Pseudocheirus occidentalis*) in the southern Swan Coastal Plain, Western Australia".

Department of Parks and Wildlife (DPaW) (2014). Threatened and Priority Fauna Rankings. 3 December 2014.

Department of Parks and Wildlife (DPaW) (2015). NatureMap Database Search – "Method='By Circle ' ; Centre = 115°39' 26" E, 33°22' 23" S. Accessed 31 January 2015.

Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) (2010a). Survey guidelines for Australia's threatened bats. Guidelines for detecting bats listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*. Department of Sustainability, Environment, Water, Population and Communities, Canberra, Australian Capital Territory.

Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) (2010b). Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*. Department of Sustainability, Environment, Water, Population and Communities, Canberra, Australian Capital Territory.

Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) (2010c). Survey guidelines for Australia's threatened frogs. Guidelines for detecting frogs listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*. Department of Sustainability, Environment, Water, Population and Communities, Canberra, Australian Capital Territory.

Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) (2011a). Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*. Department of Sustainability, Environment, Water, Population and Communities, Canberra, Australian Capital Territory.

Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) (2011b). Survey guidelines for Australia's threatened reptiles. Guidelines for detecting reptiles listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*. Department of Sustainability, Environment, Water, Population and Communities, Canberra, Australian Capital Territory.

Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) (2012). *EPBC Act* Referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo (endangered) *Calyptorhynchus latirostris*, Baudin's cockatoo (vulnerable) *Calyptorhynchus baudinii*, Forest red-tailed black cockatoo (vulnerable) *Calyptorhynchus banksii naso*.

Department of the Environment (DotE) (2013). Matters of National Environmental Significance. Significant Impact Guidelines 1.1, *EPBC Act 1999*.

Department of the Environment (DotE) (2015). *EPBC Act* Protected Matters Report: -33.37303 115.65763 (0km Buffer) Available from: <http://www.environment.gov.au>. Accessed 31 January 2015.

ENV Australia (2006a). Western Ringtail Possum Assessment Manea College. Unpublished report for Manea College.

ENV Australia (2006b). Fauna Assessment (Level 1), Manea College. Unpublished report for Manea College.

ENV Australia (2008). Edith Cowan University, South West Campus. Fauna Assessment. Unpublished report for ECU.

Environmental Protection Authority (EPA) (2002). Terrestrial Biological Surveys As An Element of Biodiversity Protection. Position Statement No. 3. EPA, Perth.

Environmental Protection Authority (EPA) (2003a). Level of Assessment for Proposals Affecting Natural Areas Within the System 6 Region and Swan Coastal Plain Portion of the System 1 Region. Guidance Statement 10.

Environmental Protection Authority (EPA) (2003b). Greater Bunbury Region Scheme – EPA Bulletin 1108. EPA, Perth.

Environmental Protection Authority (EPA) (2004). Guidance for the Assessment of Environmental Factors - Terrestrial fauna surveys for environmental impact assessment in Western Australia. Guidance Statement No 56 EPA, Perth.

Environmental Protection Authority (EPA) (2009). Environmental Protection Bulletin No. 6, The Natural Values of the Whicher Scarp. August 2009.

Environmental Protection Authority (EPA) and Department of Environment and Conservation (DEC) (2010). Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessments (eds B.M. Hyder, J. Dell and M.A. Cowan), Perth Western Australia.

Garnett, S.T., Szabo, J.K., Dutson, G. (2011). The Action Plan for Australian Birds 2010. CSIRO Publishing, Melbourne.

Glauret, L. (1961). A Handbook of the Lizards of Western Australia. Handbook 6, Western Australian Naturalists Club, Perth.

Government of Western Australia (1998). Perth Bushplan

Government of Western Australia (2000a). Bush Forever Volume 1. Policies, Principles and Processes. Department of Environmental Protection Perth, Western Australia.

Government of Western Australia (2000b). Bush Forever Volume 2. Directory of Bush Forever Sites. Department of Environmental Protection Perth, Western Australia.

Government of Western Australia (2014). Wildlife Conservation Act 1950. Wildlife Conservation (Specially Protected Fauna) Notice 2014. Government Gazette, WA. 2 December 2014.

Halpern Glick Maunsell (HGM) (2002). Natural Values of 12 Sites of the Greater Bunbury Region Scheme. Tasks 1, 2 and 3. Unpublished report for WAPC (Muddy Lakes Level 2 fauna survey results).

Harewood, G. (2006). Western Ringtail Possum Assessment Survey, Brittain Road Extension Project. Unpublished report for City of Bunbury.

Harewood, G. (2007). Western Ringtail Possum Assessment Survey, College Grove Stage 2 (Lot 9000). Unpublished report for RPS Bowman Bishaw Gorham.

Harewood, G. (2008). Western Ringtail Possum Assessment Survey, College Grove Stage 2 (Lot 9000). Unpublished report for RPS Bowman Bishaw Gorham.

Harewood, G. (2009). Western Ringtail Possum Assessment Survey, College Grove Stage 3 (Lot 9000). Unpublished report for RPS Environment Pty Ltd.

Harewood, G. (2008). Western Ringtail Possum Assessment Survey, Somerville Drive Extension, College Grove. Unpublished report for RPS Environmental/City of Bunbury.

Harewood, G. (2011). Fauna Assessment of Somerville Drive Extension, College Grove. Unpublished report for RPS.

Harewood, G. (2010a). Fauna Survey (Level 2). Kemerton Industrial Core. Unpublished report for Cardno (WA) Pty Ltd.

Harewood, G. (2010b). Terrestrial Fauna Survey (Level1) of Lot 930 (part) College Grove Bunbury. Unpublished report for ENV.

Harewood, G. (2012). Fauna Assessment of the Bunbury Clay Target Club, Davenport. Unpublished report for the City of Bunbury.

Harewood, G. (2013). Western Ringtail Possum Survey of Somerville Drive Extension, College Grove. Unpublished letter report for Bark Environmental Consulting.

Harewood, G. (2013). Western Ringtail Possum Survey. Bunbury Regional Airport Proposed Offset Site. Unpublished letter report for Opus International Consultants (PCA) Pty Ltd.

Hedde, E.M., Loneragan, O.W. and Havel, J.J. (1980). Vegetation of the Darling System, In: Atlas of Natural Resources, Darling System, Western Australia Department of Conservation and Environment, Perth, Western Australia.

How, R., Cooper, N.K. and Bannister, J.L. (2001). Checklist of the mammals of Western Australia, Records of the Western Australian Museum Supplement No. 63, 91-98.

How, R.A., Dell, J., and Humphreys, W. F. (1987). The ground vertebrate fauna of coastal areas between Busselton and Albany, Western Australia. Records of the Western Australian Museum 13(4):553-574.

Johnstone, R.E. (2001). Checklist of the birds of Western Australia, Records of the Western Australian Museum Supplement No. 63, 75-90.

Johnstone, R.E. & T. Kirkby (1999). Food of the Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso* in south-west Western Australia. *Western Australian Naturalist*. 22:167-177.

Johnstone, R. E. & Kirkby, T. (2008). Distribution, status, social organisation, movements and conservation of Baudin's Cockatoo (*Calyptorhynchus baudinii*) in South-west Western Australia. *Records of the WA Museum* 25: 107-118 (2008).

Johnstone, R. E. & Kirkby, T. (2011). Carnaby's Cockatoo (*Calyptorhynchus latirostris*), Baudin's Cockatoo (*Calyptorhynchus baudinii*) and the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) on the Swan Coastal Plain (Lancelin–Dunsborough), Western Australia. Studies on distribution, status, breeding, food, movements and historical changes. Report for the Department of Planning, Western Australia.

Johnstone R.E. & C, Kirkby, T. & Biota Environmental Sciences Pty Ltd (2006). Perth – Bunbury Highway (Kwinana Freeway Extension and Peel Deviation). Targeted Threatened Fauna Survey. Unpublished report for Main Roads Western Australia.

Johnstone, R.E. and Storr, G.M. (1998). Handbook of Western Australian Birds: Volume 1 – Non-passerines (Emu to Dollarbird). Western Australian Museum, Perth Western Australia.

Johnstone, R. E. and Storr, G.M. (2004). Handbook of Western Australian Birds: Volume 2 – Passerines (Blue-winged Pitta to Goldfinch). Western Australian Museum, Perth Western Australia.

Johnstone, R.E. & C. (2004). Review of Baudin's Cockatoo and Forest Red-Tailed Black Cockatoo in South Western Australia with Special Reference to Collie Area – In Bluewater's Power Station PER May 2004 – Appendix C.

Jones, B.A., R.A. How & D.J. Kitchener (1994a). A field study of *Pseudocheirus occidentalis* (Marsupialia: Petauridae). II. Distribution and habitat. Population studies in *Wildlife Research* 21: Page(s) 175-187.

Jones, B.A., R.A. How & D.J. Kitchener (1994b). A field study of *Pseudocheirus occidentalis* (Marsupialia: Petauridae). II. Population studies in *Wildlife Research* 21: Page(s) 189-201.

Jones, B. (1995). Western Ringtail Possum. In R. Strahan (Ed.) *The Mammals of Australia*. Australian Museum and Reed Books. Chatswood, NSW.

Kay, G.M. & Keogh, J.S. (2012). Molecular phylogeny and morphological revision of the *Ctenotus labillardieri* (Reptilia: Squamata: Scincidae) species group and a new species of immediate conservation concern in the southwestern Australian biodiversity hotspot. *Zootaxa*, vol. 3390, pp. 1-18.

