

Fauna Assessment



CPS 8057/1 Lot 4 & 5 Ludlow Road Myalup

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Version 3

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TABLE OF CONTENTS

SUMMARY

1.	INTRODUCTION	1
2.	SCOPE OF WORKS.....	2
3.	METHODS	3
3.1	POTENTIAL FAUNA INVENTORY - LITERATURE REVIEW	3
3.1.1	Database Searches.....	3
3.1.2	Previous Fauna Surveys in the Area.....	3
3.1.3	Existing Publications	5
3.1.4	Fauna of Conservation Significance.....	6
3.1.5	Taxonomy and Nomenclature	7
3.1.6	Likelihood of Occurrence – Fauna of Conservation Significance.....	7
3.2	SITE SURVEYS	8
3.2.1	Fauna Habitat Assessment	8
3.2.2	Black Cockatoo Habitat Assessment	8
3.2.2.1	Black Cockatoo Breeding Habitat.....	9
3.2.2.2	Black Cockatoo Foraging Habitat	10
3.2.2.3	Black Cockatoo Roosting Habitat	11
3.2.3	Western Ringtail Possum Assessment	11
3.2.4	Camera Traps	11
3.2.5	Other Fauna Species of Conservation Significance.....	11
3.2.6	Opportunistic Fauna Observations.....	11
4.	SURVEY CONSTRAINTS	12
5.	RESULTS	13
5.1	POTENTIAL FAUNA INVENTORY – LITERATURE REVIEW.....	13

5.2	SITE SURVEYS	13
5.2.1	Fauna Habitat Assessment	13
5.2.2	Black Cockatoo Habitat Assessment	15
5.2.2.1	Black Cockatoo Habitat Tree Assessment	15
5.2.2.2	Black Cockatoo Foraging Habitat Assessment.....	16
5.2.2.3	Black Cockatoo Roosting Habitat Assessment.....	17
5.2.3	Western Ringtail Possum Assessment	17
5.2.4	Camera Traps	18
5.2.5	Other Fauna Species of Conservation Significance.....	18
5.2.6	Opportunistic Fauna Observations.....	18
5.3	FAUNA INVENTORY – SUMMARY.....	18
6.	LIKELIHOOD OF OCCURRENCE AND POTENTIAL IMPACTS	20
7.	CONCLUSION	24
8.	REFERENCES	26

TABLES

TABLE 1:	Main Fauna Habitats within the Subject Site
TABLE 2:	Summary of Potential Black Cockatoo Breeding Habitat Trees (DBH \geq 50cm)
TABLE 3:	Summary of Potential Fauna Species (as listed in Appendix B)
TABLE 4:	Likelihood of Occurrence and Possible Impacts – Fauna Species of Conservation Significance

FIGURES

- FIGURE 1: Subject Site & Surrounds
- FIGURE 2: Subject Site - Air Photo
- FIGURE 3: Camera Trap Locations
- FIGURE 4: Habitat Trees (DBH \geq 50cm)

APPENDICES

- APPENDIX A: Conservation Categories
- APPENDIX B: Fauna Observed or Potentially in Subject Site
- APPENDIX C: DBCA NatureMap & Protected Matters Search Tool Results
- APPENDIX D: Habitat Tree Details
- APPENDIX E: Camera Trap Results

Acronyms/Abbreviations:

ALA: Atlas of Living Australia – Website - www.ala.org.au/

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

BC Bill: *Biodiversity Conservation Bill (2015)*. WA Government.

BoM: Bureau of Meteorology, Australian Government.

°C: Degrees Celsius.

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

CAMBA: China Australia Migratory Bird Agreement 1998.

CBD: Central Business District.

DAA: Department of Aboriginal Affairs, Western Australia.

DAFWA: Department of Agriculture and Food, Western Australia.

DBCA: Department of Biodiversity, Conservation and Attractions (formerly DPaW, DEC, CALM, DoE), WA Government

DBH: Diametre at breast height (~1.5m) of a tree.

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

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

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

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

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

DMP: Department of Mines and Petroleum (now DMIRS), WA Government.

DoE: Department of Environment (now DWER), WA Government.

DotE: Department of the Environment (now DotEE), Australian Government.

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

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

DMIRS: Department of Mines, Industry Regulation and Safety (formerly DMP, DoIR), WA Government.

DoW: Department of Water (now DWER), WA Government..

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

DWER: Department of Water and Environmental Regulation (formed by the amalgamation of OEPA, DoW and DER), 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.

GIS: Geographical Information System.

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.

kms: Kilometres.

MNES: Matters of National Environmental Significance.

MRWA: Main Roads Western Australia, WA Government

m: Metre.

mm: Millimetre.

P: Priority - DPaW fauna conservation ranking.

POS: Public Open Space.

RAOU: Royal Australia Ornithologist Union.

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

S: Schedule - Western Australian *Wildlife Conservation Act (1950)* Threatened Fauna Category.

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

SRE: Short Range Endemic.

SSC: Species Survival Commission, International.

WA: Western Australia.

WAM: Western Australian Museum, WA Government.

WRP: Western Ringtail Possum.

SUMMARY

This report details the results of a fauna assessment of an area of proposed clearing (CPS 8057/1) within Lots 4 and 5 Ludlow Road, Myalup (the subject site) (Figures 1 and 2). The proposed clearing is to allow for the expansion of existing limestone extraction operations. The proposed new limestone pit area is about 13.5 ha in size. The proposed clearing will require the removal of about 8.3 ha of native vegetation from within this area.

It is anticipated that the information presented here will be used by regulatory authorities to assess the potential impact of the proposal on fauna and fauna habitats at the site during the project evaluation and clearing permit approval process.

The scope of works was to conduct a Level 1 fauna survey as defined by the EPA (EPA 2016). In accordance with these guidelines the assessment has therefore included a literature review and a field reconnaissance survey. Because some listed threatened species (e.g. several species of black cockatoo and the western ringtail possum) are known to occur in the general area, the scope of the survey work was expanded to include a targeted assessment of the site's significance to these species as well.

Daytime field survey work at the site was carried out in two phases, the first on the 26 and 28 May and the 2 June 2018 the second on the 11 November 2019. A nocturnal survey of the subject site was carried out on the 28 May 2018. All field survey work was carried out by Greg Harewood (B.Sc. - Zoology).

The subject site is centred on a subtle ridge with thin grey sand over irregular outcropping limestone. Vegetated sections of the subject site are comprised of various combinations of limestone marlock (*Eucalyptus decipiens*), tuart (*Eucalyptus gomphocephala*), jarrah (*Eucalyptus marginata*) peppermint (*Agonis flexuosa*) with a very small number of candlestick banksia (*Banksia attenuata*) and WA Christmas tree (*Nuytsia floribunda*).

Native ground cover is generally absent though some small areas contain a relatively dense shrub cover. Limestone marlock (*Eucalyptus decipiens*) is the dominant tree species over much of the area. Tuart generally only occurs in the northern and southern sections of the subject site where soil cover is thicker and clearing has been more intensive. Jarrah is represented by only a few specimens at scattered locations in the southern third of the subject site. Peppermint also has a limited extent with only a few scattered specimens and some small groves in the south eastern corner of the subject site. *Nuytsia floribunda* occurs as scattered individuals and small groves in the northern and central section of the subject site. Only a few specimens of *Banksia attenuata* were observed with several dead or dying.

The assessment identified a total of 27 trees with a DBH of ≥ 50 cms within the proposed pit area. Twenty two of the trees (~81.5%) were not observed to contain hollows of any size. Five trees (~18.5%) contained one or more possible hollows considered by the Author not to be suitable for black cockatoos to use for nesting purposes.

No trees appeared to contain hollows with larger entrances (greater than ~10cm) that appeared big enough to possibly allow the entry of a black cockatoo into a suitably sized and orientated branch/trunk.

Thirty five habitat trees are present with 50m of the proposed bit area. None of these trees contain hollows considered suitable for black cockatoos to use for nesting purposes.

Overall the subject site cannot be regarded as representing quality black cockatoo foraging habitat. Tuarts and peppermint are only foraged upon rarely and the number of jarrah and *banksia* trees present is very small and would amount to far less than 1 ha in total. No existing roosting trees (trees used at night by black cockatoos to rest) were positively identified during the survey.

The overall habitat quality for black cockatoos within the subject site can therefore be regarded as being low. There are only a small number of habitat trees (DBH \geq 50cm) in or near the subject site and none contain hollows suitable for black cockatoos to use for nesting. The extent of foraging habitat is very small and dominated by plant species foraged upon only rarely, if at all (i.e. small fruited eucalypts). There were no roosting sites identified within or near the subject site.

Based on available vegetation mapping it is estimated that there is approximately 9,500 ha of native vegetation within 10 km the subject site, much of which is very likely to represent potential black cockatoo breeding, foraging and roosting habitat of some type. Remnant native vegetation present within the subject site (total ~8.3 ha) makes up ~0.087% of this total.

No evidence of western ringtail possums using the subject site was found during the day or night surveys i.e. no fresh dreys, no scats and no individuals. The generally poor quality of the habitat present (e.g. lack of favoured foraging species) and the results of the survey work suggest that they do not occur in the subject site.

With respect to native vertebrate fauna, 12 mammal (including nine bat species), 82 bird, 15 reptile and two frog species have previously been recorded in the wider area, some of which have the potential to occur in or utilise sections of the subject site at times. Eight species of introduced animals could also frequent the area.

Of the 111 native animals that are listed as occurring or potentially occurring in the area, five are considered to be endangered/vulnerable or in need of special protection under State and/or Federal law (i.e. Carnaby's black cockatoo, Baudin's black cockatoo, forest red-tailed black cockatoo, peregrine falcon and the south-western brush-tailed phascogale). In addition, one DBCA priority species (i.e. western false pipistrelle) may also be present or frequent the area at times.

The potential impacts on fauna species of conservation significance and/or their habitat will need to be taken into consideration during ongoing planning and construction phases of the proposed project.

If approval for the project is obtained it is recommended that a fauna relocation program be implemented prior to and during clearing works to ensure direct impact on fauna (e.g. common brushtail possum) most likely to be encountered, are minimised.

The results of this assessment should be provided to the relevant regulatory authorities for their consideration during the clearing permit assessment process.

1. INTRODUCTION

This report details the results of a fauna assessment of an area of proposed clearing (CPS 8057/1) within Lots 4 and 5 Ludlow Road, Myalup (the subject site) (Figures 1 and 2). The proposed clearing is to allow for the expansion of existing limestone extraction operations. The proposed new limestone pit area is about 13.5 ha in size. The proposed clearing will require the removal of about 8.3 ha of native vegetation from within this area.

Information obtained as part of this fauna assessment report will be used in conjunction with other environmental investigations to guide project planning and will also be used in the formulation of management plans, both of which will aim to minimise potential environmental impacts.

It is anticipated that the information presented here will also be used by regulatory authorities to assess the potential impact of the proposal on fauna and fauna habitats at the site, during the project evaluation and clearing permit approval process.

2. SCOPE OF WORKS

The scope of works was to conduct a Level 1 fauna survey as defined by the EPA (EPA 2016). Because the general area is known to be utilised by black cockatoos and western ringtail possums, the scope of the survey work was expanded to include a baseline assessment of the site's significance to these species as well. The fauna assessment has therefore included:

1. Level 1 fauna assessment (in accordance with EPA (2016) guidelines);
2. Targeted searches for black cockatoo habitat/site use (habitat trees, existing and potential nest hollows, foraging and roosting habitat);
3. Targeted day and night searches for western ringtail possum habitat/site use (foraging, refuge and dispersal habitat and individuals);
4. An assessment of the likelihood of occurrence of any other significant fauna species and their habitat; and
5. Report summarising results, methods and conclusions.

Note: For the purposes of this report the term black cockatoo is in reference to Baudin's black cockatoo *Calyptorhynchus baudinii*, Carnaby's black cockatoo *Calyptorhynchus latirostris* and the forest red-tailed black cockatoo *Calyptorhynchus banksii naso*.

3. METHODS

3.1 POTENTIAL FAUNA INVENTORY - LITERATURE REVIEW

3.1.1 Database Searches

Searches of the following databases were undertaken to aid in the compilation of a list of conservation significant fauna potentially occurring within the subject site:

- DBCA's NatureMap Database Search (combined data from DBCA, ALA, WAM, BA and consultant's reports) (DBCA 2018b); and
- Protected Matters Search Tool (DotEE 2018).

It should be noted that lists produced during the abovementioned database searches contain observations/inferred distributions from a broader area than the subject site and therefore may include species that would never occur/only ever occur as vagrants due to a lack of suitable habitat or the presence of only marginal habitat within the subject site itself. The databases also often include or are based on very old 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 also needs to be taken into consideration when determining what actual species may be present within the specific area being investigated.

3.1.2 Previous Fauna Surveys in the Area

Fauna surveys, assessments and reviews have been undertaken in nearby areas in the past, though not all are publicly available and could not be referenced. The most significant of those available have been used as the primary reference material for compiling a list of fauna species of conservation significance most likely to occur in the general area.

Those reports referred to included, but were not limited to:

- 360 Environmental Pty Ltd (2008). Southern Seawater Desalination Project 2007, Terrestrial Flora and Fauna Survey Report. Unpublished report for the Water Corporation.
- Alan Tingay and Associates (ATA) (1998). Vertebrate Fauna. Lake Clifton Land Exchange Proposal. Unpublished report for Bouvard Investment's Pty Ltd.
- ATA Environment (2005). Environmental Assessment, South Binningup V2, June 2005. Unpublished report.
- Bamford Consulting Ecologists (2003). Fauna Values of Cape Bouvard Investment's Pty Ltd Land, Yalgorup. Unpublished report for RPS.

- Bamford Consulting Ecologists (2008). Fauna Assessment of the Proposed South Binningup Development. Unpublished report for RPS Consulting/Mirvac.
- Bamford Consulting Ecologists (2010). Level 2 Fauna Assessment of Remnant Vegetation at the Proposed Point Grey Marina. Unpublished report for ATA Environmental.
- Bullen, R.D. (2009). Binningup Bat Survey 2009. Echolocation Survey of Bat Activity in the Lake Clifton and Lake Preston Localities on the Swan Coastal Plain. Prepared for Department of Environment and Conservation by Bat Call WA, Hillarys, Western Australia.
- Dell, J. and Hyder, B. (2009a). An Assessment of the Avifauna of the area between Dawesville and Binningup, Southern Swan Coastal Plain. Report prepared for Environmental Protection Authority, Perth.
- Dell, J. and Hyder, B. (2009b). Summary of the Fauna Values of the area between Dawesville and Binningup, Southern Swan Coastal Plain. Report prepared for Environmental Protection Authority, Perth.
- ENV Australia (ENV) (2009). Clifton Beach Fauna Assessment. Unpublished report for Cape Bouvard Investments Pty Ltd.
- Harewood, G. (2008). Western Ringtail Possum Assessment Survey – Proposed Limestone Extraction Area within Lot 4 Ludlow Road, Myalup. Unpublished report for MBS Environmental.
- Harewood, G. (2010). Fauna Survey (Level 2). Kemerton Industrial Core. Unpublished report for Cardno (WA) Pty Ltd.
- Harewood, G. (2015). Fauna Survey (Level 2). Dampier to Bunbury Natural Gas Pipeline Corridor Bristol Road (Waroona) to Clifton Road (Brunswick). Unpublished report for Aurora Environmental.
- How, R. A., Maryan, B. and Stevenson, C. A. (2009). An Assessment of Herpetofauna on Near-Coastal Landforms between Dawesville and Binningup, Southern Swan Coastal Plain. Prepared for Department of Environment and Conservation. Welshpool, Western Australia.
- Hyder, B. and Dell, J. (2009). An Assessment of the Non-volant Mammal Fauna of the area between Dawesville and Binningup, Southern Swan Coastal Plain. Report prepared for Environmental Protection Authority, Perth.
- Western Wildlife (2009). Lot 76 Binningup Road Binningup. Fauna Survey 2008. Unpublished report for Niche Consulting.

