

APPENDIX E

Greg Harewood Fauna Survey 2018

Fauna Assessment



Lot 5 Wellesley Road (CPS 8007/1) Wellesley

APRIL 2018

Version 2

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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.....	7
3.1.5	Taxonomy and Nomenclature	8
3.1.6	Likelihood of Occurrence – Fauna of Conservation Significance.....	8
3.2	SITE SURVEYS	9
3.2.1	Fauna Habitat Assessment	9
3.2.2	Black Cockatoo Habitat Assessment	9
3.2.2.1	Black Cockatoo Breeding Habitat.....	10
3.2.2.2	Black Cockatoo Foraging Habitat	11
3.2.2.3	Black Cockatoo Roosting Habitat	11
3.2.3	Western Ringtail Possum Assessment	12
3.2.4	Camera Traps	12
3.2.5	Other Fauna Species of Conservation Significance.....	12
3.2.6	Opportunistic Fauna Observations.....	12
4.	SURVEY CONSTRAINTS	13
5.	RESULTS	14
5.1	POTENTIAL FAUNA INVENTORY – LITERATURE REVIEW.....	14

5.2	SITE SURVEYS	14
5.2.1	Fauna Habitat Assessment	14
5.2.2	Black Cockatoo Habitat Assessment	16
5.2.2.1	Black Cockatoo Habitat Tree Assessment	16
5.2.2.2	Black Cockatoo Foraging Habitat Assessment.....	17
5.2.2.3	Black Cockatoo Roosting Habitat Assessment.....	18
5.2.3	Western Ringtail Possum Assessment	18
5.2.4	Camera Traps	18
5.2.5	Other Fauna Species of Conservation Significance.....	18
5.2.6	Opportunistic Fauna Observations.....	19
5.3	FAUNA INVENTORY – SUMMARY.....	19
6.	LIKELIHOOD OF OCCURRENCE AND POTENTIAL IMPACTS	21
7.	CONCLUSION.....	26
8.	REFERENCES	28

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 8007/1) within Lot 5 Wellesley Road, Wellesley (the subject site) (Figures 1 and 2). The subject site contains about 6 ha of remnant vegetation that is required to be removed to allow for an existing sand extraction operation to continue.

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 on the 7 April 2018. A nocturnal survey of the subject site was carried out on the 9 April 2018. All field survey work was carried out by Greg Harewood (B.Sc. - Zoology).

The subject site is comprised of sparse jarrah (with a very small number of marri and tuart) open woodland over a low woodland dominated by peppermint with occasional banksia. The area appears to have been subject to significant historical/ongoing disturbance (fire, partial clearing and firewood collecting) with most trees being relatively small, indicative of relatively recent regrowth. Ground cover and low shrubs are very sparse, with the majority of the subject site containing a mosaic of open highly degraded areas interspersed with occasional shrubs and grasses.

Because of the level of historical disturbance which has occurred at the site, fauna habitat values have been compromised significantly, mainly as a consequence of an absence of significant shrub and groundcover. The original fauna assemblage present before disturbance has therefore been depleted with most species now present, being generally common and widespread fauna species with non-specific requirements, which allow them to persist in disturbed/highly disturbed habitats.

The subject site was found to contain 57 potential "black cockatoo breeding habitat trees" (DBH >50cm). Seven 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, though none showed any sign of current or previous use by cockatoos for this purpose. Sections of the subject site represents black cockatoo foraging habitat mainly given the presence of jarrah and to a much lesser extent banksia and marri, though the exact extent is difficult to quantify given the tree species in question vary in density from area to area. No existing roosting trees

(trees used at night by black cockatoos to rest) were positively identified during the survey.

The subject site does contain what superficially looks like suitable habitat for the species (i.e. peppermint trees), however no evidence of western ringtail possums utilising the subject site was found during the day or night surveys (i.e. dreys, scats or individuals). This would suggest that they were either absent from the area surveyed or present in very low densities. WRPs have therefore been listed as a potential species as a precautionary measure, but they may in fact not use the site except on rare occasions.

With respect to native vertebrate fauna, 14 mammal (including nine bat species), 73 bird, 20 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. Seven species of introduced animals could also frequent the area.