- Keighery, B. J. (1994). Bushland Plant Survey: a Guide to Plant Community Surveys for the Community. Wildflower Society of Western Australia (Inc.) Nedlands, Western Australia.
- Kirkby, T. (2009). Results of Black Cockatoo Survey at Lot 2 Dawesville. Unpublished report for WA Limestone.
- Maxwell S., Burbidge A.A & Morris K. (1996). The 1996 Action Plan for Australian Marsupials and Monotremes. Wildlife Australia, Canberra.
- Menkhorst, P. and Knight, F. (2011). A Field Guide to the Mammals of Australia. Oxford University Press, Melbourne.
- Mitchell, D., Williams, K., & Desmond, A. (2002). Swan Coastal Plain 2 (SWA2 – Swan Coastal Plain subregion). In: A Biodiversity Audit of Western Australia. Eds McKenzie, N.L., May, J.E. and McKenna, S. Department of Conservation and Land Management, Perth.
- Molloy, S., Wood, J., Hall, S., Wallrodt, S., and Whisson, G., (2009). South West Regional Ecological Linkages Technical Report, Western Australian Local Government Association and Department of Environment and Conservation Perth.
- Morcombe, M. (2004). Field Guide to Australian Birds. Steve Parish Publishing, Archerfield, Queensland.
- Morgan, D. & Beatty, S. (2006). Fish and freshwater crayfish communities of the Brunswick and Preston Rivers. Freshwater Fish Research, Murdoch University report to the Leschenault Catchment Council.
- Morgan, D.L., Gill, H.S. & Potter, I.C. (1996). Distribution of freshwater fish in the south-western Corner of Australia. Water Resource Technical Series. Water and Rivers Commission Report WRT4 1996.
- Morgan, D.L., Beatty, S.J., Klunzinger, M.W, Allen, M.G. and Burnham, Q.E (2011). Field Guide to the Freshwater Fishes, Crayfishes and Mussels of South Western Australia. Published by SERCUL.
- Nevill, S (ed) (2005). Guide to the Wildlife of the Perth Region. Simon Nevill Publications, Perth.
- Nowicki, A. (2007). Analysis of Capture Data: a case study using Program MARK for analysis of brushtail possum trapping data and its relevance to conservation management of the western ringtail possum. Thesis for Honours degree, Murdoch University.
- Pizzey, G & Knight, F. (2012). The field guide to the birds of Australia. 9th Edition. Harper Collins, Sydney.

- Rhind, S. (1998) Ecology of the brush-tailed phascogale of south western Australia. PHD thesis – Murdoch University.
- Saunders D. A. (1974). Subspeciation in the White-tailed Black Cockatoo, *Calyptorhynchus baudinii*, in Western Australia. Australian Wildlife Research 1: 55-69.
- Saunders, D.A. (1977). The effect of agricultural clearing on the breeding success of the White-tailed Black Cockatoo. Emu. 77:180--184.
- Saunders, D. (1980). Food and Movements of the Short-billed Form of the White-tailed Black Cockatoo. Aust. Wildl. Res. 7(1980) pp. 257-269.
- Saunders, D.A. (1986). Breeding season, nesting success and nestling growth in Carnaby's Cockatoo, *Calyptorhynchus funereus latirostris*, over 16 years at Coomallo Creek, and a methods for assessing the viability of populations in other areas. *Australian Wildlife Research*. 13:261--273.
- Saunders, D.A., I. Rowley & G.T. Smith (1985). The effects of clearing for agriculture on the distribution of Cockatoos in the southwest of Western Australia. In: Keast, A., H.F. Recher, H. Ford & D. Saunders, eds. *Birds of Eucalypt Forests and Woodlands*. Page(s) 309-321. Surrey Beatty, Sydney.
- Shah, B. (2006). Conservation of Carnaby's Black Cockatoo on the Swan Coastal Plain, Western Australia. Birds Australia, Perth.
- Simpson, K. and Day, N. (2010). Field Guide to the Birds of Australia. Penguin Books, Ringwood.
- Smith, G.T. & D.A. Saunders (1986). Clutch size and productivity in three sympatric species of Cockatoo (Psittaciformes) in the south-west of Western Australia. *Australian Wildlife Research*. 13:275--285.
- Sorena M. and T. Soderquist (1995). Western Quoll *Dasyurus geoffroyi*. pp 62-64 in Strahan R. (ed). (1995). The Mammals of Australia. Australian Museum / Reed Books.
- Soderquist T. (1995). Brush-tailed Phascogale *Phascogale tapoatafa*. pp 104-106 in Strahan R. (ed). (1995). The Mammals of Australia. Australian Museum / Reed Books.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1983). Lizards of Western Australia II: Dragons and Monitors. WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1990). Lizards of Western Australia III: Geckos and Pygopods. WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1999). Lizards of Western Australia I: Skinks. Revised Edition, WA Museum, Perth.

Storr, G.M., Smith, L.A. and Johnstone R.E. (2002). Snakes of Western Australia. Revised Edition, WA Museum, Perth.

Tille, P.J. and Lantzke, N.C., (1990). Busselton-Margaret River-August land capability study. Western Australian Department of Agriculture, Land Resources Series No.5, Perth.

Tyler M.J. & Doughty P. (2009). Field Guide to Frogs of Western Australia, Fourth Edition, WA Museum, Perth.

Tyler M.J., Smith L.A. and Johnstone R.E. (2000). Frogs of Western Australia, Revised Edition, WA Museum, Perth.

Thackway, R. and Cresswell, I.D. (1995). An Interim Biogeographic Regionalisation for Australia. Australian Nature Conservation Agency, Canberra.

Van Dyck, S., Gynther, I. & Baker, A. Eds (2013). Field Companion to The Mammals of Australia. Queensland Museum.

Van Dyck, S. & Strahan, R. Eds (2008). The Mammals of Australia. Third edition Queensland Museum.

Wayne, A.F., Rooney J. F., Ward C. G., Vellios V.C., and Lindenmayer D.B. (2005). The life history of *Pseudocheirus occidentalis* (Pseudocheiridae) in the jarrah forest of south-western Australia. Australian Journal of Zoology 53, 325-337.

Wilson, S. and Swan, G. (2013). A Complete Guide to Reptiles of Australia. Reed, New Holland, Sydney.

Woinarski, J., Burbidge, A. & Harrison, P. (2014). The Action Plan for Australian Mammals 2012. CSIRO Publishing.

Wright, L.J., Smith, J. and Richardson, J. (2007). The Western Ringtail Possum, *Pseudocheirus occidentalis* (Thomas, 1888), A Subject Specific Bibliography. Conservation Science Western Australia 6(1): 159 – 176.

APPENDIX A

Conservation Categories

EPBC Act (1999) Threatened Fauna Categories

Category	Code	Description
Extinct	E	There is no reasonable doubt that the last member of the species has died.
*Extinct in the wild	EW	A species (a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
*Critically endangered	CE	A species is facing an extremely high risk of extinction in the wild in the immediate future.
*Endangered	EN	A species: (a) is not critically endangered; and (b) is facing a very high risk of extinction in the wild in the near future.
*Vulnerable	VU	A species (a) is not critically endangered or endangered; and (b) is facing a high risk of extinction in the wild in the medium-term future.
Conservation dependent	CD	A species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered
*Migratory	Migratory	(a) all migratory species that are: (i) native species; and (ii) from time to time included in the appendices to the Bonn Convention; and (b) all migratory species from time to time included in annexes established under JAMBA, CAMBA and ROKAMBA; and (c) all native species from time to time identified in a list established under, or an instrument made under, an international agreement approved by the Minister.
Marine	Ma	Species in the list established under s248 of the EPBC Act

Note: Only species in those categories marked with an asterisk are matters of national environmental significance under the *EPBC Act*.

Western Australian Wildlife Conservation Act (1950) Threatened Fauna Categories

Category	Code	Description
Schedule 1	S1	<p>Threatened Fauna (Fauna that is rare or is likely to become extinct). Taxa that have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.</p> <p>Threatened fauna (Schedule 1) are further ranked by the DPaW according to their level of threat using IUCN Red List criteria:</p> <p>CR: Critically Endangered - considered to be facing an extremely high risk of extinction in the wild.</p> <p>EN: Endangered - considered to be facing a very high risk of extinction in the wild.</p> <p>VU: Vulnerable - considered to be facing a high risk of extinction in the wild.</p>
Schedule 2	S2	Fauna that is presumed to be extinct. Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such.
Schedule 3	S3	Migratory birds protected under an international agreement. Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), relating to the protection of migratory birds.
Schedule 4	S4	Other specially protected fauna. Fauna that is in need of special protection, otherwise than for the reasons mentioned in the above schedules.

A list of the current rankings can be downloaded from the Parks and Wildlife Threatened Species and Communities webpage at

<http://dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/>

Western Australian DPaW Priority Fauna Categories

Category	Code	Description
Priority 1	P1	Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
Priority 2	P2	Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
Priority 3	P3	Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
Priority 4	P4	<p>(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.</p> <p>(b) Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.</p> <p>(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>
Priority 5	P5	Species that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

*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, variety or forma).