As with the databases searches, some reports refer to species that would not occur in the subject site 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. 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.

3.1.3 Existing Publications

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

- 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.
- Bush, B., Maryan, B., Browne-Cooper, R. & Robinson, D. (2007). Reptiles and Frogs in the Bush: Southwestern Australia. UWA Press, Nedlands.
- 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. Oxford University Press, Melbourne.
- 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., Gynther, I. & Baker, A. Eds (2013). Field Companion to The Mammals of Australia. Queensland Museum.
- 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.

3.1.4 Fauna of Conservation Significance

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 DoEE;
- *Wildlife Conservation Act 1950 (WC Act)*. Administered by the Western Australian DBCA (Govt. of WA 2019). Note: The Wildlife Conservation (Specially Protected Fauna) Notice 2018 has been transitioned under regulations 170, 171 and 172 of the Biodiversity Conservation Regulations 2018 to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *BC Act*;
- Red List produced by the 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
- DBCA Priority Fauna list. A non-statutory list maintained by the DBCA for management purposes (DBCA 2018a).

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 – Some but not all species listed under JAMBA are also protected under Schedule 5 of the *BC Act*.)

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

The conservation status of all vertebrate fauna species listed as occurring or possibly occurring in the vicinity of the subject site 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 is provided in Appendix A.

3.1.5 Taxonomy and Nomenclature

Taxonomy and nomenclature for vertebrate fauna species used in this report is generally taken from the DBCA's WA Fauna Census Database which is assumed to follow Aplin and Smith (2001) for amphibians and reptiles and Johnstone (2001) for birds. Jackson and Groves (2015) has been used for mammals.

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 (2017), Van Dyck & Strahan (2013), Christidis and Boles (2008), Bush *et al.* (2010), Bush *et al.* (2007), Tyler & Doughty (2009), and Glauret (1961). Not all common names are generally accepted.

3.1.6 Likelihood of Occurrence – Fauna of Conservation Significance

Fauna of conservation significance identified during the literature review as previously being recorded in the general area were assessed and ranked for their likelihood of occurrence within the subject site itself. The rankings and criteria used were:

- Would Not Occur: There is no suitable habitat for the species in the subject site and/or there is no documented record of the species in the general area since records have been kept and/or the species is generally accepted as being locally/regionally extinct (supported by a lack of recent records).
 - Locally Extinct: Populations no longer occur within a small part of the species natural range, in this case within 10 or 20 km of the subject site. 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 central/southern swan coastal plain region. Populations do however persist outside of this area.

- **Unlikely to Occur:** The subject site is outside of the currently documented distribution for the species in question, or no suitable habitat (type, quality and extent) was identified as being present during the field assessment. Individuals of some species may occur occasionally as vagrants/transients especially if suitable habitat is located nearby but the subject site itself would not support individuals or a population the species.
- **Possibly Occurs:** The subject site is within the known distribution of the species in question and habitat of at least marginal quality was identified as being present during the field assessment, supported in some cases by recent records being documented in literature from within or near the subject site. 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 subject 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, tracks and 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.

3.2 SITE SURVEYS

Daytime field survey work at the site was carried out in two phases, the first on the 26 and 28 May and the 2 June 2018 the second on the 11 November 2019. A nocturnal survey of the subject site was carried out on the 28 May 2018. All field survey work was carried out by Greg Harewood (B.Sc. - Zoology).

3.2.1 Fauna Habitat Assessment

The vegetation communities, landforms and soils observed during the fauna assessment have been used as the basis for a classification of areas into broad fauna habitat types.

As part of the literature review, available information on the habitat requirements of the species of conservation significance listed as possibly occurring in the area was researched. During the daytime reconnaissance survey, the habitats within the subject site were assessed and specific elements identified, if present, to determine the likelihood of listed species of conservation significance occurring and its likely overall value to them on a local and regional scale.

3.2.2 Black Cockatoo Habitat Assessment

The following methods were employed during the black cockatoo habitat assessment to comply with the defined scope of works and are based on guidelines published by the

DotEE (Commonwealth of Australia 2012) which states that surveys for Carnaby's, Baudin's and forest red-tailed black cockatoo habitat should:

- be done by a suitably qualified person with experience in vegetation or cockatoo surveys, depending on the type of survey being undertaken;
- maximise the chance of detecting the species' habitat and/or signs of use;
- determine the context of the site within the broader landscape—for example, the amount and quality of habitat nearby and in the local region (for example, within 10 km);
- account for uncertainty and error (false presence and absences); and
- include collation of existing data on known locations of breeding and feeding birds and night roost locations.

Habitat used by black cockatoos have been placed into three categories by the DotEE (Commonwealth of Australia 2012) these being:

- Breeding Habitat;
- Foraging Habitat; and
- Night Roosting Habitat.

So as to comply with the requested scope of works and in line with the published guidelines the following was carried out.

3.2.2.1 Black Cockatoo Breeding Habitat

The black cockatoo breeding habitat assessment involved the identification of all suitable breeding trees species (native, endemic species only) within the subject site (plus a 50m buffer) that had a DBH of equal to or over 50cm. The DBH of each tree was estimated using a pre-made 50 cm "caliper".

Target tree species included marri and jarrah or any other *Corymbia/Eucalyptus* species of a suitable size that may have been present. Peppermints, *banksia*, sheoak and *melaleuca* tree species (for example) were not assessed as they typically do not develop hollows that are used by black cockatoos.

The location of each tree identified as being over the threshold DBH was recorded with a GPS and details on tree species, number and size of hollows (if any) noted. Trees observed to contain hollows (of any size/type) were marked with "H" using spray paint for easy future reference.

Potential hollows were placed into one of four categories, based on the size of the apparent hollow entrance, these being:

- Small = ~<5cm diameter (i.e. entrance too small for a black cockatoo);
- Medium = ~5cm-10cm diameter (i.e. entrance too small for a black cockatoo);
- Large = ~>10cm diameter (entrance large enough for a black cockatoo but possible hollow appears to be unsuitable for nesting i.e. wrong orientation, too small, too low or too shallow); or
- Large (cockatoo) = ~>10cm diameter (entrance appears big enough to provide access to a possible hollow that may be suitable for a black cockatoo to use for nesting).

Based on this assessment, trees present within the subject site have been placed into one of four categories:

- Tree < 50cm DBH or an unsuitable species (not recorded);
- Tree \geq 50cm DBH, no hollows seen;
- Tree \geq 50cm DBH, one or more possible hollows seen, none of which were considered suitable for black cockatoos to use for nesting; or
- Tree \geq 50cm DBH, one or more possible hollows seen, with at least one considered potentially suitable for black cockatoos to use for nesting.

For the purposes of this assessment, a tree containing a potential cockatoo nest hollow was defined as:

Generally, any tree which is alive or dead that contains one or more visible hollows (cavities within the trunk or branches) or possible hollows considered potentially suitable for occupation by a black cockatoo for the purpose of nesting/breeding. Hollows that had an entrance greater than about 10cm in diameter and would allow the entry of a black cockatoo into a suitably orientated and sized branch/trunk were recorded as a "potential black cockatoo nest hollow".

Identified hollows were examined using binoculars for evidence of actual use by black cockatoos (e.g. chewing around hollow entrance, scarring and scratch marks on trunks and branches). Trees with possible nest hollows were also scratched and raked with a large stick/pole in an attempt to flush any sitting birds from hollows and calls of chicks were also listened for.

Where considered necessary and if possible hollows were examined using a pole mounted camera and/or a drone.

3.2.2.2 Black Cockatoo Foraging Habitat

The location and nature of black cockatoo foraging evidence (e.g. chewed fruits around base of trees) observed during the reconnaissance survey was recorded. The nature

and extent of potential foraging habitat present was also documented irrespective of the presence of any actual foraging evidence.

3.2.2.3 Black Cockatoo Roosting Habitat

Direct and indirect evidence of black cockatoos roosting in trees within the subject site was noted if observed (e.g. branch clippings, droppings or moulted feathers).

3.2.3 Western Ringtail Possum Assessment

To determine if western ringtail possums were utilising the subject site, the following was carried out:

- Concurrent with the daytime black cockatoo habitat assessment, dreys (and other potential daytime refuge habitat), scats and individual WRPs were searched for and recorded if observed; and
- One night time survey was carried out to locate and record the distribution and abundance of WRPs within the subject site. The nocturnal count involved the systematic searching of potential WRP habitats on foot using a head torch.

3.2.4 Camera Traps

Eight camera traps (infrared motion sensing cameras – Model: LTL Acorn 5210A) were set up within the subject site and left in place for seven nights. The camera trap locations are shown in Figure 3.

3.2.5 Other Fauna Species of Conservation Significance

Evidence of the presence or likely presence of other fauna species of conservation significance (or suitable habitat) was searched for and recorded concurrent with other site surveys. The aim was to obtain sufficient information to make a definitive comment on the likely significance of the subject site to other fauna species of conservation significance.

Methods involved searching microhabitats such as logs, rocks, leaf litter and observations with binoculars. Secondary evidence of a species presence such as tracks, scats, skeletal remains, foraging evidence or calls were also noted, if observed/heard.

3.2.6 Opportunistic Fauna Observations

Opportunistic observations of fauna species were made during all field survey work and recorded where positive species identifications were made.

4. SURVEY CONSTRAINTS

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. It should also be recognised that site conditions can change with time.

Some fauna species are reported as potentially occurring based on there being suitable habitat (quality and extent) within the subject site or immediately adjacent. With respect to opportunistic observations, the possibility exists that certain species may not have been detected during field investigations due to:

- seasonal inactivity during the field survey;
- species present within micro habitats not surveyed;
- cryptic species able to avoid detection; and
- transient wide-ranging species not present during the survey period.

Lack of observational data on some species should therefore not necessarily be taken as an indication that a species is absent from the site or does not utilise it for some purpose at times.

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 exclude species from the potential list based on an apparent lack of a specific habitat or microhabitat within the subject site. As a consequence of this limitation the potential fauna list produced is most likely an overestimation of those species that actually utilise the subject site for some purpose. Some species may be present in the general area but may only use the subject site itself on rare occasions or as vagrants/transients.

In recognition of survey limitations, a precautionary approach has been adopted for this assessment. Any fauna species that would possibly occur within the subject site (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 subject site.

During the black cockatoo habitat survey trees with hollows were searched for. It should be noted that identifying hollows suitable for fauna species from ground level has limitations. Generally, the full characteristics of any hollow seen are not fully evident (e.g. internal dimensions). It is also difficult to locate all hollows within all trees as some are not observable from ground level. As previously indicated some hollows were examined using a pole mounted camera and/or a drone where considered warranted.

5. RESULTS

5.1 POTENTIAL FAUNA INVENTORY – LITERATURE REVIEW

A list of fauna species considered most likely to occur in the subject site has been compiled from information obtained during the literature review and is presented in Appendix B. This list was refined after information gathered during the site reconnaissance survey was assessed. The results of some previous fauna surveys carried out in the general area are summarised in this list as are the DBCA NatureMap database search results (with species considered unlikely to occur being omitted). The raw database search results from NatureMap (DBCA 2018b) and the Protected Matters Search Tool (DotEE 2018) are contained within 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 habitat assessment, is present within the subject site, though compiling an accurate list has limitations (see Section 4 above) and therefore as discussed, the list is very likely to be an overestimation of the fauna species actually present onsite at any one time.

With respect to native vertebrate fauna, 12 mammal (including nine bat species), 82 bird, 15 reptile and two frog species have previously been recorded in the wider area, some of which have the potential to occur in or utilise sections of the subject site at times. Eight species of introduced animals could also frequent the area.

Of the 111 native animals that are listed as potentially occurring, five are considered to be endangered/vulnerable or in need of special protection under State and/or Federal law. In addition, one DBCA priority species is also listed as potential species. These particular species are discussed in further detail in the following sections of the report.

5.2 SITE SURVEYS

5.2.1 Fauna Habitat Assessment




Descriptions of the broadly defined fauna habitats, based primarily on vegetation units and landforms identified during the field reconnaissance survey are provided in Table 1. The extent of vegetation within the subject site is evident in the various figures.

The subject site is centred on a subtle ridge with thin grey sand over irregular outcropping limestone. Vegetated sections of the subject site are comprised of various combinations of limestone marlock (*Eucalyptus decipiens*), tuart (*Eucalyptus gomphocephala*), jarrah (*Eucalyptus marginata*) peppermint (*Agonis flexuosa*) with a very small number of candlestick banksia (*Banksia attenuata*) and WA Christmas tree (*Nuytsia floribunda*).

Native ground cover is generally absent though some small areas contain a relatively dense shrub cover. Limestone marlock (*Eucalyptus decipiens*) is the dominant tree species over much of the area. Tuart generally only occurs in the northern and southern

sections of the subject site where soil cover is thicker and clearing has been more intensive. Jarrah is represented by only a few specimens at scattered locations in the southern third of the subject site. Peppermint also has a limited extent with only a few scattered specimens and some small groves in the south eastern corner of the subject site. *Nuytsia floribunda* occurs as scattered individuals and small groves in the northern and central section of the subject site. Only a few specimens of *Banksia attenuata* were observed with several dead or dying.

Table 1: Main Fauna Habitats within the Subject site

Unit	Fauna Habitat Description	Example Images
1	Limestone marlock (<i>Eucalyptus decipiens</i>) over scattered shrubs and bare limestone covering the majority of the subject site.	
2	Scattered tuart (<i>E. gomphocephala</i>) over pasture grasses, dominant in small areas at the northern and southern ends of the subject site.	
3	Small grove of peppermint (<i>Agonis flexuosa</i>) and jarrah (<i>E. marginata</i>) in the south east corner of the subject site.	

The area appears to have been open to livestock grazing for many years and therefore is now in a degraded/highly degraded state. Because of this fact many of the fauna species that would have originally occurred in the area no longer persist. The Yalgorup National Park is located to the west (Lake Preston), east and north of the subject site and these areas are likely to harbour much more biodiversity and represents much better habitat for fauna species in general.

The subject site is surrounded by vegetation in a similar condition and does not represent a key “linkage” or “corridor” for wildlife movement and the relatively small amount of clearing likely to be required is not likely to create any significant barriers to fauna movement on a local or regional scale.