Of the 109 native animals that are listed as occurring or potentially occurring in the area, six 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, south-western brush-tailed phascogale and western ringtail possum). In addition, two DBCA priority species (i.e. western brush wallaby and 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, is 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 8007/1) within Lot 5 Wellesley Road, Wellesley (the subject site) (Figures 1 and 2). The subject site contains about 6 ha of remnant vegetation that is required to be removed to allow for an existing sand extraction operation to continue.

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.
- ATA Environmental (2005). Lot 1001 Mardo Avenue, Australind, Environmental Assessment. Unpublished report for Marist Brothers.
- ATA Environmental (2006). Kemerton Power Station Reserve Vegetation, Flora and Fauna Assessment. Unpublished report for Transfield Services Kemerton Pty Ltd. May 2006.
- ATA Environment (2005). Environmental Assessment, South Binningup V2, June 2005. Unpublished report.

- Bamford Consulting Ecologists (2008). Fauna Assessment of the Proposed South Binningup Development. Unpublished report for RPS Consulting/Mirvac.
- 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.
- Coffey Environments Pty Ltd (2008). Portion of Lot 510 Marriott Road, Kemerton – Stage 1 Subdivision. Flora Vegetation, Wetlands and Fauna Assessment. Unpublished report for the TME.
- 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.
- Eco Logical Australia (2014). Targeted Ecological Surveys for Kemerton Industrial Park. Prepared for LandCorp.
- Eco Logical Australia (2017a). Desktop Assessment of Selected Lots within Kemerton Industrial Area. Prepared for S2V Consulting.
- Eco Logical Australia (2017b). Kemerton Industrial Area Spring Flora and Fauna Survey. Prepared for S2V Consulting.
- Eco Logical Australia (2017c). Kemerton Industrial Area: Additional Assessment of Proposed Access Road Area'. Prepared for S2V Consulting.
- GHD (2015). Waterloo Urban and Industrial Expansion. Flora and Fauna Survey. Unpublished report for Shire of Dardanup.
- GHD (2017). Biological Assessment - Additional Area Assessment - Kemerton Strategic Industrial Area. Unpublished letter report for Albemarle Lithium Pty Ltd.
- Harewood, G. (2009). Fauna Assessment (Level 1) and Targeted Fauna Survey (Western Ringtail Possum and Southern Brush-tailed Phascogale) in the Mine Expansion Area. Unpublished Report for Kemerton Silica Pty Ltd.
- Harewood, G. (2010). Fauna Survey (Level 2). Kemerton Industrial Core. Unpublished report for Cardno (WA) Pty Ltd.
- Harewood, G. (2012). Threatened Fauna Assessment - Proposed Clearing Area Lot 43 Stanley Road Wellesley. Unpublished report for GHD.

- Harewood, G. (2012). Fauna Assessment of Lot 9004 (part) Treendale Stage 4. Unpublished report for Treendale.
- 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.
- Harewood, G. (2015). Fauna Assessment. Lot 510 (part) Kemerton Industrial Park. Unpublished report for RPS Australia Asia Pacific.
- Harewood, G. (2016). Lots 7, 9, 10, 50, 100 (east) & 100 (west) Clifton Road, Brunswick. Unpublished report for JAK Civil.
- 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 2018);
- 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 - Species listed under JAMBA are also protected under Schedule 5 of the *WC Act*.)

All migratory bird species listed in the annexes to these bilateral agreements are protected in Australia as matters of national environmental significance (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 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 on the 7 April 2018. A nocturnal survey of the subject site was carried out on the 9 April 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 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 hollows seen, none of which were considered suitable for black cockatoos to use for nesting; or
- Tree >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) 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 attempt to flush any sitting birds from hollows and calls of chicks were also listened for. It should be noted that the survey may have been conducted outside of the main breeding season of one or more of the three species of black cockatoo.

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

Six camera traps (infrared motion sensing cameras – Model: LTL Acorn 5210A) were set up within the subject site and left in place for four days/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.

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, 14 mammal (including nine bat species), 73 bird, 20 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. Seven species of introduced animals could also frequent the area.

Of the 109 native animals that are listed as potentially occurring, six are considered to be endangered/vulnerable or in need of special protection under State and/or Federal law. In addition, two DBCA priority species are also listed as potential species. These particular species are discussed in further detail in the following sections of the report.