IUCN Red List Threatened Species Categories

Category	Code	Description
Extinct	EX	Taxa for which there is no reasonable doubt that the last individual has died.
Extinct in the Wild	EW	Taxa which is known only to survive in cultivation, in captivity or and as a naturalised population well outside its past range and it has not been recorded in known or expected habitat despite exhaustive survey over a time frame appropriate to its life cycle and form.
Critically Endangered	CR	Taxa facing an extremely high risk of extinction in the wild.
Endangered	EN	Taxa facing a very high risk of extinction in the wild.
Vulnerable	VU	Taxa facing a high risk of extinction in the wild.
Near Threatened	NT	Taxa which has been evaluated but does not qualify for CR, EN or VU now but is close to qualifying or likely to qualify in the near future.
Least Concern	LC	Taxa which has been evaluated but does not qualify for CR, EN, VU, or NT but is likely to qualify for NT in the near future.
Data Deficient	DD	Taxa for which there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status.
Not Evaluated	NE	Taxa which has not been evaluated.

A full list of categories and their meanings are available at:

<http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>

APPENDIX B

Camera Trap Site – Details

Camera Trap Sites

Datum - Australian Geocentric 1994 (GDA94)

Camera ID	Lot Number	Zone	mE	mN	Start	End	Days	Photos
3	298	50H	375085	6306595	27/12/2014	26/01/2015	30	51
26	938 South	50H	375147	6306535	27/12/2014	26/01/2015	30	567
Total							60	618

Unit = LTL Acorn 5210A

APPENDIX C

Vertebrate Fauna Observed or Potentially in Study Area

Fauna Observed or Potentially in Study Area

Lot 298, 790 and 938 College Grove, W.A.

Approx. centroid = 33.373020°S and 115.657614°E.

Compiled by Greg Harewood - Jan 2015

Recorded (Captured/Sighted/Heard/Signs) = X

A = Harewood, G. (2015). Fauna Survey - Combined Observations - College Grove Amended Joint Venture. Unpublished report for City of Bunbury.

B = ENV Australia (2007). Edith Cowan University South West Campus, Bunbury, Fauna Assessment (Level 2). Unpublished report for ECU.

C = ATA Environmental (1998). Vertebrate Fauna Dalyellup Beach Estate Shire of Capel. Unpublished report for Homeswest/Home Building Society and Satterley Real Estate.

D = Bow, B. (1999). The biogeography of the ground vertebrate fauna of the southern Swan Coastal Plain, Bunbury, W.A. B.Sc (Hons) Thesis, Curtin University of Technology. (Reptiles Only).

+ McNee, S (1987). Avifaunal Surveys of Ludlow Tuart Forests, Minninup and the old Yoganup Mine Site Capel, Western Australia. Report for Westralian Sands Ltd. (Birds Only).

E = HGM (2002). Natural Values of 12 Sites of the Greater Bunbury Region Scheme. Tasks 1, 2 and 3. Unpublished report for WAPC (Muddy Lakes Fauna Survey (Level 2) results).

F = Harewood, G. (2008). Fauna Assessment Survey (Level 2), Lot 187, Stratham. Unpublished report for MBS Environmental.

G = DPaW (2015). NatureMap Database search. "By Circle" 115°39' 26" E, 33°22' 23" S – (plus 10km buffer). 31 January 2015.

Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
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Amphibia

Myobatrachidae

Ground or Burrowing Frogs

<i>Heleioporus eyrei</i>	Moaning Frog	LC			X	X		X	X
<i>Limnodynastes dorsalis</i>	Western Banjo Frog	LC		X	X	X	X	X	X
<i>Pseudophryne guentheri</i>	Crawling Toadlet	LC				X		X	

Reptilia

Gekkonidae

Geckoes

<i>Christinus marmoratus</i>	Marbled Gecko		X	X	X	X	X	X	X
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WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
Pygopodidae									
Legless Lizards									
<i>Aprasia repens</i>	Sandplain Worm Lizard					X			X
<i>Lialis burtonis</i>	Burton's Legless Lizard				X	X			X
Agamidae									
Dragon Lizards									
<i>Pogona minor</i>	Western Bearded Dragon			X	X	X	X		X
Varanidae									
Monitor's or Goanna's									
<i>Varanus gouldii</i>	Sand Monitor		X					X	
<i>Varanus rosenbergi</i>	Heath Monitor		X			X			

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
Scincidae									
Skinks									
<i>Acritoscincus trilineatum</i>	Southwestern Cool Skink			X	X		X		X
<i>Cryptoblepharus buchananii</i>	Buchanan's Snake-eyed Skink		X	X	X	X		X	X
<i>Ctenotus australis</i>	Western Ctenotus					X			X
<i>Ctenotus fallens</i>	West Coast Ctenotus				X				X
<i>Ctenotus impar</i>	Odd-striped Ctenotus					X			X
<i>Ctenotus ora</i>	Coastal Plains Skink	P3				X			X
<i>Egernia kingii</i>	King's Skink			X			X	X	
<i>Egernia napoleonis</i>	Salmon-bellied Skink			X	X		X	X	X
<i>Hemiergis gracilipes</i>	Southwestern Mulch Skink								X
<i>Hemiergis quadrilineata</i>	Three-toed Mulch Skink			X	X	X		X	X
<i>Lerista elegans</i>	West Coast Four-toed Lerista				X	X		X	X
<i>Menetia greyii</i>	Dwarf Skink				X	X		X	X
<i>Morethia lineocellata</i>	West Coast Pale-flecked Morethia			X	X			X	X
<i>Morethia obscura</i>	Shrubland Pale-flecked Morethia					X			

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
<i>Tiliqua rugosa</i>	Bobtail		X	X	X	X	X	X	X
Typhlopidae Blind Snakes									
<i>Ramphotyphlops australis</i>	Southern Blind Snake				X		X		X
Elapidae Elapid Snakes									
<i>Notechis scutatus</i>	Tiger Snake						X	X	X
<i>Pseudonaja affinis</i>	Dugite		X			X	X	X	X
<i>Simoselaps bertholdi</i>	Jan's Banded Snake								X
Aves									
Phasianidae Quails, Pheasants									
<i>Coturnix pectoralis</i>	Stubble Quail	LC							X

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
Accipitridae Kites, Goshawks, Eagles, Harriers									
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk	Bp LC			X				X
<i>Accipiter fasciatus</i>	Brown Goshawk	Bp LC	X	X				X	X
<i>Aquila audax</i>	Wedge-tailed Eagle	Bp LC			X			X	X
<i>Aquila morphnoides</i>	Little Eagle	Bp LC	X		X	X			
<i>Haliastur sphenurus</i>	Whistling Kite	Bp LC		X	X	X	X	X	X
Falconidae Falcon									
<i>Falco berigora</i>	Brown Falcon	Bp LC				X			X
<i>Falco cenchroides</i>	Australian Kestrel	LC						X	X
<i>Falco longipennis</i>	Australian Hobby	LC			X	X	X	X	X
<i>Falco peregrinus</i>	Peregrine Falcon	S4 Bp LC							X
Turnicidae Button-quails									
<i>Turnix varia</i>	Painted Button-quail	Bp LC			X				

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
Columbidae Pigeons, Doves									
<i>Columba livia</i>	Domestic Pigeon	Introduced			X				
<i>Ocyphaps loquax</i>	Crested Pigeon	LC	X		X		X		
<i>Phaps chalcoptera</i>	Common Bronzewing	Bh LC	X	X	X	X	X	X	X
<i>Streptopelia chinensis</i>	Spotted Turtle-Dove	Introduced							
<i>Streptopelia senegalensis</i>	Laughing Turtle-Dove	Introduced	X	X	X				X

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
Psittacidae									
Parrots									
<i>Cacatua roseicapilla</i>	Galah	LC	X	X	X		X	X	
<i>Cacatua sanguinea</i>	Little Corella	Introduced	X	X					
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black-Cockatoo	S1 VU Be VU A2c+3c+4c						X	
<i>Calyptorhynchus baudinii</i>	Baudin's Black-Cockatoo	S1 VU Bp VU C2a(ii)	X		X				
<i>Calyptorhynchus latirostris</i>	Carnaby's Black-Cockatoo	S1 EN Bp EN A2bcde+3bcd	X	X				X	
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet	LC					X		
<i>Neophema elegans</i>	Elegant Parrot	LC				X			X
<i>Platycercus icterotis icterotis</i>	Western Rosella (western ssp)	Bp LC		X	X	X	X		X
<i>Platycercus spurius</i>	Red-capped Parrot	LC	X	X	X	X	X	X	X
<i>Platycercus zonarius</i>	Australian Ringneck	LC	X	X	X	X	X	X	X
<i>Polytelis anthopeplus</i>	Regent Parrot	LC		X	X		X	X	

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
Cuculidae Parasitic Cuckoos									
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	LC					X	X	X
<i>Chrysococcyx basalis</i>	Horsfield's Bronze Cuckoo	LC					X		
<i>Chrysococcyx lucidus</i>	Shining Bronze Cuckoo	LC					X		
<i>Cuculus pallidus</i>	Pallid Cuckoo	LC					X		X
Strigidae Hawk Owls									
<i>Ninox novaeseelandiae</i>	Boobook Owl	LC	X		X				X
Tytonidae Barn Owls									
<i>Tyto alba</i>	Barn Owl	LC							X
Podargidae Frogmouths									
<i>Podargus strigoides</i>	Tawny Frogmouth	LC	X		X				X
Halcyonidae Tree Kingfishers									
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Introduced	X	X	X		X	X	X
<i>Todiramphus sanctus</i>	Sacred Kingfisher	LC	X	X			X		