5.2.2 Black Cockatoo Habitat Assessment

5.2.2.1 Black Cockatoo Habitat Tree Assessment

Trees considered potentially suitable for black cockatoos to use as nesting habitat (subject to a suitable hollow being present and other factors) which were found within the subject site are comprised of the following species:

- Tuart (*Eucalyptus gomphocephala*),
- Jarrah (*Eucalyptus marginata*); and
- Limestone Marlock (*Eucalyptus decipiens*).

It should be noted that the likelihood of any one particular tree species developing hollows suitable for black cockatoos to use for breeding varies considerably. For example, available data suggests that jarrah (*Eucalyptus marginata*) rarely produces hollows large enough for black cockatoos. Kirkby (2009) reports that from a database of 109 confirmed black cockatoo nest trees throughout the jarrah forest only six were located in jarrah trees.

The vast majority of limestone marlock (*Eucalyptus decipiens*), specimens within the subject site also did not appear to have the characteristics suitable for the creation of hollows suitable for black cockatoos with most specimens being small and stunted (despite having a DBH of ≥ 50 cm) with no hollows whatsoever. This tree species is not documented in the literature as being used by black cockatoos for breeding.

A summary of the potential black cockatoo breeding trees (using DotEE criteria i.e. any suitable tree species with a DBH ≥ 50 cm (Commonwealth of Australia 2012)) observed within the subject site is provided in Table 2 and their location shown in Figure 4.

Table 2: Summary of potential cockatoo breeding habitat trees (DBH \geq 50cm)

Area	Total Number of Habitat Trees	Number of Trees with <u>No Hollows Observed</u>	Number of Trees with Hollows Considered <u>Unsuitable</u> for Nesting Black Cockatoos	Number of Trees with Hollows Considered <u>Possibly Suitable</u> for Nesting Black Cockatoos	Tree Species		
					Tuart	Limestone Marlock	Jarrah
Pit Area	27	22	5	0	8	15	4
50m Buffer	35	26	9	0	25	8	2
Total	62	48	14	0	33	23	6

The assessment identified a total of 27 trees with a DBH of \geq 50cms within the proposed pit area. Twenty two of the trees (~81.5%) were not observed to contain hollows of any size. Five trees (~18.5%) contained one or more possible hollows considered by the Author not to be suitable for black cockatoos to use for nesting purposes.

No trees appeared to contain hollows with larger entrances (greater than ~10cm) that appeared big enough to possibly allow the entry of a black cockatoo into a suitably sized and orientated branch/trunk.

Thirty five habitat trees are present with 50m of the proposed bit area. None of these trees contain hollows considered suitable for black cockatoos to use for nesting purposes.

Additional details on each habitat tree observed can be found in Appendix D.

Based on available vegetation mapping it is estimated that there is approximately 9,514 ha of native vegetation within 10 km the subject site. Remnant native vegetation present within the subject site (total ~8.3 ha) makes up ~0.087% of this total. It can be reasonably expected that these areas contain numerous “habitat trees” many of which are likely to provide breeding opportunities for black cockatoos.

5.2.2.2 Black Cockatoo Foraging Habitat Assessment

Following is a list of the main flora species recorded within the subject site during the fauna assessment that are known to be used as a direct food source (i.e. seeds or flowers) by one or more species of black cockatoo:

- Tuart (*Eucalyptus gomphocephala*) - seeds,
- Jarrah (*Eucalyptus marginata*) - seeds;

- Peppermint (*Agonis flexuosa*) – bark, grubs; and
- Candlestick Banksia (*Banksia attenuata*) - seeds.

Overall the subject site cannot be regarded as representing quality black cockatoo foraging habitat. Tuarts and peppermint are only foraged upon rarely and the number of jarrah and *banksia* trees present is very small and would amount to far less than 1 ha in total.

No foraging debris left by black cockatoos was observed within the subject site during the site surveys, though a small amount of evidence (chewed tuart fruits) was recorded just outside of the proposed pit area. This foraging evidence was attributed to the forest red-tailed black cockatoo two individuals of which were observed feeding within the tree.

Based on available vegetation mapping it is estimated that there is approximately 9,514 ha of native vegetation within 10 km the subject site. Remnant native vegetation present within the subject site (total ~8.3 ha) makes up ~0.087% of this total. There are also over 3,000 ha of pine plantations with 10km of the site. Pine cones provide an important food source for Carnaby's black cockatoo and to a lesser extent Baudin's black cockatoo.

5.2.2.3 Black Cockatoo Roosting Habitat Assessment

No evidence of black cockatoo roosting within trees located within the subject site was observed during the field reconnaissance survey.

A review of the 2017 Great Cocky Count database shows no documented roost sites within or near the subject site. The closest recorded roost is about 6 km south east of the subject site, but no birds have been recorded at this location (during the great cocky count) since 2011.

Based on available vegetation mapping it is estimated that there is approximately 9,514 ha of native vegetation within 10 km the subject site. Remnant native vegetation present within the subject site (total ~8.3 ha) makes up ~0.087% of this total. There are also over 3,000 ha of pine plantations with 10km of the site. It can be reasonably expected that these areas contain many roosting options for black cockatoos.

5.2.3 Western Ringtail Possum Assessment

No evidence of western ringtail possums using the subject site was found during the day or night surveys i.e. no fresh dreys, no scats and no individuals. The generally poor quality of the habitat present (e.g. lack of favoured foraging species) and the results of the survey work suggest that they do not occur in the subject site.

5.2.4 Camera Traps

The complete results of the camera trapping carried out are provided within Appendix E. In total, six fauna species (native and introduced) were recorded. The western grey kangaroo (*Macropus fuliginosus*) was the most commonly recorded species, with the common brushtail possum (*Trichosurus vulpecula*), Australian magpie (*Cracticus tibicen*) and Australia raven (*Corvus coronoides*) also being photographed.

Feral species recorded included the red fox (*Vulpes vulpes*) and the rabbit (*Oryctolagus cuniculus*) at one location.

5.2.5 Other Fauna Species of Conservation Significance

No fauna species of conservation significance were confirmed as being present or using the site during the various site surveys. The habitat assessment and other observations made during the field reconnaissance survey does however suggest that some fauna species of conservation significance are likely to persist in the general area. Subject to suitable habitat being present (i.e. quality and extent) it is considered possible that some are also likely to reside or at least frequent the subject site at times. The total size of the subject site is however relatively small and therefore any fauna species actually present are only likely to be represented by a small number of individuals at any one time. A summary of those species considered likely to be present is provided in Table 4 within Section 7 and in Appendix B.

5.2.6 Opportunistic Fauna Observations

Opportunistic fauna observations are listed in Appendix B. Including those species recorded on camera traps and during the nocturnal survey, a total of 21 native fauna species were observed (or positively identified from foraging evidence, scats, tracks, skeletons or calls) within or very near the subject site during the survey period. Three introduced species (laughing kookaburra, red fox, and rabbit) were also recorded.

Most of the fauna species recorded were common, widespread bird species.

5.3 FAUNA INVENTORY – SUMMARY

Table 3 summarises the number of fauna species potentially occurring within or utilising at times, the subject site, based on results from the literature review and observations made during the field assessment. A complete list of fauna possibly inhabiting or frequenting the subject site is located in Appendix B.

As previously indicated, not all species listed as potentially occurring within the wider area in existing databases and publications (i.e. *EPBC Act* threatened fauna and migratory species lists, DBCA's NatureMap database, various reports and publications) are shown in the expected listing in Appendix B. Some species have been excluded from this list based largely on the lack of suitable habitat at the subject site and in the general area or known local extinction even if suitable habitat is present.

Despite the omission of some species it should be noted that the list provided is still very likely 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. At any one time, only a subset of the listed potential species is likely to be present within the bounds of the subject site.

Table 3: Summary of Potential Fauna Species (as listed in Appendix B)

Group	Total number of <u>Potential</u> 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 <u>Observed:</u> Field Survey 2018/2019
Amphibians	2	0	0	0	0
Reptiles	15	0	0	0	0
Birds	83 ¹	4	0	0	20 ¹
Non-Volant Mammals	10 ⁷	1	0	0	4 ²
Volant Mammals (Bats)	9	0	0	1	0
Total	119⁸	5	0	1	24³

Superscript = number of introduced species included in total.

A number of other species of conservation significance, while possibly present in the general area, are not listed as potential species due to known localised extinction (and no subsequent recruitment from adjoining areas) and/or lack of suitable habitat and/or the presence of feral predators.

6. LIKELIHOOD OF OCCURRENCE AND POTENTIAL IMPACTS

Fauna of conservation significance identified during the literature review as previously being recorded in the general area are listed in Table 4. Each has been assessed and ranked for their likelihood of occurrence within the subject site itself based on information obtained during the fauna assessment.

The potential direct and indirect impact on fauna that may occur as a consequence of clearing and then ongoing use of the area will be dependent on each fauna species' habits, population density and the quantity and quality of potential habitat that will be affected.

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;
- 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, foxes);
- Death or injury of fauna during clearing and construction; and
- An increase in fauna road kills subsequent to development.

In this instance impacts are most likely to be related to the loss of habitat and the potential for some species to be killed or injured during clearing. Based on the anticipated extent of clearing and the habitats present, likely impacts on species of conservation significance previously recorded in the general area has been assessed, a summary of which is provided in Table 4.

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

Species	Conservation Status		Habitat Preferences	Habitat Present	Likelihood of Occurrence	Possible Impacts
	WC Act/ DBCA Priority	EPBC Act				
Graceful Sunmoth <i>Synemon gratiosa</i>	P4	-	Areas of herbland, heathland and shrubland containing <i>Lomandra maritima</i> or <i>Banksia woodland/woolly bush Lomandra hermaphrodita</i> .	No/Very Marginal	Unlikely to Occur.	No impact anticipated.
Carter's Freshwater Mussel <i>Westralunio carteri</i>	S3	-	Occurs in greatest abundance in slower flowing streams with stable sediments that are soft enough for burrowing amongst woody debris and exposed tree roots.	No	Would Not Occur.	No impact.
Black-stripe Minnow <i>Galaxiella nigrostriata</i>	S2	-	Permanent or ephemeral pools, roadside ditches and small creeks in sandy, thickly vegetated wetland areas. Water is usually darkly tannin stained and acidic (pH 4.6 – 6.5)	No	Would Not Occur.	No impact.
Pouched Lamprey <i>Geotria australis</i>	P1	-	This species lives in mud burrows in the upper reaches of coastal streams for the first four years of life until migrating to the sea. Adults migrate up to 60km upstream during spawning.	No	Would Not Occur.	No impact.
Perth Lined Lerista <i>Lerista lineata</i>	P3	-	This small species of skink inhabits white sands under areas of shrubs and heath where it inhabits loose soil and leaf litter particularly in association with banksias.	No/Very Marginal	Unlikely to Occur.	No impact anticipated.
Coastal Plains Skink <i>Ctenotus ora</i>	P3	-	Sandy substrates with low vegetation (including heath) in open <i>Eucalyptus/Corymbia</i> woodland over <i>Banksia</i> .	No/Very Marginal	Unlikely to Occur.	No impact anticipated.
Malleefowl <i>Leipoa ocellata</i>	S3	VU	Mainly scrubs and thickets of mallee <i>Eucalyptus</i> spp., boree <i>Melaleuca lanceolata</i> and bowgada <i>Acacia linophylla</i> , also dense litter forming shrublands	No	Would Not Occur	No impact.
Blue-billed Duck <i>Oxyura australis</i>	P4	-	Well vegetated freshwater swamps, large dams and lakes, winters on more open water. Occasionally salt lakes and estuaries freshened by floodwaters.	No	Would Not Occur.	No impact.
Glossy Ibis <i>Plegadis falcinellus</i>	S5	Mig	Well vegetated wetlands, wet pastures, rice fields, floodwaters, floodplains, brackish or occasionally saline wetlands, mangroves, mudflats, occasionally dry grasslands.	No	Would Not Occur.	No impact.

Species	Conservation Status		Habitat Preferences	Habitat Present	Likelihood of Occurrence	Possible Impacts
	WC Act/ DBCA Priority	EPBC Act				
Painted Snipe <i>Rostratula benghalensis</i>	S2	EN, Mig	Well vegetated shallows and margins of wetlands, dams, sewerage ponds, wet pastures, marshy areas, irrigation systems, lignum, tea tree scrub, open timber. Requires dense low cover.	No	Would Not Occur	No impact.
Hooded Plover <i>Charadrius rubricollis</i>	P4	-	Broad sandy ocean beaches and bays, coastal and inland salt lakes	No	Would Not Occur	No impact.
Migratory Shorebirds/Wetland Species/Marine Species (various reptiles, birds and mammals)	S5, Various	Ma, Mig, Various	Varies between species but includes open ocean, beaches and permanent/temporary wetlands varying from billabongs, swamps, lakes, floodplains, sewerage farms, saltwork ponds, estuaries, lagoons, mudflats sandbars, pastures, airfields, sports fields and lawns.	No	Would Not Occur.	No impact.
Eastern Osprey <i>Pandion haliaetus</i>	S5	Ma, Mig	Coasts, estuaries, bays, inlets, islands, and surrounding waters, coral atolls, reefs, lagoons, rock cliffs and stacks. Ascends larger rivers.	No	Would Not Occur.	No impact.
Peregrine Falcon <i>Falco peregrinus</i>	S7	-	Diverse from rainforest to arid shrublands, from coastal heath to alpine Mainly about cliffs along coasts, rivers and ranges and about wooded watercourses and lakes.	Yes	Possibly Occurs but only rarely.	Loss/modification of a small area of habitat.
Australasian Bittern <i>Botaurus poiciloptilus</i>	S1	EN	Freshwater wetlands, occasionally estuarine; prefers heavy vegetation such as beds of tall dense <i>Typha</i> , <i>Baumea</i> and sedges in freshwater swamps.	No	Would Not Occur.	No impact.
Painted Snipe <i>Rostratula benghalensis</i>	S2/S5	Mig	Well vegetated shallows and margins of wetlands, dams, sewerage ponds, wet pastures, marshy areas, irrigation systems, lignum, tea tree scrub, open timber. Requires dense low cover.	No	Would Not Occur.	No impact.
Carnaby's Black Cockatoo <i>Calyptorhynchus latirostris</i>	S2	EN	Forests, woodlands, heathlands, farms; feeds on <i>Banksia</i> , <i>Hakea</i> and Marri.	Yes	Possibly Occurs.	Loss/modification of a small area of marginal habitat.
Baudin's Black Cockatoo <i>Calyptorhynchus baudinii</i>	S2	EN	Mainly eucalypt forests where it feeds primarily on the marri seeds.	Yes	Possibly Occurs.	Loss/modification of a small area of marginal habitat
Forest Red-tailed Black Cockatoo <i>Calyptorhynchus banksii naso</i>	S3	VU	Eucalypt forests, feeds on marri, jarrah, blackbutt, karri, sheoak and snottygobble.	Yes	Known to Occur	Loss/modification of a small area of marginal habitat

Species	Conservation Status		Habitat Preferences	Habitat Present	Likelihood of Occurrence	Possible Impacts
	WC Act/ DBCA Priority	EPBC Act				
Fork-tailed Swift <i>Apus pacificus</i>	S5	Ma, Mig	Low to very high airspace over varied habitat from rainforest to semi desert.	Yes	Unlikely to Occur, Flyover only on very rare occasions.	No impact.
Grey Wagtail <i>Motacilla cinerea</i>	S5	Mig, Ma	In Australia, near running water in disused quarries, sandy, rocky streams in escarpments and rainforest, sewerage ponds, ploughed fields and airfields.	No	Would Not Occur.	No impact.
Chuditch <i>Dasyurus geoffroii</i>	S3	VU	Forest, mallee shrublands, woodland and desert. The densest populations have been found in riparian jarrah forest.	No	Unlikely to Occur – Locally extinct.	No impact anticipated.
South-western Brush-tailed Phascogale <i>Phascogale tapoatafa wambenger</i>	S6	-	Dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover.	Yes/Marginal	Possibly Occurs.	Loss/modification of a small area of habitat. Death/injury of individuals during clearing.
Quenda <i>Isoodon fusciventer</i>	P4	-	Dense scrubby, often swampy, vegetation with dense cover.	No	Would Not Occur.	No impact.
Western Ringtail Possum <i>Pseudocheirus occidentalis</i>	S1	CR	Coastal peppermint, coastal peppermint-tuart, jarrah-marri associations, sheoak woodland, and eucalypt woodland and mallee.	Yes/Very Marginal	Unlikely to Occur.	No impact anticipated.
Quokka <i>Setonix brachyurus</i>	S3	VU	Currently restricted to densely vegetated coastal heaths, swamps, riverine habitats including tea-tree thickets on sandy soils along creek systems.	No	Would Not Occur.	No impact.
Western Brush Wallaby <i>Macropus irma</i>	P4	-	Open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets.	Yes	Unlikely to Occur.	No impact anticipated.
Western False Pipistrelle <i>Falsistrellus mackenziei</i>	P4	-	Wet sclerophyll forest dominated by karri and in high rainfall zones of the jarrah and marri forest.	Yes	Possibly Occurs.	Loss/modification of a small area of habitat. Death/injury of individuals during clearing.