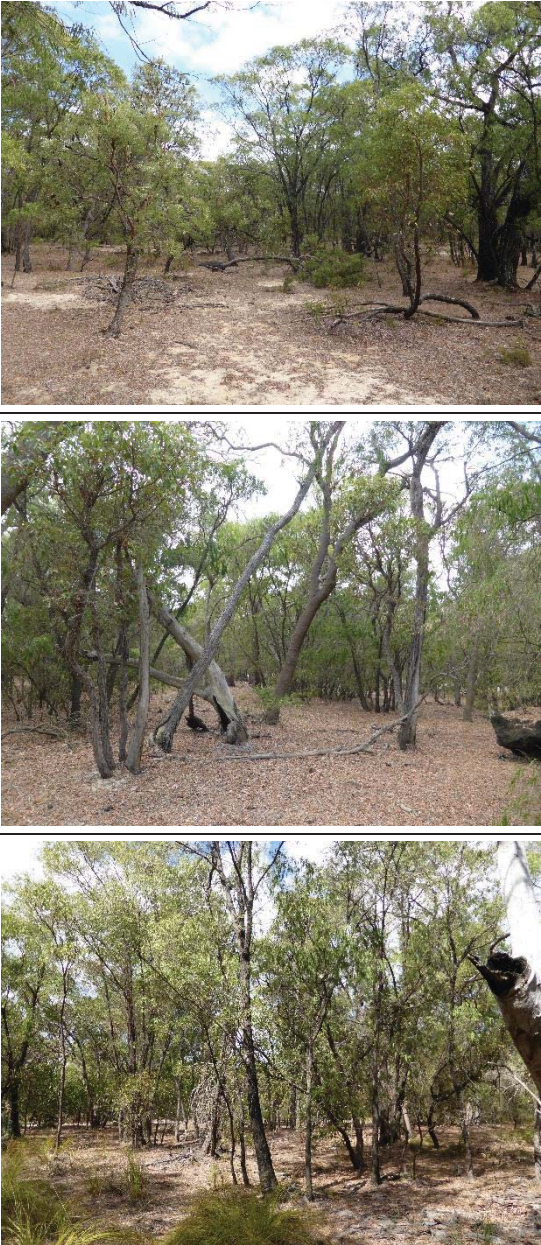
5.2 SITE SURVEYS

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 comprised of sparse jarrah (with a very small number of marri and tuart) open woodland over a low woodland dominated by peppermint with occasional *banksia*. The area appears to have been subject to significant historical/ongoing disturbance (fire, partial clearing and firewood collecting) with most trees being relatively small, indicative of relatively recent regrowth. Ground cover and low shrubs are very sparse, with the majority of the subject site containing a mosaic of open, highly degraded areas interspersed with occasional shrubs and grasses.

Table 1: Main Fauna Habitats within the Subject site

Unit	Fauna Habitat Description	Example Images
1	<p>Open woodland of <i>Eucalyptus marginata</i> with very occasional <i>Corymbia calophylla</i> over a low woodland dominated by <i>Agonis flexuosa</i> with very occasional <i>Banksia attenuata</i> and <i>B. grandis</i> over a low open shrubland or very open grassland of introduced species or bare sand on dune crest with grey to light grey/white sands (grading to yellow at depth).</p>	 <p>The 'Example Images' column contains three photographs stacked vertically. The top photo shows a wide view of an open woodland with scattered trees and a sandy ground covered in dry leaves. The middle photo shows a closer view of trees with thick, gnarled trunks and sparse foliage. The bottom photo shows another view of the woodland, highlighting the sandy ground and the distribution of trees.</p>

Because of the level of historical disturbance which has occurred at the site, fauna habitat values have been compromised significantly, mainly as a consequence of an absence of significant shrub and groundcover. This would make these areas unsuitable, or at best, marginal for some fauna species which would originally have occurred, in particular some ground dwelling reptiles and mammals, in addition to birds which favour dense low vegetation.

The original fauna assemblage present before disturbance has therefore been depleted with most species now present, being generally common and widespread fauna species

with non-specific requirements which allow them to persist in disturbed/highly disturbed habitats.

Because of its generally degraded state, the area cannot be regarded as being of any specific local or regional conservation value when compared to other areas in the vicinity, much of which appears to be of a similar composition, but generally in better condition (e.g. areas within the Kemerton Industrial Buffer Zone, to the south and east).