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
Meropidae Bee-eaters									
<i>Merops ornatus</i>	Rainbow Bee-eater	S3 Mig JA LC	X				X	X	X
Maluridae Fairy Wrens, GrassWrens									
<i>Malurus splendens</i>	Splendid Fairy-wren	Bh LC	X	X	X	X	X	X	X
Acanthizidae Thornbills, Geryones, Fieldwrens & Whitefaces									
<i>Acanthiza apicalis</i>	Broad-tailed Thornbill	Bh LC	X	X	X	X	X	X	X
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Bh LC	X	X	X		X	X	X
<i>Gerygone fusca</i>	Western Gerygone	LC	X	X	X	X	X	X	X
<i>Sericornis frontalis</i>	White-browed Scrubwren	Bh LC			X	X	X		X
<i>Smicromis brevirostris</i>	Weebill	Bh LC	X	X	X	X	X	X	X
Pardalotidae Pardalotes									
<i>Pardalotus punctatus</i>	Spotted Pardalote	LC			X				
<i>Pardalotus striatus</i>	Striated Pardalote	LC	X	X	X		X	X	

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
Meliphagidae Honeyeaters, Chats									
<i>Acanthorhynchus superciliosus</i>	Western Spinebill	LC	X	X	X	X			
<i>Anthochaera carunculata</i>	Red Wattlebird	LC	X	X	X	X	X	X	X
<i>Anthochaera lunulata</i>	Western Little Wattlebird	Bp LC							
<i>Lichenostomus leucotis</i>	White-eared Honeyeater	LC							
<i>Lichenostomus virescens</i>	Singing Honeyeater	LC		X	X	X			X
<i>Lichmera indistincta</i>	Brown Honeyeater	LC	X	X	X	X	X		X
<i>Phylidonyris melanops</i>	Tawny-crowned Honeyeater	Bp LC							
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	Bp LC	X	X	X	X	X		X
Petroicidae Australian Robins									
<i>Eopsaltria griseogularis</i>	Western Yellow Robin	Bh LC	X	X				X	
<i>Petroica multicolor</i>	Scarlet Robin	Bh LC	X	X	X			X	
Neosittidae Sitellas									
<i>Daphoenositta chrysoptera</i>	Varied Sittella	Bh LC			X		X		

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
Pachycephalidae									
Crested Shrike-tit, Crested Bellbird, Shrike Thrushes, Whistlers									
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	Bh LC	X	X	X		X	X	X
<i>Pachycephala pectoralis</i>	Golden Whistler	Bh LC	X	X	X		X	X	X
<i>Pachycephala rufiventris</i>	Rufous Whistler	LC	X	X	X		X	X	X
Dicruridae									
Monarchs, Magpie Lark, Flycatchers, Fantails, Drongo									
<i>Rhipidura fuliginosa</i>	Grey Fantail	LC	X	X	X	X	X	X	X
<i>Rhipidura leucophrys</i>	Willie Wagtail	LC	X	X	X	X	X	X	X
Campephagidae									
Cuckoo-shrikes, Trillers									
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	LC	X	X	X	X	X	X	X
<i>Lalage tricolor</i>	White-winged Triller	LC					X		
Artamidae									
Woodswallows, Butcherbirds, Currawongs									
<i>Artamus cinereus</i>	Black-faced Woodswallow	Bp LC					X	X	X
<i>Artamus cyanopterus</i>	Dusky Woodswallow	Bp LC	X						

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
Cracticidae Currawongs, Magpies & Butcherbirds									
<i>Cracticus tibicen</i>	Australian Magpie	LC	X	X	X		X	X	X
<i>Cracticus torquatus</i>	Grey Butcherbird	LC	X	X	X		X	X	X
<i>Strepera versicolor</i>	Grey Currawong	Bp LC							
Corvidae Ravens, Crows									
<i>Corvus coronoides</i>	Australian Raven	LC	X	X	X		X	X	X
Dicaeidae Flowerpeckers									
<i>Dicaeum hirundinaceum</i>	Mistletoebird	LC							
Hirundinidae Swallows, Martins									
<i>Hirundo neoxena</i>	Welcome Swallow	LC		X	X	X	X	X	X
<i>Hirundo nigricans</i>	Tree Martin	LC		X	X	X	X	X	
Sylviidae Old World Warblers									
<i>Cincloramphus cruralis</i>	Brown Songlark	LC							X
<i>Cincloramphus mathewsi</i>	Rufous Songlark	LC							

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
Zosteropidae White-eyes									
<i>Zosterops lateralis</i>	Silvereye	LC	X	X	X	X	X	X	X
Mammalia									
Tachyglossidae Echidnas									
<i>Tachyglossus aculeatus</i>	Echidna	LC						X	
Dasyuridae Carnivorous Marsupials									
<i>Phascogale tapoatafa ssp</i>	Southern Brush-tailed Phascogale	S1 VU NT	X					X	
Peramelidae Bandicoots									
<i>Isodon obesulus fusciventer</i>	Southern Brown Bandicoot	P5 LC		X			X		X
Phalangeridae Brushtail Possums, Cuscuses									
<i>Trichosurus vulpecula vulpecula</i>	Common Brushtail Possum	LC	X	X				X	
Burramyidae Pygmy Possums									
<i>Cercartetus concinnus</i>	Western Pygmy-possum	LC							

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
Tarsipedidae									
Honey Possum									
<i>Tarsipes rostratus</i>	Honey Possum	LC							
Pseudocheiridae									
Ringtail Possums									
<i>Pseudocheirus occidentalis</i>	Western Ringtail Possum	S1 EN VU A2bce+3bce+4bc	X	X			X	X	X
Macropodidae									
Kangaroos, Wallabies									
<i>Macropus fuliginosus</i>	Western Grey Kangaroo	LC	X	X			X	X	X
<i>Macropus irma</i>	Western Brush Wallaby	P4	X						
Molossidae									
Freetail Bats									
<i>Mormopterus kitcheneri</i>	Southern Freetail-bat	LC	X						
<i>Tadarida australis</i>	White-striped Freetail-bat	LC	X				X		

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
Vespertilionidae									
Ordinary Bats									
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	LC	X					X	
<i>Chalinolobus morio</i>	Chocolate Wattled Bat	LC	X						
<i>Falsistrellus mackenziei</i>	Western False Pipistrelle	P4 NT	X					X	X
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat	LC	X					X	
<i>Nyctophilus gouldi</i>	Gould's Long-eared Bat	LC						X	
<i>Nyctophilus major</i>	Western Long-eared Bat	LC	X						
<i>Vespadelus regulus</i>	Southern Forest Bat	LC	X					X	
Muridae									
Rats, Mice									
<i>Mus musculus</i>	House Mouse	Introduced		X			X		
<i>Rattus fuscipes</i>	Western Bush Rat	LC							X
<i>Rattus rattus</i>	Black Rat	Introduced	X	X			X	X	
Canidae									
Dogs, Foxes									
<i>Canis lupus familiaris</i>	Dog	Introduced		X				X	
<i>Vulpes vulpes</i>	Red Fox	Introduced	X	X				X	

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
Felidae Cats									
<i>Felis catus</i>	Cat	Introduced	X	X				X	
Leporidae Rabbits, Hares									
<i>Oryctolagus cuniculus</i>	Rabbit	Introduced	X	X				X	

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APPENDIX D

DPaW & *EPBC* Database Search Results

NatureMap - Lot 298, 790 and 938

Created By Greg Harewood on 31/01/2015

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115°39' 26" E, 33°22' 23" S
Buffer 10km
Group By Species Group

Species Group	Species	Records
Amphibian	10	193
Bird	166	4470
Fish	62	96
Invertebrate	36	149
Mammal	34	829
Reptile	35	172
TOTAL	343	5909

Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area
Amphibian				
1.	25398 <i>Crinia georgiana</i> (Quacking Frog)			
2.	25399 <i>Crinia glauerti</i> (Clicking Frog)			
3.	25400 <i>Crinia insignifera</i> (Squelching Froglet)			
4.	25401 <i>Crinia pseudinsignifera</i> (Bleating Froglet)			
5.	25404 <i>Geocrinia leai</i> (Ticking Frog)			
6.	25410 <i>Heleioporus eyrei</i> (Moaning Frog)			
7.	25415 <i>Limnodynastes dorsalis</i> (Western Banjo Frog)			
8.	25378 <i>Litoria adelaidensis</i> (Slender Tree Frog)			
9.	25388 <i>Litoria moorei</i> (Motorbike Frog)			
10.	25433 <i>Pseudophryne guentheri</i> (Crawling Toadlet)			
Bird				
11.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
12.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
13.	24262 <i>Acanthiza inornata</i> (Western Thornbill)			
14.	24560 <i>Acanthorhynchus superciliosus</i> (Western Spinebill)			
15.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
16.	25755 <i>Acrocephalus australis</i> (Australian Reed Warbler)			
17.	41323 <i>Actitis hypoleucos</i> (Common Sandpiper)		IA	
18.	24310 <i>Anas castanea</i> (Chestnut Teal)			
19.	24312 <i>Anas gracilis</i> (Grey Teal)			
20.	24313 <i>Anas platyrhynchos</i> (Mallard)			
21.	24315 <i>Anas rhynchotis</i> (Australasian Shoveler)			
22.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
23.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
24.	24562 <i>Anthochaera lunulata</i> (Western Little Wattlebird)			
25.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
26.	25558 <i>Ardea ibis</i> (Cattle Egret)		IA	
27.	41324 <i>Ardea modesta</i> (Eastern Great Egret)		IA	
28.	24341 <i>Ardea pacifica</i> (White-necked Heron)			
29.	25736 <i>Arenaria interpres</i> (Ruddy Turnstone)		IA	
30.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
31.	24353 <i>Artamus cyanopterus</i> (Dusky Woodswallow)			
32.	24318 <i>Aythya australis</i> (Hardhead)			
33.	24319 <i>Biziura lobata</i> (Musk Duck)			
34.	24359 <i>Burhinus grallarius</i> (Bush Stone-curlew)		P4	
35.	25714 <i>Cacatua pastinator</i> (Western Long-billed Corella)			
36.	25716 <i>Cacatua sanguinea</i> (Little Corella)			
37.	25598 <i>Cacomantis flabelliformis</i> (Fan-tailed Cuckoo)			
38.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
39.	24779 <i>Calidris acuminata</i> (Sharp-tailed Sandpiper)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
40.	25738 <i>Calidris canutus</i> (Red Knot)		IA	
41.	24784 <i>Calidris ferruginea</i> (Curlew Sandpiper)		IA	
42.	24788 <i>Calidris ruficollis</i> (Red-necked Stint)		T	
43.	24790 <i>Calidris tenuirostris</i> (Great Knot)		IA	
44.	25717 <i>Calyptorhynchus banksii</i> (Red-tailed Black-Cockatoo)		T	
45.	24731 <i>Calyptorhynchus banksii</i> subsp. <i>naso</i> (Forest Red-tailed Black-Cockatoo)		T	
46.	24733 <i>Calyptorhynchus baudinii</i> (Baudin's Cockatoo (long-billed black-cockatoo), Baudin's Cockatoo)		T	
47.	24734 <i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo (short-billed black-cockatoo), Carnaby's Cockatoo)		T	
48.	25575 <i>Charadrius leschenaultii</i> (Greater Sand Plover)		IA	
49.	24377 <i>Charadrius ruficapillus</i> (Red-capped Plover)			
50.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
51.	24432 <i>Chrysococcyx lucidus</i> subsp. <i>plagosus</i> (Shining Bronze Cuckoo)			
52.	24288 <i>Circus approximans</i> (Swamp Harrier)			
53.	24774 <i>Cladorhynchus leucocephalus</i> (Banded Stilt)			
54.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
55.	24399 <i>Columba livia</i> (Domestic Pigeon)	Y		
56.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
57.	25592 <i>Corvus coronoides</i> (Australian Raven)			
58.	24417 <i>Corvus coronoides</i> subsp. <i>perplexus</i> (Australian Raven)			
59.	24671 <i>Coturnix pectoralis</i> (Stubble Quail)			
60.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
61.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
62.	24322 <i>Cygnus atratus</i> (Black Swan)			
63.	30901 <i>Dacelo novaeguineae</i> (Laughing Kookaburra)	Y		
64.	25673 <i>Daphoenositta chrysoptera</i> (Varied Sittella)			
65.	24468 <i>Diomedea chrysostoma</i> (Grey-headed Albatross)		T	
66.	25618 <i>Diomedea exulans</i> (Wandering Albatross)		T	
67.	24651 <i>Eopsaltria australis</i> subsp. <i>griseogularis</i> (Western Yellow Robin)			
68.	24652 <i>Eopsaltria georgiana</i> (White-breasted Robin)			
69.	24567 <i>Epthianura albifrons</i> (White-fronted Chat)			
70.	24813 <i>Eudyptes chrysocome</i> subsp. <i>filholi</i> (Rockhopper Penguin)			Y
71.	24814 <i>Eudyptes chrysocome</i> subsp. <i>moseleyi</i> (Rockhopper Penguin)			
72.	24368 <i>Eurostopodus argus</i> (Spotted Nightjar)			
73.	25621 <i>Falco berigora</i> (Brown Falcon)			
74.	25622 <i>Falco cenchroides</i> (Australian Kestrel)			
75.	25623 <i>Falco longipennis</i> (Australian Hobby)			
76.	25624 <i>Falco peregrinus</i> (Peregrine Falcon)		S	
77.	25727 <i>Fulica atra</i> (Eurasian Coot)			
78.	25729 <i>Gallinula tenebrosa</i> (Dusky Moorhen)			
79.	24763 <i>Gallinula tenebrosa</i> subsp. <i>tenebrosa</i> (Dusky Moorhen)			
80.	25730 <i>Gallirallus philippensis</i> (Buff-banded Rail)			
81.	24765 <i>Gallirallus philippensis</i> subsp. <i>mellori</i> (Buff-banded Rail)			
82.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
83.	24735 <i>Glossopsitta porphyrocephala</i> (Purple-crowned Lorikeet)			
84.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
85.	24487 <i>Haematopus longirostris</i> (Pied Oystercatcher)			
86.	24293 <i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)		IA	
87.	24295 <i>Haliastur sphenurus</i> (Whistling Kite)			
88.	24689 <i>Halobaena caerulea</i> (Blue Petrel)			
89.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
90.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
91.	24347 <i>Ixobrychus flavicollis</i> subsp. <i>australis</i> (Australian Black Bittern)		P3	
92.	24348 <i>Ixobrychus minutus</i> subsp. <i>dubius</i> (Australian Little Bittern)		P4	
93.	25638 <i>Larus pacificus</i> (Pacific Gull)			
94.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
95.	30932 <i>Limosa lapponica</i> (Bar-tailed Godwit)		IA	
96.	25741 <i>Limosa limosa</i> (Black-tailed Godwit)		IA	
97.	24690 <i>Macronectes giganteus</i> (Southern Giant Petrel)		P4	
98.	24326 <i>Malacorhynchus membranaceus</i> (Pink-eared Duck)			
99.	25650 <i>Malurus elegans</i> (Red-winged Fairy-wren)			
100.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
101.	25758 <i>Megalurus gramineus</i> (Little Grassbird)			
102.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)		IA	
103.	24738 <i>Neophema elegans</i> (Elegant Parrot)			
104.	24739 <i>Neophema petrophila</i> (Rock Parrot)			
105.	25748 <i>Ninox novaeseelandiae</i> (Boobook Owl)			
106.	24798 <i>Numenius madagascariensis</i> (Eastern Curlew)		T	