See Appendix A for conservation status codes

7. CONCLUSION

The fauna assessment within the subject site was undertaken for the purposes of delineating and characterising the fauna habitats and faunal assemblages present and to identify potential impacts of the proposed works. Targeted black cockatoo and western ringtail possum assessments were also carried out.

The black cockatoo habitat tree assessment identified two trees which appeared to contain hollows with larger entrances (greater than ~10cm) that would possibly be big enough to allow the entry of a black cockatoo into a suitably sized and orientated branch/trunk. Both these hollows showed signs of use in the form of chew and rub marks around the hollow entrances though it was unclear if these were caused by black cockatoos or galahs.

Overall the subject site cannot be regarded as representing quality black cockatoo foraging habitat. Tuarts and peppermint are only foraged upon rarely and the number of jarrah and *banksia* trees present is very small and would amount to far less than 1 ha in total. No existing roosting trees (trees used at night by black cockatoos to rest) were positively identified during the survey.

No evidence of western ringtail possums using the subject site was found during the day or night surveys i.e. no fresh dreys, no scats and no individuals. The generally poor quality of the habitat present (e.g. lack of favoured foraging species) and the results of the survey work suggest that they do not occur in the subject site.

With respect to native vertebrate fauna, 12 mammal (including nine bat species), 82 bird, 15 reptile and two frog species have previously been recorded in the wider area, some of which have the potential to occur in or utilise sections of the subject site at times. Eight species of introduced animals could also frequent the area.

Of the 111 native animals that are listed as occurring or potentially occurring in the area, five are considered to be endangered/vulnerable or in need of special protection under State and/or Federal law (i.e. Carnaby's black cockatoo, Baudin's black cockatoo, forest red-tailed black cockatoo, peregrine falcon and the south-western brush-tailed phascogale). In addition, one DBCA priority species (i.e. western false pipistrelle) may also be present or frequent the area at times.

The potential impacts on fauna species of conservation significance and/or their habitat will need to be taken into consideration during ongoing planning and construction phases of the proposed project.

Given the presence of two potential cockatoo nest hollows it is recommended that either further investigation be carried out to determine if the hollows in question are or have the potential to be used by black cockatoos in the future or that consideration be given to remove them from the proposed pit area. The two trees are located near the boundary

of the currently proposed pit and therefore only a minor adjustment would appear to be needed. The location of these trees is shown in Figure 4 (as red dots).

If approval for the project is obtained it is recommended that a fauna relocation program be implemented prior to and during clearing works to ensure direct impact on fauna (e.g. common brushtail possum) most likely to be encountered, are minimised.

The results of this assessment should be provided to the relevant regulatory authorities for their consideration during the clearing permit assessment process.

8. REFERENCES

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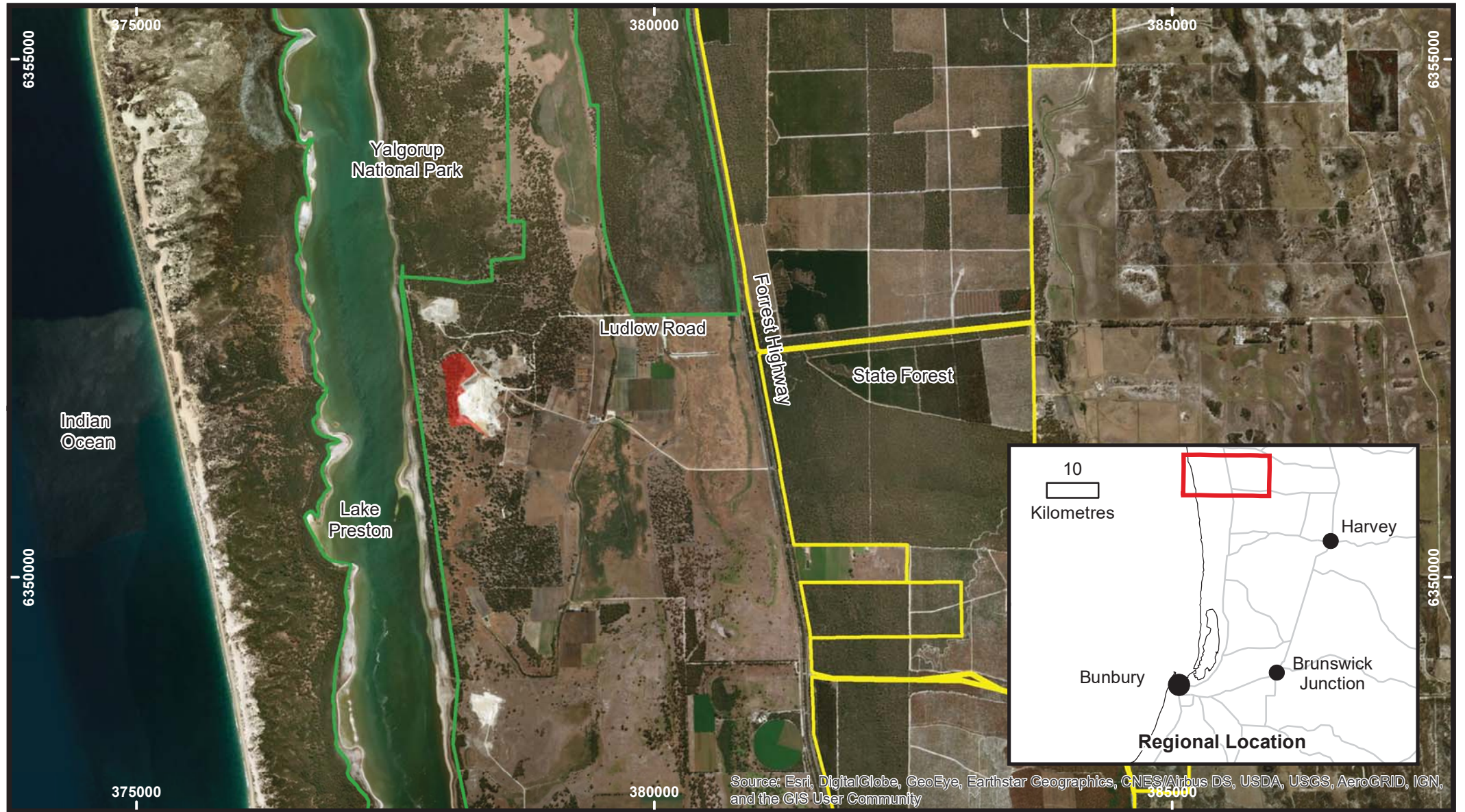
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FIGURES



Legend

- Subject Site
- National Park
- State Forest





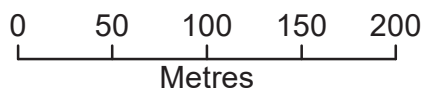
Fauna Assessment
 Drawn: G Harewood
 Date: Nov 2019
 Scale: 1:50,000

**Lot 4 & 5 Ludlow Road
 Myalup**
**Subject Site
 &
 Surrounds**



Legend

-  Proposed Extraction Area
-  Clearing Permit Boundary







Fauna Survey
 Drawn: G Harewood
 Date: Nov 2019
 Scale: 1:4,000
 Projection/Coordinate System: UTM/MGA Zone 50

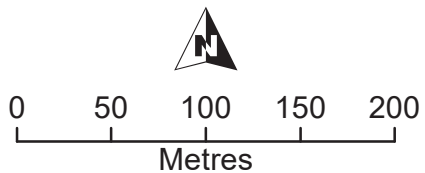
Lot 4 & 5 Ludlow Road
 Myalup

**Subject Site
 Air Photo**



Legend

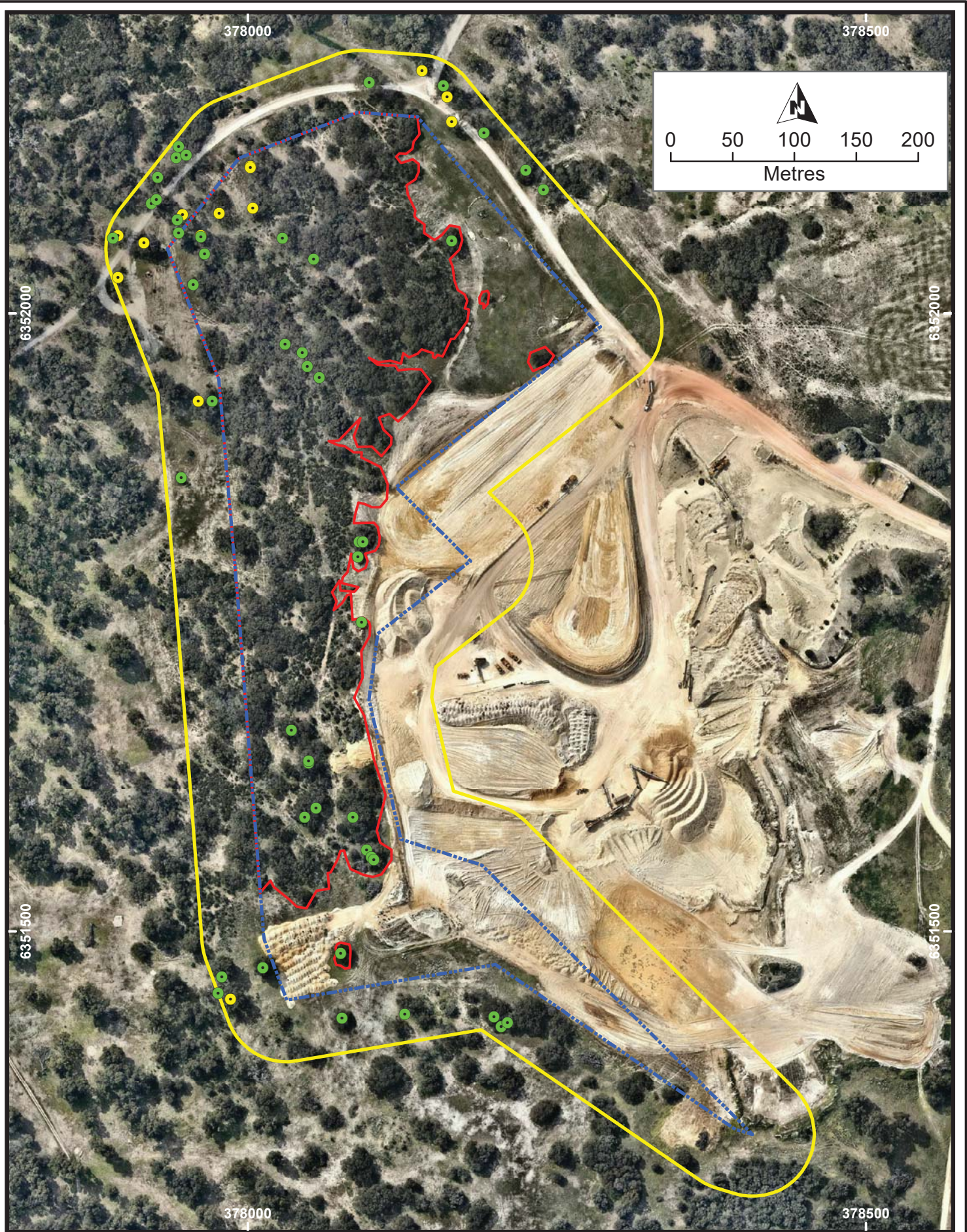
-  Proposed Extraction Area
-  Clearing Permit Boundary
-  Camera Traps







Fauna Survey
 Drawn: G Harewood
 Date: June 2018
 Scale: 1:4,000
 Projection/Coordinate System: UTM/MGA Zone 50



Lot 4 & 5 Ludlow Road
Myalup

Camera Trap Locations



Legend

-  Proposed Extraction Area
-  Clearing Permit Boundary
-  50m Buffer

-  Habitat Tree - One or more possible small/medium hollows. **None suitable for black cockatoos.**
-  Habitat Tree - No hollows seen



Drawn: G Harewood
Date: Nov 2019
Scale: 1:4,000

Lot 4 & 5 Ludlow Road
Myalup

Habitat Trees (DBH >50cm)

Projection/Coordinate System: UTM/MGA Zone 50

Figure: 4

APPENDIX A

CONSERVATION CATEGORIES

EPBC Act (1999) Threatened Fauna Categories

Threatened fauna may be listed under Section 178 of the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* in any one of the following 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 <i>EPBC Act</i>

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

Wildlife Conservation (Specially Protected Fauna) Notice 2017 Categories

Published as Specially Protected under the *Wildlife Conservation Act 1950*, and listed under Schedules 1 to 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.

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

Category	Code	Description
Schedule 1 Critically Endangered species	CR	Threatened species considered to be facing an extremely high risk of extinction in the wild.
Schedule 2 Endangered species	EN	Threatened species considered to be facing a very high risk of extinction in the wild.
Schedule 3 Vulnerable species	VU	Threatened species considered to be facing a high risk of extinction in the wild.
Schedule 4 Presumed extinct species	EX	Species which have been adequately searched for and there is no reasonable doubt that the last individual has died.
Schedule 5 Migratory birds protected under an international agreement	IA	Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds.
Schedule 6 Fauna that is of special conservation need as conservation dependent fauna	CD	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
Schedule 7 Other specially protected fauna.	OS	Fauna otherwise in need of special protection to ensure their conservation.

Western Australian DBCA Priority Fauna Categories

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

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

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

Category	Code	Description
Priority 1 Poorly Known Species.	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 Poorly Known Species.	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 Poorly Known Species.	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 Rare, Near Threatened and other species in need of monitoring.	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 are close to qualifying for Vulnerable, but are not listed as Conservation Dependent.</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>

*Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

IUCN Red List Threatened Species Categories

The *IUCN Red List of Threatened Species*[™] is a checklist of taxa that have undergone an extinction risk assessment using the *IUCN Red List Categories and Criteria*.

Categories are summarized below.

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

FAUNA OBSERVED OR POTENTIALLY IN SUBJECT SITE

Observed and Potential Fauna Listing

Lot 4 and 5 Ludlow Road Myalup, W.A.

Approximate centroid = 32.96646° and 115.69491°

Compiled by Greg Harewood - November 2019

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

A = Harewood, G. (2019). Fauna Assessment CPS 8057/1 Lot 4 5 Ludlow Road Myalup. Unpublished report for B J Catalano.

B = Harewood, G. (2015). Fauna Survey (Level 2) Dampier to Bunbury Natural Gas Pipeline Corridor. Bristol Road to Clifton Road. Unpublished report for Aurora Environmental.

C = Harewood, G. (2010). Kemerton Industrial Core - Fauna Survey. Unpublished report for Landcorp.

D = 360 Environmental Pty Ltd (2008). Southern Seawater Desalination Project 2007, Terrestrial Flora and Fauna Survey Report. Unpublished report for the Water Corporation.

E = Bamford Consulting Ecologists (2008). Fauna Assessment of the Proposed South Binningup Development. Unpublished report for RPS Consulting/Mirvac.

F = ENV (2009). Clifton Beach Fauna Assessment. Unpublished report for Cape Bouvard Investments Pty Ltd.

G = Bamford Consulting Ecologists (2003). Fauna Values of Cape Bouvard Investment's Pty Ltd Land, Yalgorup. Unpublished report for RPS.

H = ATA (1998). Vertebrate Fauna. Lake Clifton Land Exchange Proposal. Unpublished report for Bouvard Investment's Pty Ltd.

I = Bamford Consulting Ecologists (2010). Level 2 Fauna Assessment of Remnant Vegetation at the Proposed Point Grey Marina. Unpublished report for RPS.

J = Western Wildlife (2009). Lot 76 Binningup Rd, Binningup: Fauna Survey 2008. Unpublished report for Niche Consulting.

K = DBCA (2018). NatureMap Database search. "By Circle" – Centre - 115° 41' 42" E, 32° 57' 59" S; Accessed 03/06/2018.

Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J	K
Amphibia													
Myobatrachidae													
Ground or Burrowing Frogs													
<i>Heleioporus eyrei</i>	Moaning Frog	LC		X	X	X	X	X		X	X	X	X
<i>Limnodynastes dorsalis</i>	Western Banjo Frog	LC		X	X	X	X	X		X	X	X	X
Reptilia													
Gekkonidae													
Geckoes													
<i>Christinus marmoratus</i>	Marbled Gecko			X	X	X	X	X	X	X	X	X	X

BC Act Status - S1 to S7, EPBC Act Status - CR = Critically Endangered, EN = Endangered, VU = Vulnerable, EX = Extinct, DPCA Priority Status - P1 to P4, 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	H	I	J	K
Varanidae													
Monitor's or Goanna's													
<i>Varanus gouldii</i>	Sand Monitor			X	X	X							X
<i>Varanus rosenbergi</i>	Heath Monitor			X	X			X					X
Scincidae													
Skinks													
<i>Acritoscincus trilineatum</i>	Southwestern Cool Skink			X	X			X		X	X	X	
<i>Cryptoblepharus buchananii</i>	Buchanan's Snake-eyed Skink			X	X			X	X		X	X	X
<i>Egernia kingii</i>	King's Skink					X							X
<i>Egernia napoleonis</i>	Salmon-bellied Skink			X	X			X	X	X			X
<i>Hemiergis quadrilineata</i>	Two-toed Mulch Skink			X	X	X	X	X	X	X	X	X	X
<i>Lerista elegans</i>	West Coast Four-toed Lerista			X	X	X	X	X	X		X	X	X
<i>Menetia greyii</i>	Dwarf Skink			X	X	X	X	X	X	X	X	X	X
<i>Morethia lineocellata</i>	West Coast Pale-flecked Morethia			X	X	X	X	X	X		X	X	X
<i>Tiliqua rugosa</i>	Bobtail			X	X	X	X	X	X		X	X	X
Typhlopidae													
Blind Snakes													
<i>Anilius australis</i>	Southern Blind Snake				X	X		X		X	X	X	

BC Act Status - S1 to S7, EPBC Act Status - CR = Critically Endangered, EN = Endangered, VU = Vulnerable, EX = Extinct, DPCA Priority Status - P1 to P4, 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	H	I	J	K
Elapidae Elapid Snakes													
<i>Notechis scutatus</i>	Tiger Snake			X	X	X			X				X
<i>Pseudonaja affinis</i>	Dugite			X	X	X		X	X	X	X		X
Aves													
Casuariidae Emus, Cassowaries													
<i>Dromaius novaehollandiae</i>	Emu	Bp LC		X	X			X	X	X	X		X
Phasianidae Quails, Pheasants													
<i>Coturnix pectoralis</i>	Stubble Quail	LC											X
Anatidae Geese, Swans, Ducks													
<i>Anas gracilis</i>	Grey Teal	LC		X		X	X	X			X		X
<i>Anas superciliosa</i>	Pacific Black Duck	LC		X		X	X	X		X	X		X
<i>Chenonetta jubata</i>	Australian Wood Duck	LC		X	X		X					X	X
<i>Tadorna tadornoides</i>	Australian Shelduck	LC	X			X	X	X	X	X	X	X	X
Threskiornithidae Ibises, Spoonbills													
<i>Threskiornis molucca</i>	Australian White Ibis	LC		X	X						X		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	LC		X	X		X				X		X

BC Act Status - S1 to S7, EPBC Act Status - CR = Critically Endangered, EN = Endangered, VU = Vulnerable, EX = Extinct, DPCA Priority Status - P1 to P4, 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	H	I	J	K
Accipitridae													
Kites, Goshawks, Eagles, Harriers													
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk	Bp LC						X	X	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		X	X		X		X
<i>Aquila morphnoides</i>	Little Eagle	Bp LC					X			X	X	X	
<i>Circus approximans</i>	Swamp Harrier	LC			X			X			X		X
<i>Elanus caeruleus</i>	Black-shouldered Kite	LC			X		X				X		X
<i>Haliastur sphenurus</i>	Whistling Kite	Bp LC		X	X			X	X		X		X
<i>Hamirostra isura</i>	Square-tailed Kite	Bp LC			X		X					X	X
Falconidae													
Falcons													
<i>Falco berigora</i>	Brown Falcon	Bp LC					X	X	X	X			X
<i>Falco cenchroides</i>	Australian Kestrel	LC		X	X	X	X	X	X	X	X		X
<i>Falco longipennis</i>	Australian Hobby	LC								X	X		X
<i>Falco peregrinus</i>	Peregrine Falcon	S7 Bp LC				X							X
Columbidae													
Pigeons, Doves													
<i>Ocyphaps lophotes</i>	Crested Pigeon	LC		X	X		X					X	X
<i>Phaps chalcoptera</i>	Common Bronzewing	Bh LC		X	X	X	X	X	X	X	X	X	X

BC Act Status - S1 to S7, EPBC Act Status - CR = Critically Endangered, EN = Endangered, VU = Vulnerable, EX = Extinct, DPCA Priority Status - P1 to P4, 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	H	I	J	K
Psittacidae													
Parrots													
<i>Cacatua roseicapilla</i>	Galah	LC	X	X	X	X	X		X	X	X	X	X
<i>Cacatua sanguinea</i>	Little Corella	LC			X						X	X	
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black-Cockatoo	S3 VU Be	X	X	X						X	X	X
<i>Calyptorhynchus baudinii</i>	Baudin's Black-Cockatoo	S2 EN Bp EN A3cde			X			X		X			X
<i>Calyptorhynchus latirostris</i>	Carnaby's Black-Cockatoo	S2 EN Bp EN A2bcde		X	X	X	X	X	X	X	X		X
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet	LC					X	X				X	
<i>Neophema elegans</i>	Elegant Parrot	LC		X	X	X		X			X		X
<i>Platycercus icterotis icterotis</i>	Western Rosella (western ssp)	Bp LC											X
<i>Platycercus spurius</i>	Red-capped Parrot	LC		X	X		X	X	X	X	X	X	X
<i>Platycercus zonarius</i>	Australian Ringneck	LC	X	X	X	X	X	X	X	X	X	X	X
<i>Polytelis anthopeplus</i>	Regent Parrot	LC		X	X		X	X	X		X		X
Cuculidae													
Parasitic Cuckoos													
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	LC						X		X		X	X
<i>Chrysococcyx basalis</i>	Horsfield's Bronze Cuckoo	LC						X					X
<i>Chrysococcyx lucidus</i>	Shining Bronze Cuckoo	LC		X	X	X		X	X		X	X	X
<i>Cuculus pallidus</i>	Pallid Cuckoo	LC						X	X				

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J	K
Strigidae Hawk Owls													
<i>Ninox novaeseelandiae</i>	Boobook Owl	LC		X	X	X	X	X	X			X	
Tytonidae Barn Owls													
<i>Tyto alba</i>	Barn Owl	LC							X				X
Podargidae Frogmouths													
<i>Podargus strigoides</i>	Tawny Frogmouth	LC			X				X			X	X
Aegothelidae Owlet-nightjars													
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar	LC						X					X
Halcyonidae Tree Kingfishers													
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Introduced	X	X	X		X	X	X	X	X	X	X
<i>Todiramphus sanctus</i>	Sacred Kingfisher	LC		X	X			X			X	X	X
Meropidae Bee-eaters													
<i>Merops ornatus</i>	Rainbow Bee-eater	JA LC		X	X	X		X	X		X	X	X
Maluridae Fairy Wrens, GrassWrens													
<i>Malurus splendens</i>	Splendid Fairy-wren	Bh LC	X	X	X	X	X	X	X	X	X	X	X

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J	K
Acanthizidae													
Thornbills, Geryones, Fieldwrens & Whitefaces													
<i>Acanthiza apicalis</i>	Broad-tailed Thornbill	Bh LC		X	X	X	X	X	X	X	X	X	X
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Bh LC	X	X	X			X	X		X	X	X
<i>Acanthiza inornata</i>	Western Thornbill	Bh LC									X		X
<i>Gerygone fusca</i>	Western Gerygone	LC	X	X	X	X	X	X	X		X	X	X
<i>Sericornis frontalis</i>	White-browed Scrubwren	Bh LC		X	X	X	X	X	X	X	X	X	X
<i>Smicrornis brevirostris</i>	Weebill	Bh LC	X	X	X	X	X	X	X	X	X	X	X
Pardalotidae													
Pardalotes													
<i>Pardalotus punctatus</i>	Spotted Pardalote	LC	X	X						X	X		X
<i>Pardalotus striatus</i>	Striated Pardalote	LC	X	X	X	X	X	X	X	X	X	X	X

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J	K
Meliphagidae													
Honeyeaters, Chats													
<i>Acanthorhynchus superciliosus</i>	Western Spinebill	LC		X	X					X	X		X
<i>Anthochaera carunculata</i>	Red Wattlebird	LC	X	X	X	X	X	X	X	X	X	X	X
<i>Epthianura albifrons</i>	White-fronted Chat	LC						X	X				X
<i>Lichenostomus virescens</i>	Singing Honeyeater	LC				X		X	X	X		X	
<i>Lichmera indistincta</i>	Brown Honeyeater	LC		X	X	X		X	X	X	X	X	X
<i>Phylidonyris nigra</i>	White-cheeked Honeyeater	Bp LC											
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	Bp LC			X	X	X	X	X	X	X		X
Petroicidae													
Australian Robins													
<i>Eopsaltria australis griseogularis</i>	Western Yellow Robin	Bh LC			X			X					
<i>Petroica multicolor</i>	Scarlet Robin	Bh LC	X	X	X			X	X	X	X		
Neosittidae													
Sitellas													
<i>Daphoenositta chrysoptera</i>	Varied Sittella	Bh LC	X						X				X

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

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

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J	K
Zosteropidae White-eyes													
<i>Zosterops lateralis</i>	Silvereye	LC	X	X	X	X	X	X	X	X	X	X	X
Mammalia													
Dasyuridae Carnivorous Marsupials													
<i>Phascogale tapoatafa wambenger</i>	South-western Brush-tailed Phascogale	S6 NT		X	X								
Phalangeridae Brush-tail Possums, Cuscuses													
<i>Trichosurus vulpecula</i>	Common Brushtail Possum	LC	X	X	X	X	X	X	X	X		X	X
Macropodidae Kangaroos, Wallabies													
<i>Macropus fuliginosus</i>	Western Grey Kangaroo	LC	X	X	X	X	X	X	X	X	X	X	X
Molossidae Freetail Bats													
<i>Austronomus australis</i>	White-striped Freetail-bat	LC		X	X	X	X		X				
<i>Ozimops kitcheneri</i>	Southern Freetail-bat	LC		X	X	X	X						

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

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J	K
Suidae													
Pigs													
<i>Sus scrofa</i>	Pig	Introduced		X	X			X					X
Leporidae													
Rabbits, Hares													
<i>Oryctolagus cuniculus</i>	Rabbit	Introduced	X	X	X	X	X	X	X	X	X	X	X

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APPENDIX C

DBCA NATUREMAP & PROTECTED MATTERS SEARCH TOOL RESULTS

NatureMap - Ludlow Road Mylaup

Created By Greg Harewood on 03/06/2018

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115° 41' 42" E, 32° 57' 59" S
Buffer 20km
Group By Species Group

Species Group	Species	Records
Amphibian	9	253
Bird	189	7292
Fish	10	60
Invertebrate	75	416
Mammal	35	864
Reptile	51	462
TOTAL	369	9347