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
107.	25742 <i>Numenius phaeopus</i> (Whimbrel)		IA	
108.	25564 <i>Nycticorax caledonicus</i> (Rufous Night Heron)			
109.	24497 <i>Oceanites oceanicus</i> (Wilson's Storm Petrel)		IA	
110.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
111.	24328 <i>Oxyura australis</i> (Blue-billed Duck)			
112.	25679 <i>Pachycephala pectoralis</i> (Golden Whistler)			
113.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
114.	24692 <i>Pachyptila belcheri</i> (Slender-billed Prion)			
115.	24693 <i>Pachyptila desolata</i> (Antarctic Prion)			
116.	25707 <i>Pachyptila salvini</i> (Salvin's Prion)			
117.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
118.	25687 <i>Passer domesticus</i> (House Sparrow)	Y		
119.	24642 <i>Passer montanus</i> (Eurasian Tree Sparrow)	Y		
120.	24649 <i>Pelecanoides urinatrix</i> subsp. <i>exsul</i> (Common Diving Petrel)			
121.	24648 <i>Pelecanus conspicillatus</i> (Australian Pelican)			
122.	25697 <i>Phalacrocorax carbo</i> (Great Cormorant)			
123.	24664 <i>Phalacrocorax carbo</i> subsp. <i>novaeahollandiae</i> (Great Cormorant)			
124.	24665 <i>Phalacrocorax fuscescens</i> (Black-faced Cormorant)			
125.	24667 <i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)			
126.	25699 <i>Phalacrocorax varius</i> (Pied Cormorant)			
127.	24668 <i>Phalacrocorax varius</i> subsp. <i>hypoleucos</i> (Pied Cormorant)			
128.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
129.	24596 <i>Phylidonyris novaehollandiae</i> (New Holland Honeyeater)			
130.	24841 <i>Platalea flavipes</i> (Yellow-billed Spoonbill)			
131.	25720 <i>Platycercus icterotis</i> (Western Rosella)			
132.	24745 <i>Platycercus icterotis</i> subsp. <i>icterotis</i> (Western Rosella)			
133.	24747 <i>Platycercus spurius</i> (Red-capped Parrot)			
134.	25721 <i>Platycercus zonarius</i> (Australian Ringneck, Ring-necked Parrot)			
135.	24843 <i>Plegadis falcinellus</i> (Glossy Ibis)		IA	
136.	24382 <i>Pluvialis fulva</i> (Pacific Golden Plover)		IA	
137.	24383 <i>Pluvialis squatarola</i> (Grey Plover)		IA	
138.	25703 <i>Podargus strigoides</i> (Tawny Frogmouth)			
139.	25704 <i>Podiceps cristatus</i> (Great Crested Grebe)			
140.	24681 <i>Poliiocephalus poliocephalus</i> (Hoary-headed Grebe)			
141.	25722 <i>Polytelis anthopeplus</i> (Regent Parrot)			
142.	25731 <i>Porphyrio porphyrio</i> (Purple Swamphen)			
143.	24771 <i>Porzana tabuensis</i> (Spotless Crane)			
144.	24388 <i>Psophodes nigrogularis</i> subsp. <i>nigrogularis</i> (Western Whipbird (western heath))		T	
145.	24702 <i>Pterodroma brevirostris</i> (Kerguelen Petrel)			
146.	24703 <i>Pterodroma lessonii</i> (White-headed Petrel)			
147.	-14095 <i>Pterodroma macroptera</i> subsp. <i>macroptera</i>			
148.	25711 <i>Pterodroma mollis</i> (Soft-plumaged Petrel)			
149.	42340 <i>Ptilotula ornatus</i> (Yellow-plumed Honeyeater)			
150.	24711 <i>Puffinus assimilis</i> subsp. <i>assimilis</i> (Little Shearwater)			
151.	24776 <i>Recurvirostra novaehollandiae</i> (Red-necked Avocet)			
152.	25613 <i>Rhipidura fuliginosa</i> (Grey Fantail)			
153.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
154.	25616 <i>Rhipidura rufiventris</i> (Northern Fantail)			
155.	25534 <i>Sericornis frontalis</i> (White-browed Scrubwren)			
156.	30948 <i>Sericornis brevirostris</i> (Weebill)			
157.	24522 <i>Sterna bergii</i> (Crested Tern)			
158.	25642 <i>Sterna hirundo</i> (Common Tern)		IA	
159.	25644 <i>Sterna nereis</i> (Fairy Tern)			
160.	25655 <i>Stipiturus malachurus</i> (Southern Emu-wren)			
161.	24554 <i>Stipiturus malachurus</i> subsp. <i>westernensis</i> (Southern Emu-wren)			
162.	25597 <i>Strepera versicolor</i> (Grey Currawong)			
163.	25589 <i>Streptopelia chinensis</i> (Spotted Turtle-Dove)	Y		
164.	25590 <i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)	Y		
165.	25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
166.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
167.	34134 <i>Thalassarche carteri</i> (Indian Yellow-nosed Albatross)		T	
168.	24844 <i>Threskiornis molucca</i> (Australian White Ibis)			
169.	24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)			
170.	25549 <i>Todiramphus sanctus</i> (Sacred Kingfisher)			
171.	24755 <i>Trichoglossus haematodus</i> subsp. <i>moluccanus</i> (Rainbow Lorikeet)	Y		
172.	24803 <i>Tringa brevipes</i> (Grey-tailed Tattler)		IA	
173.	24808 <i>Tringa nebularia</i> (Common Greenshank)		IA	
174.	24809 <i>Tringa stagnatilis</i> (Marsh Sandpiper)		IA	
175.	24386 <i>Vanellus tricolor</i> (Banded Lapwing)			
176.	25765 <i>Zosterops lateralis</i> (Grey-breasted White-eye, Silvereye)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Fish				
177.	-16128 <i>Acentrogobius bifrenatus</i>			
178.	-16192 <i>Aetapcus maculatus</i>			
179.	-15728 <i>Aldrichetta forsteri</i>			
180.	-16964 <i>Anoplocapros lenticularis</i>			
181.	-16613 <i>Aracana aurita</i>			
182.	-16882 <i>Arenigobius bifrenatus</i>			
183.	-14910 <i>Arripis truttacea</i>			
184.	-16442 <i>Asymbolus submaculatus</i>			
185.	-16171 <i>Atherinosoma elongata</i>			
186.	-14501 <i>Aulohalaelurus labiosus</i>			
187.	-15356 <i>Auxis thazard</i>			
188.	-16639 <i>Carcharhinus sp.</i>			
189.	-17992 <i>Chelidonichthys kumu</i>			
190.	-15746 <i>Cleidopus gloriamaris</i>			
191.	-14266 <i>Dactylophora nigricans</i>			
192.	-15210 <i>Diodon nichthemerus</i>			
193.	-15245 <i>Diodon sp.</i>			
194.	-16685 <i>Echeneis naucrates</i>			
195.	-18124 <i>Eubalichthys sp.</i>			
196.	-15782 <i>Euleptorhamphus viridis</i>			
197.	-15158 <i>Furgaleus macki</i>			
198.	-18172 <i>Galeorhinus galeus</i>			
199.	34030 <i>Geotria australis</i> (Pouched Lamprey)		P1	
200.	-14441 <i>Gonorynchus greyi</i>			
201.	-15689 <i>Gymnapistes marmoratus</i>			
202.	-17933 <i>Gymnothorax woodwardi</i>			
203.	-16707 <i>Hemipristis elongata</i>			
204.	-15690 <i>Heterodontus portusjacksoni</i>			
205.	-17536 <i>Hippocampus sp.</i>			
206.	-15868 <i>Hyperlophus vittatus</i>			
207.	-16798 <i>Hyporhamphus melanocheir</i>			
208.	-16219 <i>Ichthyoscopus barbatus</i>			
209.	-16809 <i>Lagocephalus sceleratus</i>			
210.	-15923 <i>Macroramphosus scolopax</i>			
211.	-17710 <i>Makaira indica</i>			
212.	-15707 <i>Meuschenia freycineti</i>			
213.	-15692 <i>Mugil cephalus</i>			
214.	-17604 <i>Myliobatis sp.</i>			
215.	-14537 <i>Nelusetta ayraudi</i>			
216.	-15769 <i>Omegophora armilla</i>			
217.	-17502 <i>Ophisurus serpens</i>			
218.	-14446 <i>Ophthalmolepis lineolatus</i>			
219.	-15049 <i>Parazancistius hutchinsi</i>			
220.	-15157 <i>Phyllopteryx taeniolatus</i>			
221.	-16090 <i>Platycephalus speculator</i>			
222.	-16750 <i>Prionace glauca</i>			
223.	-17024 <i>Pristiophorus nudipinnis</i>			
224.	-16630 <i>Pseudogobius olorum</i>			
225.	-15205 <i>Pterygotrigla polyommata</i>			
226.	-15677 <i>Scomber australasicus</i>			
227.	-18115 <i>Sillago fraseri</i> (invalid)			Y
228.	-14498 <i>Sphyraena obtusata</i>			
229.	-17667 <i>Squalus megalops</i>			
230.	-16631 <i>Squatina australis</i>			
231.	-15185 <i>Stigmatopora argus</i>			
232.	-15012 <i>Thyrstites atun</i>			
233.	-16096 <i>Trachinotus bailloni</i>			
234.	-17983 <i>Trachurus novaezelandiae</i>			
235.	-15006 <i>Trichiurus lepturus</i>			
236.	-17601 <i>Trichiurus sp.</i>			
237.	-16218 <i>Trygonoptera mucosa</i>			
238.	-15869 <i>Urolophus sp.</i>			
Invertebrate				
239.	-13038 <i>Allothereua maculata</i>			
240.	-13287 <i>Aname mainae</i>			
241.	-12101 <i>Aname tepperi</i>			
242.	-1925 <i>Argiope protensa</i>			
243.	-13727 <i>Arkys walckenaeri</i>			

	Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
244.	-13341	<i>Artoria linnaei</i>			
245.	-12897	<i>Artoriopsis expolita</i>			
246.	-12920	<i>Austracantha minax</i>			
247.	-12252	<i>Backobourkia brounii</i>			
248.	-12356	<i>Backobourkia heroine</i>			
249.	-12857	<i>Celaenia excavata</i>			
250.	-13755	<i>Cercophonius sulcatus</i>			
251.	-12921	<i>Cormocephalus hartmeyerii</i>			
252.	-12094	<i>Cryptoerithus quobba</i>			
253.	-12522	<i>Cyclosa trilobata</i>			
254.	-12919	<i>Cyrtophora parnasia</i>			
255.	-12461	<i>Dingosa serrata</i>			
256.	-12234	<i>Erigone prominens</i>			
257.	-13748	<i>Eriophora biapicata</i>			
258.	-12774	<i>Idiosoma sigillatum</i>			
259.	-13282	<i>Isopeda leishmanni</i>			
260.	-1870	<i>Lampona cylindrata</i>			
261.	-13346	<i>Missulena hoggi</i>			
262.	-13794	<i>Missulena occatoria</i>			
263.	-13296	<i>Mituliodon tarantulinus</i>			
264.	-13073	<i>Mitzoruga insularis</i>			
265.	-1806	<i>Nicodamus mainae</i>			
266.	-13187	<i>Nunciella aspera</i>			
267.	-13048	<i>Pholcus phalangioides</i>			
268.	-13475	<i>Platorish gelorup</i>			
269.	-13045	<i>Steatoda capensis</i>			
270.	-12434	<i>Steatoda grossa</i>			
271.	-13367	<i>Synsphyronus magnus</i>			
272.	-12268	<i>Tamopsis distinguenda</i>			
273.	-12469	<i>Tasmanicosa leuckartii</i>			
274.	-12898	<i>Venator immansueta</i>			