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.	25404 <i>Geocrinia leai</i> (Ticking Frog)			
5.	25410 <i>Heleioporus eyrei</i> (Moaning Frog)			
6.	25415 <i>Limnodynastes dorsalis</i> (Western Banjo Frog)			
7.	25378 <i>Litoria adelaidensis</i> (Slender Tree Frog)			
8.	25388 <i>Litoria moorei</i> (Motorbike Frog)			
9.	25433 <i>Pseudophryne guentheri</i> (Crawling Toadlet)			
Bird				
10.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
11.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
12.	24262 <i>Acanthiza inornata</i> (Western Thornbill)			
13.	24560 <i>Acanthorhynchus superciliosus</i> (Western Spinebill)			
14.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
15.	24281 <i>Accipiter cirrocephalus</i> subsp. <i>cirrocephalus</i> (Collared Sparrowhawk)			
16.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
17.	25755 <i>Acrocephalus australis</i> (Australian Reed Warbler)			
18.	41323 <i>Actitis hypoleucos</i> (Common Sandpiper)		IA	
19.	25544 <i>Aegotheles cristatus</i> (Australian Owlet-nightjar)			
20.	24301 <i>Aegotheles cristatus</i> subsp. <i>cristatus</i> (Australian Owlet-nightjar)			
21.	24310 <i>Anas castanea</i> (Chestnut Teal)			
22.	24312 <i>Anas gracilis</i> (Grey Teal)			
23.	24313 <i>Anas platyrhynchos</i> (Mallard)			
24.	24315 <i>Anas rhynchotis</i> (Australasian Shoveler)			
25.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
26.	47414 <i>Anhinga novaehollandiae</i> (Australasian Darter)			
27.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
28.	25670 <i>Anthus australis</i> (Australian Pipit)			
29.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
30.	24337 <i>Ardea garzetta</i> subsp. <i>nigripes</i> (Little Egret)			
31.	41324 <i>Ardea modesta</i> (great egret, white egret)			
32.	24340 <i>Ardea novaehollandiae</i> (White-faced Heron)			
33.	24341 <i>Ardea pacifica</i> (White-necked Heron)			
34.	25560 <i>Ardea sacra</i> (Eastern Reef Egret, Eastern Reef Heron)			
35.	24610 <i>Ardeotis australis</i> (Australian Bustard)			
36.	25736 <i>Arenaria interpres</i> (Ruddy Turnstone)		IA	
37.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
38.	24353 <i>Artamus cyanopterus</i> (Dusky Woodswallow)			
39.	24318 <i>Aythya australis</i> (Hardhead)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
40.	<i>Barnardius zonarius</i>			
41.	24319 <i>Biziura lobata</i> (Musk Duck)			
42.	25715 <i>Cacatua roseicapilla</i> (Galah)			
43.	25598 <i>Cacomantis flabelliformis</i> (Fan-tailed Cuckoo)			
44.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
45.	24779 <i>Calidris acuminata</i> (Sharp-tailed Sandpiper)		IA	
46.	24780 <i>Calidris alba</i> (Sanderling)		IA	
47.	24784 <i>Calidris ferruginea</i> (Curlew Sandpiper)		□	
48.	24788 <i>Calidris ruficollis</i> (Red-necked Stint)		IA	
49.	24790 <i>Calidris tenuirostris</i> (Great Knot)		□	
50.	25717 <i>Calyptorhynchus banksii</i> (Red-tailed Black-Cockatoo)			
51.	24731 <i>Calyptorhynchus banksii</i> subsp. <i>naso</i> (Forest Red-tailed Black Cockatoo)		□	
52.	24733 <i>Calyptorhynchus baudinii</i> (Baudin's Cockatoo, White-tailed Long-billed Black Cockatoo)		□	
53.	24734 <i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)		□	
54.	48400 <i>Calyptorhynchus</i> sp. (white-tailed black cockatoo)		□	
55.	25575 <i>Charadrius leschenaultii</i> (Greater Sand Plover)		IA	
56.	24377 <i>Charadrius ruficapillus</i> (Red-capped Plover)			
57.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
58.	<i>Chroicocephalus novaehollandiae</i>			
59.	24431 <i>Chrysococcyx basalis</i> (Horsfield's Bronze Cuckoo)			
60.	25601 <i>Chrysococcyx lucidus</i> (Shining Bronze Cuckoo)			
61.	24432 <i>Chrysococcyx lucidus</i> subsp. <i>plagusus</i> (Shining Bronze Cuckoo)			
62.	24288 <i>Circus approximans</i> (Swamp Harrier)			
63.	24774 <i>Cladorhynchus leucocephalus</i> (Banded Stilt)			
64.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
65.	24613 <i>Colluricincla harmonica</i> subsp. <i>rufiventris</i> (Grey Shrike-thrush)			
66.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
67.	24362 <i>Coracina novaehollandiae</i> subsp. <i>novaehollandiae</i> (Black-faced Cuckoo-shrike)			
68.	25592 <i>Corvus coronoides</i> (Australian Raven)			
69.	24671 <i>Coturnix pectoralis</i> (Stubble Quail)			
70.	25701 <i>Coturnix ypsilophora</i> (Brown Quail)			
71.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
72.	24422 <i>Cracticus tibicen</i> subsp. <i>dorsalis</i> (White-backed Magpie)			
73.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
74.	24322 <i>Cygnus atratus</i> (Black Swan)			
75.	30901 <i>Dacelo novaeguineae</i> (Laughing Kookaburra)	Y		
76.	25673 <i>Daphoenositta chrysoptera</i> (Varied Sittella)			
77.	25607 <i>Dicaeum hirundinaceum</i> (Mistletoebird)			
78.	24470 <i>Dromaius novaehollandiae</i> (Emu)			
79.	<i>Egretta garzetta</i>			
80.	<i>Egretta novaehollandiae</i>			
81.	<i>Elanus axillaris</i>			
82.	25540 <i>Elanus caeruleus</i> (Black-shouldered Kite)			
83.	24290 <i>Elanus caeruleus</i> subsp. <i>axillaris</i> (Australian Black-shouldered Kite)			
84.	47937 <i>Euseyonis melanops</i> (Black-fronted Dotterel)			
85.	<i>Eolophus roseicapillus</i>			
86.	24651 <i>Eopsaltria australis</i> subsp. <i>griseogularis</i> (Western Yellow Robin)			
87.	24567 <i>Epthianura albifrons</i> (White-fronted Chat)			
88.	24379 <i>Erythronyctes cinctus</i> (Red-kneed Dotterel)			
89.	25746 <i>Eudyptula minor</i> (Little Penguin)			
90.	24818 <i>Eudyptula minor</i> subsp. <i>novaehollandiae</i> (Little Penguin)			
91.	24368 <i>Eurostopodus argus</i> (Spotted Nightjar)			
92.	25621 <i>Falco berigora</i> (Brown Falcon)			
93.	25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
94.	25623 <i>Falco longipennis</i> (Australian Hobby)			
95.	25624 <i>Falco peregrinus</i> (Peregrine Falcon)		S	
96.	25727 <i>Fulica atra</i> (Eurasian Coot)			
97.	24761 <i>Fulica atra</i> subsp. <i>australis</i> (Eurasian Coot)			
98.	25729 <i>Gallinula tenebrosa</i> (Dusky Moorhen)			
99.	24763 <i>Gallinula tenebrosa</i> subsp. <i>tenebrosa</i> (Dusky Moorhen)			
100.	25730 <i>Gallirallus philippensis</i> (Buff-banded Rail)			
101.	42314 <i>Gavicalis virescens</i> (Singing Honeyeater)			
102.	47954 <i>Gelochelidon nilotica</i> (Gull-billed Tern)		IA	
103.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
104.	24443 <i>Gallina cyanoleuca</i> (Magpie-lark)			
105.	24487 <i>Haematopus longirostris</i> (Pied Oystercatcher)			
106.	24295 <i>Haliastur sphenurus</i> (Whistling Kite)			
107.	24296 <i>Hamirostra isura</i> (Square-tailed Kite)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
108.	47965 <i>Hieraaetus morphnoides</i> (Little Eagle)			
109.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
110.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
111.	48587 <i>Hydroprogne caspia</i> (Caspian Tern)		IA	
112.	24511 <i>Larus novaehollandiae</i> subsp. <i>novaehollandiae</i> (Silver Gull)			
113.	25638 <i>Larus pacificus</i> (Pacific Gull)			
114.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
115.	<i>Lophoictinia isura</i>			
116.	24690 <i>Macronectes giganteus</i> (Southern Giant Petrel)		IA	
117.	24326 <i>Malacorhynchus membranaceus</i> (Pink-eared Duck)			
118.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
119.	25758 <i>Megalurus gramineus</i> (Little Grassbird)			
120.	25663 <i>Melithreptus brevirostris</i> (Brown-headed Honeyeater)			
121.	24586 <i>Melithreptus brevirostris</i> subsp. <i>leucogenys</i> (Brown-headed Honeyeater)			
122.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)			
123.	<i>Microcarbo melanoleucos</i>			
124.	25693 <i>Microeca fascians</i> (Jacky Winter)			
125.	24738 <i>Neophema elegans</i> (Elegant Parrot)			
126.	24798 <i>Numenius madagascariensis</i> (Eastern Curlew)		□	
127.	25742 <i>Numenius phaeopus</i> (Whimbrel)		IA	
128.	25564 <i>Nycticorax caledonicus</i> (Rufous Night Heron)			
129.	24497 <i>Oceanites oceanicus</i> (Wilson's Storm-petrel)		IA	
130.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
131.	41347 <i>Onychoprion anaethetus</i> (Bridled Tern)		IA	
132.	24328 <i>Oxyura australis</i> (Blue-billed Duck)		P4	
133.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
134.	24692 <i>Pachyptila belcheri</i> (Slender-billed Prion)			
135.	24693 <i>Pachyptila desolata</i> (Antarctic Prion)			
136.	25707 <i>Pachyptila salvini</i> (Salvin's Prion)			
137.	24697 <i>Pachyptila vittata</i> (Broad-billed Prion)			
138.	48591 <i>Pandion cristatus</i> (Osprey, Eastern Osprey)		IA	
139.	25681 <i>Pardalotus punctatus</i> (Spotted Pardalote)			
140.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
141.	24630 <i>Pardalotus striatus</i> subsp. <i>westraliensis</i> (Striated Pardalote)			
142.	24648 <i>Pelecanus conspicillatus</i> (Australian Pelican)			
143.	48060 <i>Petrochelidon ariel</i> (Fairy Martin)			
144.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
145.	48066 <i>Petroica boodang</i> (Scarlet Robin)			
146.	24659 <i>Petroica goodenovii</i> (Red-capped Robin)			
147.	25697 <i>Phalacrocorax carbo</i> (Great Cormorant)			
148.	25698 <i>Phalacrocorax melanoleucos</i> (Little Pied Cormorant)			
149.	24667 <i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)			
150.	25699 <i>Phalacrocorax varius</i> (Pied Cormorant)			
151.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
152.	25587 <i>Phaps elegans</i> (Brush Bronzewing)			
153.	48071 <i>Phylidonyris niger</i> (White-cheeked Honeyeater)			
154.	24596 <i>Phylidonyris novaehollandiae</i> (New Holland Honeyeater)			
155.	24841 <i>Platalea flavipes</i> (Yellow-billed Spoonbill)			
156.	25720 <i>Platycercus icterotis</i> (Western Rosella)			
157.	24747 <i>Platycercus spurius</i> (Red-capped Parrot)			
158.	25721 <i>Platycercus zonarius</i> (Australian Ringneck, Ring-necked Parrot)			
159.	24750 <i>Platycercus zonarius</i> subsp. <i>semitorquatus</i> (Twenty-eight Parrot)			
160.	24843 <i>Plegadis falcinellus</i> (Glossy Ibis)		IA	
161.	24382 <i>Pluvialis fulva</i> (Pacific Golden Plover)		IA	
162.	24383 <i>Pluvialis squatarola</i> (Grey Plover)		IA	
163.	25703 <i>Podargus strigoides</i> (Tawny Frogmouth)			
164.	24679 <i>Podargus strigoides</i> subsp. <i>brachypterus</i> (Tawny Frogmouth)			
165.	25704 <i>Podiceps cristatus</i> (Great Crested Grebe)			
166.	24681 <i>Poliiocephalus poliocephalus</i> (Hoary-headed Grebe)			
167.	25722 <i>Polytelis anthopeplus</i> (Regent Parrot)			
168.	25731 <i>Porphyrio porphyrio</i> (Purple Swamphen)			
169.	24767 <i>Porphyrio porphyrio</i> subsp. <i>bellus</i> (Purple Swamphen)			
170.	24770 <i>Porzana pusilla</i> subsp. <i>palustris</i> (Baillon's Crake)			
171.	24771 <i>Porzana tabuensis</i> (Spotless Crake)			
172.	<i>Purpureicephalus spurius</i>			
173.	24776 <i>Recurvirostra novaehollandiae</i> (Red-necked Avocet)			
174.	48096 <i>Rhipidura albiscapa</i> (Grey Fantail)			
175.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
176.	24454 <i>Rhipidura leucophrys</i> subsp. <i>leucophrys</i> (Willie Wagtail)			
177.	25534 <i>Sericornis frontalis</i> (White-browed Scrubwren)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
178.	24279 <i>Sericornis frontalis</i> subsp. <i>maculatus</i> (White-browed Scrubwren)			
179.	30948 <i>Smicronis brevirostris</i> (Weebill)			
180.	24522 <i>Sterna bergii</i> (Crested Tern)			
181.	48594 <i>Sternula nereis</i> (Fairy Tern)			
182.	24329 <i>Stictonetta naevosa</i> (Freckled Duck)			
183.	25597 <i>Strepera versicolor</i> (Grey Currawong)			
184.	25589 <i>Streptopelia chinensis</i> (Spotted Turtle-Dove)	Y		
185.	25590 <i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)	Y		
186.	25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
187.	24682 <i>Tachybaptus novaehollandiae</i> subsp. <i>novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
188.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
189.	34007 <i>Thalassarche chlororhynchos</i> (Atlantic Yellow-nosed Albatross)		□	
190.	48597 <i>Thalasseus bergii</i> (Crested Tern)		IA	
191.	48135 <i>Thinornis rubricollis</i> (Hooded Plover, Hooded Dotterel)		P4	
192.	24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)			
193.	25549 <i>Todiramphus sanctus</i> (Sacred Kingfisher)			
194.	24803 <i>Tringa brevipes</i> (Grey-tailed Tattler)		P4	
195.	24808 <i>Tringa nebularia</i> (Common Greenshank, greenshank)		IA	
196.	24852 <i>Tyto alba</i> subsp. <i>delicatula</i> (Barn Owl)			
197.	24386 <i>Vanellus tricolor</i> (Banded Lapwing)			
198.	25765 <i>Zosterops lateralis</i> (Grey-breasted White-eye, Silvereye)			

ish

199.	<i>Cynoglossus broadhursti</i>			
200.	<i>Edelia vittata</i>			
201.	<i>Eubalichthys caeruleoguttatus</i>			
202.	34028 <i>Galaxias occidentalis</i> (Western Minnow)			
203.	34027 <i>Galaxiella nigrostriata</i> (Black-stripe Minnow, black-striped dwarf galaxias)		□	
204.	<i>Gambusia affinis</i>			
205.	34030 <i>Geotria australis</i> (Pouched Lamprey)		P1	
206.	<i>Pegasus volitans</i>			
207.	<i>Pseudogobius olorum</i>			
208.	<i>Siphonognathus argyrophanes</i>			

Invertebrate

209.	<i>Acariformes</i> sp.			
210.	<i>Aeshnidae</i> sp.			
211.	<i>Aname mainae</i>			
212.	<i>Ancyliidae</i> sp.			
213.	<i>Argiope protensa</i>			
214.	<i>Arkys walckenaeri</i>			
215.	<i>Austracantha minax</i>			
216.	<i>Baetidae</i> sp.			
217.	<i>Caenidae</i> sp.			
218.	<i>Calamoecia clitellata</i>			
219.	<i>Ceinidae</i> sp.			
220.	<i>Celaenia excavata</i>			
221.	<i>Ceratopogonidae</i> sp.			
222.	<i>Cercophonius sulcatus</i>			
223.	<i>Chironominae</i> sp.			
224.	<i>Coenagrionidae</i> sp.			
225.	<i>Corduliidae</i> sp.			
226.	<i>Corixidae</i> sp.			
227.	<i>Cormocephalus aurantiipes</i>			
228.	<i>Culicidae</i> sp.			
229.	<i>Dytiscidae</i> sp.			
230.	<i>Ecnomidae</i> sp.			
231.	<i>Ephydriidae</i> sp.			
232.	<i>Erpobdellidae</i> sp.			
233.	<i>Ethmostigmus rubripes</i>			
234.	<i>Geogarypus taylori</i>			
235.	<i>Glossiphoniidae</i> sp.			
236.	<i>Gomphidae</i> sp.			
237.	<i>Gripopterygidae</i> sp.			
238.	<i>Gyrinidae</i> sp.			
239.	<i>Hebridae</i> sp.			
240.	<i>Hemicorduliidae</i> sp.			
241.	<i>Hoggicosa castanea</i>			
242.	<i>Hoggicosa storri</i>			
243.	<i>Hydraenidae</i> sp.			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
244.	<i>Hydrobiosidae</i> sp.			
245.	<i>Hydrophilidae</i> sp.			
246.	<i>Hydropsychidae</i> sp.			
247.	<i>Hydroptilidae</i> sp.			
248.	<i>Hyriidae</i> sp.			
249.	<i>Latrodectus hasseltii</i>			
250.	<i>Leptoceridae</i> sp.			
251.	<i>Leptophlebiidae</i> sp.			
252.	<i>Libellulidae</i> sp.			
253.	<i>Lymnaeidae</i> sp.			
254.	<i>Maratus pavonis</i>			
255.	<i>Mesoveliidae</i> sp.			
256.	<i>Missulena granulosa</i>			
257.	<i>Missulena occatoria</i>			
258.	<i>Nematoda</i> sp.			
259.	<i>Nicodamus mainae</i>			
260.	<i>Notonectidae</i> sp.			
261.	<i>Nunciella aspera</i>			
262.	<i>Oligochaeta</i> sp.			
263.	<i>Orthocladinae</i> sp.			
264.	<i>Palaemonidae</i> sp.			
265.	<i>Parastacidae</i> sp.			
266.	<i>Pentastemon intermedium</i>			
267.	<i>Perthidae</i> sp.			
268.	<i>Physidae</i> sp.			
269.	<i>Pinkfloydia harveii</i>			
270.	<i>Raveniella peckorum</i>			
271.	<i>Richardsonianidae</i> sp.			
272.	<i>Simuliidae</i> sp.			
273.	<i>Sphaeriidae</i> sp.			
274.	<i>Staphylinidae</i> sp.			
275.	<i>Supunna picta</i>			
276.	33992 <i>Synemon gratiosa</i> (Graceful Sunmoth)		P4	
277.	<i>Tanypodinae</i> sp.			
278.	<i>Tenebrionidae</i> sp.			
279.	<i>Tipulidae</i> sp.			
280.	<i>Urodacus novaehollandiae</i>			
281.	<i>Velliidae</i> sp.			
282.	<i>Venator immansueta</i>			
283.	34113 <i>Westralunio carteri</i> (Carter's Freshwater Mussel)			□

Mammal

284.	24088 <i>Antechinus flavipes</i> subsp. <i>leucogaster</i> (Yellow-footed Antechinus, Mardo)			
285.	25454 <i>Canis lupus</i> (Dog, Dingo)	Y		
286.	30883 <i>Canis lupus</i> subsp. <i>familiaris</i> (Dog)	Y		
287.	24086 <i>Cercartetus concinnus</i> (Western Pygmy-possum, Mundarda)			
288.	24186 <i>Chalinolobus gouldii</i> (Gould's Wattled Bat)			
289.	24187 <i>Chalinolobus morio</i> (Chocolate Wattled Bat)			
290.	24092 <i>Dasyurus geoffroyi</i> (Chuditch, Western Quoll)			□
291.	24189 <i>Falsistrellus mackenziei</i> (Western False Pipistrelle, Western Falsistrelle)		P4	
292.	24041 <i>Felis catus</i> (Cat)	Y		
293.	24215 <i>Hydromys chrysogaster</i> (Water-rat, Rakali)		P4	
294.	48588 <i>Isoodon fusciventer</i> (Quenda, southwestern brown bandicoot)		P4	
295.	24071 <i>Kogia sima</i> (Dwarf Sperm Whale)			Y
296.	24132 <i>Macropus fuliginosus</i> (Western Grey Kangaroo)			
297.	24051 <i>Megaptera novaeangliae</i> (Humpback Whale)		S	
298.	24213 <i>Mirounga leonina</i> (Southern Elephant Seal)			
299.	24223 <i>Mus musculus</i> (House Mouse)	Y		
300.	24042 <i>Mustela putorius</i> (European Polecat, Ferret)	Y		
301.	24210 <i>Neophoca cinerea</i> (Australian Sea-lion)			□
302.	48022 <i>Notamacropus irma</i> (Western Brush Wallaby)		P4	
303.	24194 <i>Nyctophilus geoffroyi</i> (Lesser Long-eared Bat)			
304.	24195 <i>Nyctophilus gouldi</i> (Gould's Long-eared Bat)			
305.	24085 <i>Oryctolagus cuniculus</i> (Rabbit)	Y		
306.	48070 <i>Phascogale tapoatafa</i> subsp. <i>wambenger</i> (South-western Brush-tailed Phascogale, Wambenger)		S	
307.	24166 <i>Pseudocheirus occidentalis</i> (Western Ringtail Possum, ngwayir)			□
308.	24230 <i>Pseudomys albocinereus</i> (Ash-grey Mouse)			
309.	24245 <i>Rattus rattus</i> (Black Rat)	Y		
310.	24145 <i>Setonix brachyurus</i> (Quokka)			□
311.	25515 <i>Sminthopsis griseoventer</i> (Grey-bellied Dunnart)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
312.	24259 <i>Sus scrofa</i> (Pig)	Y		
313.	24167 <i>Tarsipes rostratus</i> (Honey Possum, Noolbenger)			
314.	25521 <i>Trichosurus vulpecula</i> (Common Brushtail Possum)			
315.	24158 <i>Trichosurus vulpecula</i> subsp. <i>vulpecula</i> (Common Brushtail Possum)			
316.	30954 <i>Tursiops aduncus</i> (Indo-Pacific Bottlenose Dolphin)			
317.	24206 <i>Vespadelus regulus</i> (Southern Forest Bat)			
318.	24040 <i>Vulpes vulpes</i> (Red Fox)	Y		

Reptile

319.	42368 <i>Acritoscincus trilineatus</i> (Western Three-lined Skink)			
320.	24991 <i>Aprasia repens</i> (Sand-plain Worm-lizard)			
321.	25335 <i>Caretta caretta</i> (Loggerhead Turtle)		□	
322.	43380 <i>Chelodina colliei</i> (South-western Snake-necked Turtle)			
323.	24980 <i>Christinus marmoratus</i> (Marbled Gecko)			
324.	25456 <i>Crenadactylus ocellatus</i> (Clawless Gecko)			
325.	30893 <i>Cryptoblepharus buchananii</i>			
326.	25020 <i>Cryptoblepharus plagiocephalus</i>			
327.	30899 <i>Ctenophorus adelaidensis</i> (Southern Heath Dragon, Western Heath Dragon)			
328.	25027 <i>Ctenotus australis</i>			
329.	25039 <i>Ctenotus fallens</i>			
330.	25047 <i>Ctenotus impar</i>			
331.	41641 <i>Ctenotus ora</i> (Coastal Plains Skink)		P3	
332.	25074 <i>Ctenotus schomburgkii</i>			
333.	25766 <i>Delma fraseri</i> (Fraser's Legless Lizard)			
334.	24999 <i>Delma grayii</i>			
335.	25296 <i>Demansia psammophis</i> subsp. <i>reticulata</i> (Yellow-faced Whipsnake)			
336.	24939 <i>Diplodactylus polyophthalmus</i>			
337.	25092 <i>Egernia depressa</i> (Southern Pygmy Spiny-tailed Skink)			
338.	25096 <i>Egernia kingii</i> (King's Skink)			
339.	25100 <i>Egernia napoleonis</i>			
340.	25250 <i>Elapognathus coronatus</i> (Crowned Snake)			
341.	25119 <i>Hemiergis quadrilineata</i>			
342.	43384 <i>Hydrophis platurus</i> (Yellow-bellied Seasnake)			
343.	25128 <i>Lerista christinae</i>			
344.	25131 <i>Lerista distinguenda</i>			
345.	25133 <i>Lerista elegans</i>			
346.	25147 <i>Lerista lineata</i> (Perth Slider, Lined Skink)		P3	
347.	25148 <i>Lerista lineopunctulata</i>			
348.	25165 <i>Lerista praepedita</i>			
349.	25005 <i>Lialis burtonis</i>			
350.	25184 <i>Menetia greyii</i>			
351.	25190 <i>Morethia butleri</i>			
352.	25191 <i>Morethia lineocellata</i>			
353.	25192 <i>Morethia obscura</i>			
354.	25248 <i>Neelaps bimaculatus</i> (Black-naped Snake)			
355.	25252 <i>Notechis scutatus</i> (Tiger Snake)			
356.	25255 <i>Parasuta nigriceps</i>			
357.	25510 <i>Pogona minor</i> (Dwarf Bearded Dragon)			
358.	24907 <i>Pogona minor</i> subsp. <i>minor</i> (Dwarf Bearded Dragon)			
359.	25511 <i>Pseudonaja affinis</i> (Dugite)			
360.	25259 <i>Pseudonaja affinis</i> subsp. <i>affinis</i> (Dugite)			
361.	42416 <i>Pseudonaja mengdeni</i> (Western Brown Snake)			
362.	25008 <i>Pygopus lepidopodus</i> (Common Scaly Foot)			
363.	25266 <i>Simoselaps bertholdi</i> (Jan's Banded Snake)			
364.	25518 <i>Strophurus spinigerus</i>			
365.	24942 <i>Strophurus spinigerus</i> subsp. <i>spinigerus</i>			
366.	25519 <i>Tiliqua rugosa</i>			
367.	25218 <i>Varanus gouldii</i> (Bungarra or Sand Monitor)			
368.	25225 <i>Varanus rosenbergi</i> (Heath Monitor)			
369.	25227 <i>Varanus tristis</i> subsp. <i>tristis</i> (Racehorse Monitor)			

Conservation Codes

- Rare or likely to become extinct
- 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 comply 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 03/06/18 13:11:36

[Summary](#)

[Details](#)

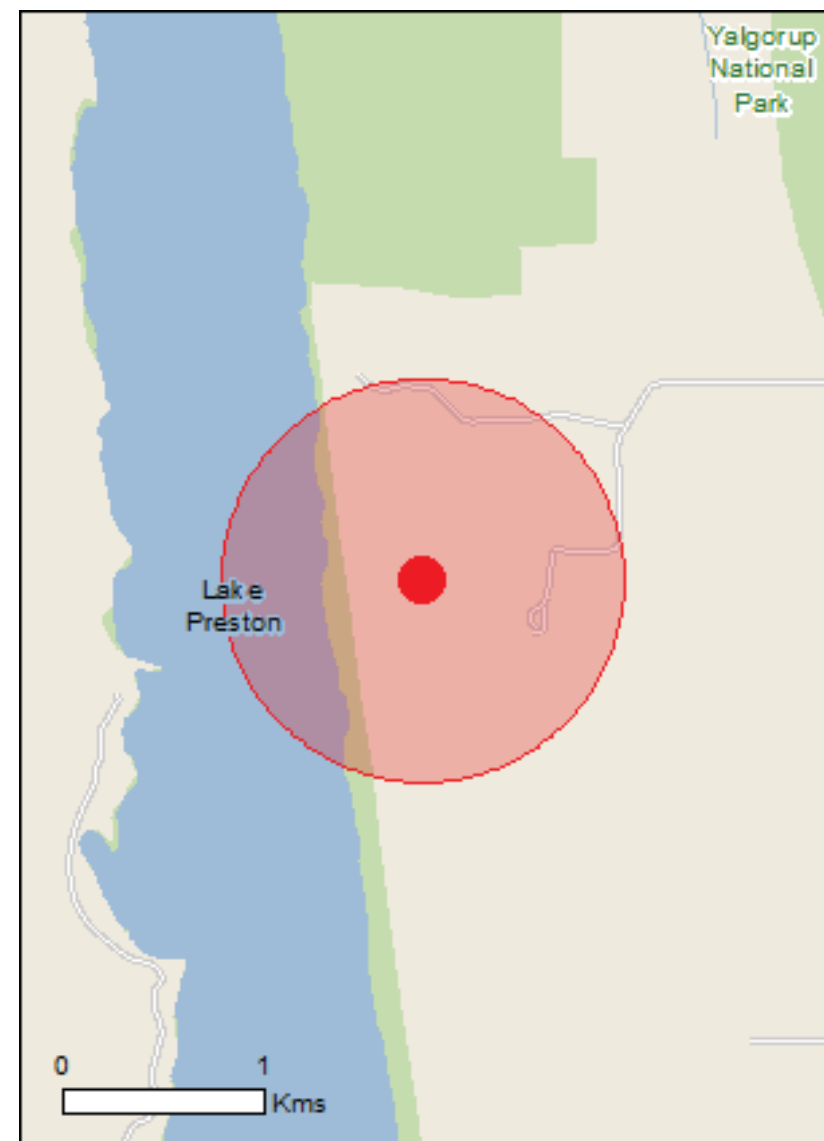
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

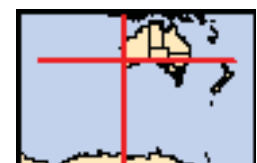
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Summary

Matters of National Environmental Significance

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

World Heritage Properties	None
National Heritage Places	None
Wetlands of International Importance	1
Great Barrier Reef Marine Park	None
Commonwealth Marine Area	None
Listed Threatened Ecological Communities	1
Listed Threatened Species	21
Listed Migratory Species	27

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land	None
Commonwealth Heritage Places	None
Listed Marine Species	36
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.