Mammal

275.	24209	<i>Arctocephalus tropicalis</i> (Sub-antarctic Fur Seal)			
276.	24044	<i>Balaenoptera acutorostrata</i> (Dwarf Minke Whale)			
277.	24251	<i>Bos taurus</i> (European Cattle)	Y		
278.	24086	<i>Cercartetus concinnus</i> (Western Pygmy-possum, Mundarda)			
279.	24092	<i>Dasyurus geoffroii</i> (Chuditch, Western Quoll)		T	
280.	24043	<i>Eubalaena australis</i> (Southern Right Whale)		T	
281.	24189	<i>Falsistrellus mackenziei</i> (Western False Pipistrelle)		P4	
282.	24041	<i>Felis catus</i> (Cat)	Y		
283.	24215	<i>Hydromys chrysogaster</i> (Water-rat)		P4	
284.	24153	<i>Isodon obesulus</i> subsp. <i>fusciventer</i> (Quenda, Southern Brown Bandicoot)		P5	
285.	-18347	<i>Lobodon carcinophaga</i>			
286.	24132	<i>Macropus fuliginosus</i> (Western Grey Kangaroo)			
287.	24133	<i>Macropus irma</i> (Western Brush Wallaby)		P4	
288.	24051	<i>Megaptera novaeangliae</i> (Humpback Whale)		T	
289.	24076	<i>Mesoplodon bowdoini</i> (Andrew's Beaked Whale)			
290.	24078	<i>Mesoplodon grayi</i> (Gray's Beaked Whale)			
291.	24081	<i>Mesoplodon mirus</i> (True's Beaked Whale)			
292.	24223	<i>Mus musculus</i> (House Mouse)	Y		
293.	24210	<i>Neophoca cinerea</i> (Australian Sea Lion)		S	
294.	24085	<i>Oryctolagus cuniculus</i> (Rabbit)	Y		
295.	25508	<i>Phascogale tapoatafa</i> (Brush-tailed Phascogale)			
296.	24099	<i>Phascogale tapoatafa</i> subsp. <i>tapoatafa</i> (Southern Brush-tailed Phascogale, Wambenger)		T	
297.	24073	<i>Physeter macrocephalus</i> (Sperm Whale)		P4	
298.	24166	<i>Pseudocheirus occidentalis</i> (Western Ringtail Possum)		T	
299.	24243	<i>Rattus fuscipes</i> (Western Bush Rat)			
300.	24245	<i>Rattus rattus</i> (Black Rat)	Y		
301.	24145	<i>Setonix brachyurus</i> (Quokka)		T	
302.	-18362	<i>Stenella coeruleoalba</i>			
303.	-18428	<i>Stenella longirostris</i>			
304.	24259	<i>Sus scrofa</i> (Pig)	Y		
305.	25521	<i>Trichosurus vulpecula</i> (Common Brushtail Possum)			
306.	24158	<i>Trichosurus vulpecula</i> subsp. <i>vulpecula</i> (Common Brushtail Possum)			
307.	30954	<i>Tursiops aduncus</i> (Indo-Pacific Bottlenose Dolphin)			
308.	24069	<i>Tursiops truncatus</i> (Bottlenose Dolphin)			

Reptile

309.	42368	<i>Acritoscincus trilineatus</i> (Western Three-lined Skink)			
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	Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
310.	24991	<i>Aprasia repens</i> (Sand-plain Worm-lizard)			
311.	25335	<i>Caretta caretta</i> (Loggerhead Turtle)		T	
312.	24980	<i>Christinus marmoratus</i> (Marbled Gecko)			
313.	30893	<i>Cryptoblepharus buechananii</i>			
314.	25027	<i>Ctenotus australis</i>			
315.	25039	<i>Ctenotus fallens</i>			
316.	25047	<i>Ctenotus impar</i>			
317.	25049	<i>Ctenotus labillardieri</i>			
318.	41641	<i>Ctenotus ora</i> (Coastal Plains Skink)		P1	
319.	25096	<i>Egernia kingii</i> (King's Skink)			
320.	25100	<i>Egernia napoleonis</i>			
321.	25250	<i>Elapognathus coronatus</i> (Crowned Snake)			
322.	30919	<i>Hemiergis gracilipes</i>			
323.	25119	<i>Hemiergis quadrilineata</i>			
324.	-18500	<i>Hydrophis major</i>			
325.	42410	<i>Hydrophis ornatulus</i>			
326.	43384	<i>Hydrophis platurus</i> (Yellow-bellied Seasnake)			
327.	25131	<i>Lerista distinguenda</i>			
328.	25133	<i>Lerista elegans</i>			
329.	25005	<i>Lialis burtonis</i>			
330.	42413	<i>Lissolepis luctuosa</i> (Western Swamp Skink)			
331.	25184	<i>Menetia greyii</i>			
332.	25191	<i>Morethia lineocellata</i>			
333.	25344	<i>Natator depressus</i> (Flatback Turtle)		T	
334.	25248	<i>Neelaps bimaculatus</i> (Black-naped Snake)			
335.	25252	<i>Notechis scutatus</i> (Tiger Snake)			
336.	25253	<i>Parasuta gouldii</i>			
337.	25255	<i>Parasuta nigriceps</i>			
338.	25510	<i>Pogona minor</i> (Dwarf Bearded Dragon)			
339.	24907	<i>Pogona minor subsp. minor</i> (Dwarf Bearded Dragon)			
340.	25259	<i>Pseudonaja affinis subsp. affinis</i> (Dugite)			
341.	25271	<i>Ramphotyphlops australis</i>			
342.	25266	<i>Simoselaps bertholdi</i> (Jan's Banded Snake)			
343.	25519	<i>Tiliqua rugosa</i>			

Conservation Codes

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

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



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: 31/01/15 11:48:25

[Summary](#)

[Details](#)

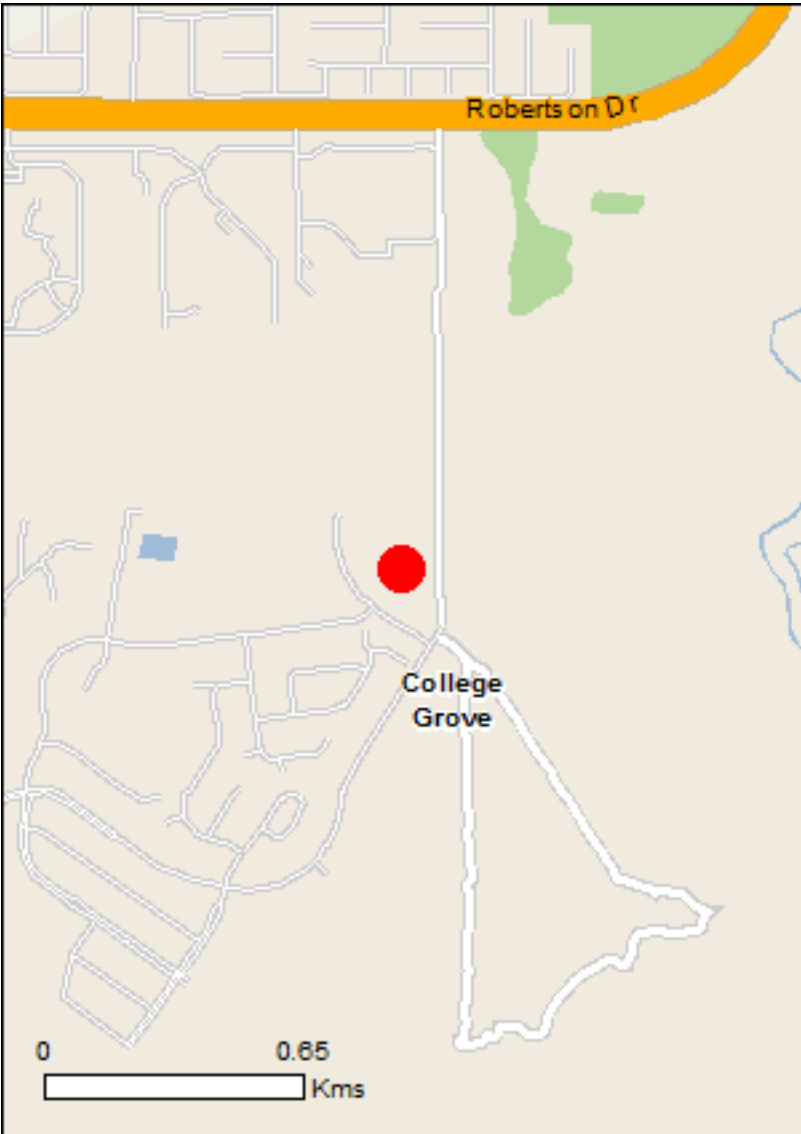
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



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[Coordinates](#)

[Buffer: 0.0Km](#)



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:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	15
Listed Migratory Species:	5

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 and the heritage values of a place on the Register of the National Estate.

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.

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:	6
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine	None

Extra Information

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

Place on the RNE:	None
State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	29
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat may occur within area
Calyptorhynchus baudinii Baudin's Black-Cockatoo, Long-billed Black-Cockatoo [769]	Vulnerable	Breeding known to occur within area
Calyptorhynchus latirostris Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
Mammals		
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir [25911]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Setonix brachyurus Quokka [229]	Vulnerable	Species or species habitat may occur within area
Plants		
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Centrolepis caespitosa [6393]	Endangered	Species or species habitat may occur within area
Darwinia foetida Muchea Bell [83190]	Critically Endangered	Species or species habitat likely to occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat may occur within area
Drakaea elastica Glossy-leafed Hammer-orchid, Praying Virgin [16753]	Endangered	Species or species habitat likely to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species	[<u>Resource Information</u>]	
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[<u>Resource Information</u>]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
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 likely to occur

Name	Threatened	Type of Presence
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		within area Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area

Extra Information

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

Name	Status	Type of Presence
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
Asparagus declinatus Bridal Veil, Bridal Veil Creeper, Pale Berry Asparagus Fern, Asparagus Fern, South African Creeper [66908]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Protasparagus plumosus Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area

Coordinates

-33.37303 115.65763

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 Heritage and Register of National Estate properties, Wetlands of International 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.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

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.