State and Territory Reserves	1
Regional Forest Agreements	None
Invasive Species	23
Nationally Important Wetlands	1
Key Ecological Features Marine	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)		Resource Information
Name		Proximity
Peel/yalorup system		Within Ramsar site

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

Name	Status	Type of Presence
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community may occur within area

Listed Threatened Species		Resource Information
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Name	Status	Type of Presence
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Birds		
Botaurus poiciloptilus		
Australasian Bittern (1001)	Endangered	Species or species habitat may occur within area
Calidris canutus		
Red knot, (not 1855)	Endangered	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper (856)	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris		
Great knot (862)	Critically Endangered	Species or species habitat known to occur within area
Calyptorhynchus banksii naso		
Forest Red-tailed Black-Cockatoo, (arrak (67034)	Vulnerable	Species or species habitat likely to occur within area
Calyptorhynchus baudinii		
Baudin's Cockatoo, (on-billed Black-Cockatoo (769)	Endangered	Species or species habitat likely to occur within area
Calyptorhynchus latirostris		
Carnaby's Cockatoo, Short-billed Black-Cockatoo (59523)	Endangered	Breeding likely to occur within area
Charadrius leschenaultii		
Greater Sand Plover, (ar-e Sand Plover (877)	Vulnerable	Species or species habitat known to occur within area
Charadrius moncolus		
(esser Sand Plover, Moncolian Plover (879)	Endangered	Species or species habitat known to occur within area
Cipeipoa ocellata		
Malleefowl (934)	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Limosa lapponica baueri Bar-tailed Godwit baueri, Western Alaskan Bar-tailed Godwit 86380	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit menzbieri 86432	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew 847	Critically Endangered	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe 77037	Endangered	Species or species habitat may occur within area

Mammals

Dasyurus eoiffroii Chuditch, Western Quoll 330	Vulnerable	Species or species habitat likely to occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Numbayir, Womp, Woder, Nabor, Noolanit 25911	Critically Endangered	Species or species habitat known to occur within area

Plants

Caladenia huegelii Green Spiderorchid, Grand Spiderorchid, Rusty Spiderorchid 7309	Endangered	Species or species habitat may occur within area
Chamelaucium sp. Ginkin (N.G. Marchant 6) Ginkin Wa 88881	Endangered	Species or species habitat likely to occur within area
Diuris micrantha Dwarf Beeorchid 55082	Vulnerable	Species or species habitat known to occur within area
Diuris purdiei Purdie's Donkeyorchid 12950	Endangered	Species or species habitat may occur within area
Drakaea micrantha Dwarf Hammerorchid 56755	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species

Resource Information

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

Name	Threatened	Type of Presence
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Migratory Marine Birds

Apus pacificus Fork-tailed Sift 678		Species or species habitat likely to occur within area
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Migratory Terrestrial Species

Motacilla cinerea Grey Wagtail 642		Species or species habitat may occur within area
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Migratory Wetlands Species

Actitis hypoleucos Common Sandpiper 59309		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone 872		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper 874		Species or species habitat known to occur

Name	Threatened	Type of Presence
Calidris alba Sanderling 875		Within area Species or species habitat known to occur within area
Calidris canutus Red knot, not 855	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper 856	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper 858		Species or species habitat may occur within area
Calidris ruficollis Red-necked Stint 860		Species or species habitat known to occur within area
Calidris subminuta Long-toed Stint 861		Species or species habitat known to occur within area
Calidris tenuirostris Great knot 862	Critically Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover 877	Vulnerable	Species or species habitat known to occur within area
Charadrius moncolus Lesser Sand Plover, Moncolian Plover 879	Endangered	Species or species habitat known to occur within area
Limicola falcinellus Broad-billed Sandpiper 842		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit 844		Species or species habitat likely to occur within area
Limosa limosa Black-tailed Godwit 845		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew 847	Critically Endangered	Species or species habitat known to occur within area
Numenius phaeopus Whimbrel 849		Species or species habitat known to occur within area
Pandion haliaetus Osprey 952		Species or species habitat likely to occur within area
Philomachus pugnax Ruff 850		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover 25545		Species or species habitat known to occur within area
Tringa brevipes Grey-tailed Tattler 851		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Tringa bairdii Wood Sandpiper 829		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank 832		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank 833		Species or species habitat known to occur within area
Tringa totanus Common Redshank, Redshank 835		Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information](#)

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

Name	Threatened	Type of Presence
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Birds

Actitis hypoleucos Common Sandpiper 59309		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift 678		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret 59541		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret 59542		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone 872		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper 874		Species or species habitat known to occur within area
Calidris alba Sanderling 875		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot 855	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper 856	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper 858		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Calidris ruficollis Red-necked Stint (860)		Species or species habitat known to occur within area
Calidris subminuta Long-toed Stint (861)		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot (862)	Critically Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover (877)	Vulnerable	Species or species habitat known to occur within area
Charadrius moncolus Lesser Sand Plover, Moncolian Plover (879)	Endangered	Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover (881)		Species or species habitat known to occur within area
Haliaeetus leucogaster White-bellied Sea Eagle (943)		Species or species habitat likely to occur within area
Actoscelus brevipes Grey-tailed Antler (59311)		Species or species habitat known to occur within area
Himantopus himantopus Black-winged Stilt (870)		Species or species habitat known to occur within area
Limicola falcinellus Broad-billed Sandpiper (842)		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit (844)		Species or species habitat likely to occur within area
Limosa limosa Black-tailed Godwit (845)		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater (670)		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail (642)		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew (847)	Critically Endangered	Species or species habitat known to occur within area
Numenius phaeopus Whimbrel (849)		Species or species habitat known to occur within area
Pandion haliaetus Osprey (952)		Species or species habitat likely to occur within area
Philomachus pugnax Ruff (Reeve) (850)		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Pluvialis fulva Pacific Golden Plover 25545		Species or species habitat known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet 871		Species or species habitat known to occur within area
Rostratula benhalensis sensu lato Painted Snipe 889	Endangered	Species or species habitat may occur within area
Thinornis rubricollis Wooded Plover 59510		Species or species habitat known to occur within area
Tringa bairdii Wood Sandpiper 829		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank 832		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank 833		Species or species habitat known to occur within area
Tringa totanus Common Redshank, Redshank 835		Species or species habitat known to occur within area

Extra Information

State and Territory Reserves	Resource Information
Name	State
Yalgorup	WA

Invasive Species [Resource Information](#)

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

Name	Status	Type of Presence
Streptopelia chinensis Spotted Pouter Dove 780		habitat likely to occur within area Species or species habitat likely to occur within area
Streptopelia senegalensis Australian Pouter Dove, Australian Dove 781		Species or species habitat likely to occur within area

Mammals

Canis lupus familiaris Domestic Dog 82654		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat 19		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia 85733		Species or species habitat likely to occur within area
Mus musculus House Mouse 120		Species or species habitat likely to occur within area
Lepus europaeus 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

Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus 22473		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass 5879		Species or species habitat may occur within area
Cenchrus ciliaris Buffel Grass, Black Buffel Grass 20213		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed 18983		Species or species habitat may occur within area
Genista sp. Genista monspessulana Broom 67538		Species or species habitat may occur within area
Antennaria camara Antennaria, Common Antennaria, Camara Antennaria, Carrot leaf Antennaria, Pink Flowered Antennaria, Red Flowered Antennaria, Red Flowered Sage, White Sage, Wild Sage 10892 Antennaria europaea Lemon Thyme, Common Lemon Thyme 9160		Species or species habitat likely to occur within area Species or species habitat may occur within area

Name	Status	Type of Presence
Pinus radiata Radiata Pine Monterey Pine, Insular Pine, Wilding Pine 20780		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry 68406		Species or species habitat likely to occur within area

Nationally Important Wetlands		Resource Information
Name		State
Yalgorup Lakes System		WA

Caveat

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

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

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

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

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

Where very little information is available for species or large number of maps are required in a short time frame, maps are derived either from 0.04 or 0.02 decimal degree cells by an automated process using polygon capture techniques (static 10 kilometre grid cells, alpha hull and convex hull) or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100 or 250 map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

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

- migratory and
- marine

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

- threatened species listed as extinct or considered as variants
- 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, variant, or only occur in small numbers

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

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

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

Coordinates

32.96646 115.69491

Acknowledgements

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

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

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

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

APPENDIX D

HABITAT TREE DETAILS

Habitat Trees (DBH >50 cm)

Datum - GDA 94

Entrance Size Ranges - Small = >5cm, Medium = 5 to 10cm, Large = >10cm

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Estimated Hollow Entrance Size Range (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt001	50H	377962	6352063	Tuart	20+	>50	2+	Small-Medium	No Signs	No Signs	No	
wpt002	50H	377977	6352081	Tuart	20+	>50	2+	Small	No Signs	No Signs	No	
wpt003	50H	378004	6352085	Tuart	20+	>50	2+	Small	No Signs	No Signs	No	
wpt004	50H	378002	6352119	Tuart	20+	>50	2+	Small	No Signs	No Signs	No	
wpt005	50H	378002	6352118	Tuart	20+	>50	2+	Small	No Signs	No Signs	No	
wpt006	50H	378028	6352061	Tuart	15-20	>50	0					
wpt007	50H	378053	6352044	Limestone Marlock	10-15	>50	0					
wpt008	50H	378058	6351948	Limestone Marlock	10-15	>50	0					
wpt009	50H	378048	6351957	Limestone Marlock	10-15	>50	0					
wpt010	50H	378044	6351968	Limestone Marlock	10-15	>50	0					
wpt011	50H	378030	6351975	Limestone Marlock	10-15	>50	0					
wpt012	50H	378090	6351815	Limestone Marlock	10-15	>50	0					
wpt013	50H	378093	6351815	Limestone Marlock	10-15	>50	0					
wpt014	50H	378089	6351803	Limestone Marlock	10-15	>50	0					
wpt015	50H	378092	6351750	Limestone Marlock	10-15	>50	0					
wpt016	50H	378035	6351663	Limestone Marlock	10-15	>50	0					
wpt017	50H	378049	6351636	Tuart	20+	>50	0					
wpt018	50H	378049	6351638	Tuart	20+	>50	0					
wpt019	50H	378055	6351600	Limestone Marlock	15-20	>50	0					
wpt020	50H	378046	6351592	Limestone Marlock	15-20	>50	0					
wpt021	50H	378085	6351592	Limestone Marlock	10-15	>50	0					
wpt023	50H	378096	6351566	Jarrah	15-20	>50	0					
wpt024	50H	378100	6351560	Jarrah	15-20	>50	0					
wpt025	50H	378102	6351558	Jarrah	15-20	>50	0					
wpt026	50H	378075	6351482	Jarrah	15-20	>50	0					
wpt027	50H	378076	6351430	Limestone Marlock	10-15	>50	0					Buffer
wpt028	50H	378127	6351433	Limestone Marlock	10-15	>50	0					Buffer
wpt033	50H	378199	6351431	Limestone Marlock	10-15	>50	0					Buffer
wpt034	50H	378205	6351423	Limestone Marlock	10-15	>50	0					Buffer
wpt035	50H	378210	6351426	Jarrah	15-20	>50	0					Buffer
wpt056	50H	377986	6351445	Tuart	20+	>50	1	Medium	No Signs	Galahs	No	Buffer - Scarring by Galahs

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Estimated Hollow Entrance Size Range (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt057	50H	377976	6351450	Tuart	20+	>50	0					Buffer
wpt058	50H	377979	6351463	Tuart	20+	>50	0					Buffer
wpt059	50H	378012	6351471	Tuart	20+	>50	0					Buffer
wpt076	50H	377956	6352023	Limestone Marlock	15-20	>50	0					
wpt077	50H	377947	6352080	Dead Tuart	15-20	>50	2+	Small-Medium	No Signs	No Signs	No	Buffer
wpt078	50H	377943	6352076	Tuart	15-20	>50	0					Buffer
wpt079	50H	377944	6352065	Tuart	15-20	>50	0					Buffer
wpt080	50H	377962	6352062	Tuart	15-20	>50	0					Buffer
wpt081	50H	377965	6352048	Tuart	15-20	>50	0					Buffer
wpt082	50H	377960	6351929	Tuart	20+	>50	2+	Small-Medium	No Signs	No Signs	No	Buffer
wpt083	50H	377971	6351929	Tuart	5-10	>50	0					Buffer
wpt084	50H	377946	6351867	Limestone Marlock	5-10	>50	0					Buffer
wpt085	50H	377895	6352029	Tuart	20+	>50	2+	Small	No Signs	No Signs	No	Buffer
wpt086	50H	377916	6352057	Tuart	20+	>50	2+	Small	No Signs	No Signs	No	Buffer
wpt087	50H	377895	6352063	Tuart	20+	>50	2+	Small	No Signs	No Signs	No	Buffer
wpt088	50H	377891	6352061	Tuart	15-20	>50	0					Buffer
wpt089	50H	377922	6352089	Tuart	15-20	>50	0					Buffer
wpt090	50H	377926	6352092	Tuart	15-20	>50	0					Buffer
wpt091	50H	377927	6352110	Tuart	15-20	>50	0					Buffer
wpt092	50H	377942	6352126	Limestone Marlock	10-15	>50	0					Buffer
wpt093	50H	377950	6352128	Tuart	15-20	>50	0					Buffer
wpt094	50H	377944	6352135	Limestone Marlock	10-15	>50	0					Buffer
wpt095	50H	378098	6352187	Tuart	15-20	>50	0					Buffer
wpt096	50H	378141	6352196	Tuart	20+	>50	2+		Galahs	No Signs	No	Buffer - Bees in hollow
wpt097	50H	378158	6352184	Tuart	15-20	>50	0					Buffer
wpt098	50H	378161	6352175	Tuart	15-20	>50	2+	Small-Medium	No signs	Galahs	No	Buffer
wpt099	50H	378165	6352155	Tuart	20+	>50	2+	Small	Bees		No	Buffer - Bees in hollow
wpt100	50H	378191	6352146	Tuart	15-20	>50	0					Buffer
wpt101	50H	378225	6352116	Limestone Marlock	10-15	>50	0					Buffer
wpt102	50H	378239	6352100	Jarrah	15-20	>50	0					Buffer
wpt103	50H	378165	6352059	Limestone Marlock	10-15	>50	0					

APPENDIX E

CAMERA TRAP RESULTS

Camera Trap Results

Camera Number	Date	Common Name	Species	Number
GH 17	27/05/2018	Australian Magpie	<i>Cracticus tibicen</i>	1
GH 22	01/06/2018	Australian Raven	<i>Corvus coronoides</i>	1
GH 22	01/06/2018	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	01/06/2018	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	1
GH 22	28/05/2018	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	1
GH 23	28/05/2018	Red Fox	<i>Vulpes vulpes</i>	1
GH 23	02/06/2018	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	3
GH 23	26/05/2018	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	4
GH 23	28/05/2018	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	2
GH 23	29/05/2018	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	5
GH 23	30/05/2018	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	3
GH 24	01/06/2018	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	1
GH 24	31/05/2018	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	2
GH 25	27/05/2018	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 25	28/05/2018	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 25	28/05/2018	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	1
GH 25	29/05/2018	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	2
GH 26	30/05/2018	Common Brushtail Possum	<i>Trichosurus vulpecula</i>	1
GH 26	30/05/2018	Red Fox	<i>Vulpes vulpes</i>	1
GH 29	28/05/20118	Common Brushtail Possum	<i>Trichosurus vulpecula</i>	1
GH 29	02/06/20118	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	2
GH 29	31/05/20118	Western Grey Kangaroo	<i>Macropus fuliginosus</i>	1
GH 31	01/06/2018	Common Brushtail Possum	<i>Trichosurus vulpecula</i>	1
GH 31	28/05/2018	Common Brushtail Possum	<i>Trichosurus vulpecula</i>	1
GH 31	30/05/2018	Common Brushtail Possum	<i>Trichosurus vulpecula</i>	1

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