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:

- [-Department of Environment, Climate Change and Water, New South Wales](#)
- [-Department of Sustainability and Environment, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment and Natural Resources, South Australia](#)
- [-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts](#)
- [-Environmental and Resource Management, Queensland](#)
- [-Department of Environment and Conservation, Western Australia](#)
- [-Department of the Environment, Climate Change, Energy and Water](#)
- [-Birds Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-SA 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, Atherton and Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [-State Forests of NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- Other groups and individuals

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

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

APPENDIX E

Raw Camera Trap Results and Bird/Opportunistic Observations

Camera Trap results

Camera Number	Lot Number	Date	Common Name	Species	Number	Comments
3	298	3/01/2015	Laughing Kookaburra	<i>Dacelo novaeguinea</i>	1	
3	298	4/01/2015	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	2	
3	298	9/01/2015	Red Fox	<i>Vulpes vulpes</i>	1	
3	298	30/12/2014	Red Fox	<i>Vulpes vulpes</i>	1	
3	298	31/12/2014	Cat	<i>Felis catus</i>	1	Ginger
26	938 South	2/01/2015	Red Fox	<i>Vulpes vulpes</i>	1	
26	939 South	3/01/2015	Laughing Kookaburra	<i>Dacelo novaeguinea</i>	1	
26	940 South	5/01/2015	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	1	
26	941 South	7/01/2015	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	1	
26	942 South	7/01/2015	Bobtail	<i>Tiliqua rugosa</i>	1	
26	943 South	7/01/2015	Grey Butcherbird	<i>Cracticus torquatus</i>	1	
26	944 South	8/01/2015	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	1	
26	945 South	9/01/2015	Cat	<i>Felis catus</i>	1	
26	946 South	9/01/2015	Laughing Kookaburra	<i>Dacelo novaeguinea</i>	1	
26	947 South	13/01/2015	Australian Magpie	<i>Cracticus tibicen</i>	1	
26	948 South	14/01/2015	Laughing Kookaburra	<i>Dacelo novaeguinea</i>	1	
26	949 South	14/01/2015	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	1	
26	950 South	14/01/2015	Australian Magpie	<i>Cracticus tibicen</i>	1	
26	951 South	15/01/2015	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	1	
26	952 South	15/01/2015	Western Brush Wallaby	<i>Macropus irma</i>	1	
26	953 South	15/01/2015	Australian Magpie	<i>Cracticus tibicen</i>	1	
26	954 South	16/01/2015	Australian Magpie	<i>Cracticus tibicen</i>	1	
26	955 South	19/01/2015	Tawny Frogmouth	<i>Podargus strigoides</i>	1	
26	956 South	20/01/2015	Red Fox	<i>Vulpes vulpes</i>	1	
26	957 South	20/01/2015	Australian Magpie	<i>Cracticus tibicen</i>	1	
26	958 South	22/01/2015	Red Fox	<i>Vulpes vulpes</i>	1	
26	959 South	23/01/2015	Australian Magpie	<i>Cracticus tibicen</i>	1	
26	960 South	25/01/2015	Australian Magpie	<i>Cracticus tibicen</i>	1	
26	961 South	28/12/2014	Bobtail	<i>Tiliqua rugosa</i>	1	
26	962 South	29/12/2014	Australian Magpie	<i>Cracticus tibicen</i>	2	
26	963 South	30/12/2014	Red Fox	<i>Vulpes vulpes</i>	1	

Bird and Opportunistic Observations

Date	Lot Number	Survey Type	Common Name	Species	Number observed
11/01/2015	298, 938 and 790	Transect	Western Spinebill	<i>Acanthorhynchus superciliosus</i>	1
11/01/2015	298, 938 and 790	Transect	Red Wattlebird	<i>Anthochaera carunculata</i>	1
11/01/2015	298, 938 and 790	Transect	Galah	<i>Cacatua roseicapilla</i>	1
11/01/2015	298, 938 and 790	Transect	Baudin's Black-Cockatoo	<i>Calyptorhynchus baudinii</i>	foraging evidence
11/01/2015	298, 938 and 791	Transect	Carnaby Black-Cockatoo	<i>Calyptorhynchus latirostris</i>	foraging evidence
11/01/2015	298, 938 and 790	Transect	Australian Raven	<i>Corvus coronoides</i>	1
11/01/2015	298, 938 and 790	Transect	Australian Magpie	<i>Cracticus tibicen</i>	1
11/01/2015	298, 938 and 790	Transect	Brown Honeyeater	<i>Lichmera indistincta</i>	1
11/01/2015	298, 938 and 790	Transect	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	1
11/01/2015	298, 938 and 790	Transect	Rabbit	<i>Oryctolagus cuniculus</i>	1
11/01/2015	298, 938 and 790	Transect	Red-capped Parrot	<i>Platycercus spurius</i>	1
11/01/2015	298, 938 and 790	Transect	Australian Ringneck Parrot	<i>Platycercus zonarius</i>	1
11/01/2015	298, 938 and 790	Transect	Grey Fantail	<i>Rhipidura fuliginosa</i>	1
11/01/2015	298, 938 and 790	Transect	Willie Wagtail	<i>Rhipidura leucophrys</i>	1
11/01/2015	298, 938 and 790	Transect	Weebill	<i>Smicrornis brevirostris</i>	1
11/01/2015	298, 938 and 790	Transect	Silvereye	<i>Zosterops lateralis</i>	1

APPENDIX F

Habitat Tree Details

Habitat Trees (DBH>50cm)

Datum = GDA 94

Waypoint Number	Lot Number	Zone	mE	mN	Tree Species	Tree Height (m)	Number of Hollows	Hollow Type 1	Hollow Size 1 (cm)	Hollow Type 2	Hollow Size 2 (cm)	Hollow Type 3	Hollow Size 3 (cm)	Hollow Type 4	Hollow Size 4 (cm)	Hollow Type 5	Hollow Size 5 (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt002	298	50H	375110	6306658	Jarrah	15-20	0											No Signs	No Signs	No	
wpt005	298	50H	375083	6306601	Dead Unknown	20+	5+	Knot Hole	5-12	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	No Signs	No Signs	No	Depth of Hollows Unknown
wpt006	298	50H	375091	6306573	Jarrah	15-20	1	Branch	5-12									No Signs	No Signs	No	Depth of Hollows Unknown
wpt007	298	50H	375071	6306566	Jarrah	10-15	0											No Signs	No Signs	No	
wpt008	298	50H	375047	6306590	Jarrah	15-20	1	Branch	5-12									No Signs	No Signs	No	Depth of Hollows Unknown
wpt009	298	50H	375022	6306631	Marri	20+	0											No Signs	No Signs	No	
wpt010	298	50H	375040	6306670	Dead Unknown	20+	5+	Knot Hole	5-12	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	No Signs	No Signs	No	Depth of Hollows Unknown
wpt012	298	50H	375014	6306628	Marri	20+	0											No Signs	No Signs	No	
wpt013	298	50H	375001	6306633	Jarrah	5-10	1	Spout Trunk	20+									No Signs	No Signs	No	Too low?
wpt014	298	50H	375005	6306617	Dead Unknown	20+	5+	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	Branch	<5	No Signs	No Signs	No	Depth of Hollows Unknown
wpt015	298	50H	375007	6306575	Dead Unknown	20+	5+	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	Branch	<5	No Signs	No Signs	No	Depth of Hollows Unknown
wpt016	298	50H	375035	6306539	Jarrah	15-20	0											No Signs	No Signs	No	
wpt017	298	50H	375053	6306548	Jarrah	20+	0											No Signs	No Signs	No	
wpt018	298	50H	375059	6306545	Jarrah	20+	0											No Signs	No Signs	No	
wpt020	298	50H	375059	6306504	Jarrah	15-20	5+	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	Branch	<5	No Signs	No Signs	No	Depth of Hollows Unknown
wpt021	298	50H	375113	6306482	Jarrah	20+	0											No Signs	No Signs	No	
wpt028	298	50H	375115	6306553	Jarrah	15-20	0											No Signs	No Signs	No	
wpt022	790	50H	375083	6306413	Jarrah	15-20	0											No Signs	No Signs	No	
wpt024	790	50H	375150	6306390	Jarrah	20+	0											No Signs	No Signs	No	
wpt001	938 South	50H	375176	6306617	Jarrah	15-20	0											No Signs	No Signs	No	
wpt025	938 South	50H	375180	6306551	Jarrah	20+	0											No Signs	No Signs	No	
wpt026	938 South	50H	375165	6306545	Jarrah	15-20	5+	Knot Hole	<5	Knot Hole	<5	Knot Hole	<5	Branch	<5	Branch	5-12	No Signs	No Signs	No	Depth of Hollows Unknown
wpt027	938 South	50H	375142	6306545	Jarrah	15-20	1	Spout Branch	12-20									No Signs	No Signs	No	Depth of Hollows Unknown

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