The subject site is surrounded on three sides by areas of continuous native remnant vegetation and therefore it does not specifically represent a key “linkage” or “corridor” for wildlife movement. 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:

- Jarrah - *Eucalyptus marginata*;
- Marri – *Corymbia calophylla*;
- Tuart - *Eucalyptus gomphocephala*; and
- Dead unidentifiable species (most likely jarrah).

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.

A summary of the potential black cockatoo breeding trees (using DotEE criteria i.e. any suitable tree species with a DBH \geq 50cm (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)

Total Number of Habitat Trees	Number of Trees with <u>No Hollows</u> Observed	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			
				Jarrah	Marri	Tuart	Dead Unknown
57	28	22	7	47	3	1	6

The assessment identified a total of 57 trees with a DBH of \geq 50cms within the subject site. Twenty eight of the trees (~49.1%) were not observed to contain hollows of any size. Twenty two trees (~38.6%) contained one or more possible hollows considered by the Author not to be suitable for black cockatoos to use for nesting purposes.

Seven trees (~12.3%) 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, though none showed any sign of current or previous use by cockatoos for this purpose.

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

There are significant areas of similar habitat in vegetation bordering the subject site and it can be reasonably expected that these also 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:

- Jarrah - *Eucalyptus marginata*;
- Marri - *Corymbia calophylla*; and
- Banksia - *Banksia attenuata* and *B. grandis*.

It is very difficult to quantify the extent of actual foraging habitat with the subject site as the density and distribution of the abovementioned species varies from area to area with many areas being devoid of any significant foraging resources. In some areas the favoured foraging species are absent or represented by only a small number of specimens (e.g. areas totally dominated by peppermint).

Overall, the quality of the subject site as foraging habitat can be regarded as being poor given the general absence of marri and *banksia* and the dominance of peppermint. This conclusion is supported by the fact that no recent foraging debris left by black cockatoos was observed within the subject site during the survey period.

There are vast areas of similar habitat in vegetation bordering the subject site and it can be reasonably expected that these areas also contain vegetation that represents foraging habitat suitable for black cockatoos.

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.

There are vast areas of similar habitat in vegetation bordering the subject site and it can be reasonably expected that these areas contain many roosting options for black cockatoos.

5.2.3 Western Ringtail Possum Assessment

The subject site does contain what superficially looks like suitable habitat for the species (i.e. peppermint trees) however no evidence of western ringtail possums utilising the subject site was found during the day or night surveys i.e. no dreys, no scats and no individuals. This would suggest that they were either absent from the area surveyed or present in very low densities.

WRPs have been listed as a potential species as a precautionary measure, but they may in fact not use the site, except on rare occasions. Previous surveys carried out by the Author in this general area (i.e. east of Forrest Highway) have also failed to find individuals of the species, though it is very likely to occur at some locations, in particular along the Wellesley/Brunswick Rivers further to the south and eastwards of the subject site.

5.2.4 Camera Traps

The complete results of the camera trapping carried out are provided within Appendix E. Only two fauna species were recorded these being the common brushtail possum (*Trichosurus vulpecula*) and the western grey kangaroo (*Macropus fuliginosus*).

5.2.5 Other Fauna Species of Conservation Significance

No evidence of any fauna species of conservation significance utilising the subject site was found 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 12 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. Two introduced species (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.

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
Amphibians	2	0	0	0	0
Reptiles	20	0	0	0	0
Birds	74 ¹	4	0	0	10
Non-Volant Mammals	11 ⁶	2	0	1	4 ²
Volant Mammals (Bats)	9	0	0	1	0
Total	116⁷	6	0	2	14²

Superscript = number of introduced species included in total.

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 are likely to be present within the bounds of the subject site.

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				
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/Marginal	Unlikely to Occur.	No impact anticipated.
The Bunbury Skink <i>Hemiergis 'koontoolasi'</i>	P1	-	Low lying or swampy areas. Previously specimens have been captured in low "saltlake" vegetation (on the edge of the Preston River) and in a "swamp" (near Collie).	No	Would Not Occur.	No impact.
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/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 an area of habitat.
Masked Owl (SW population) <i>Tyto n. novaehollandiae</i>	P3	-	Roosts and nests in heavy forest, hunts over open woodlands and farmlands.	No/Marginal	Unlikely to Occur.	No impact anticipated.
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.
Black Bittern <i>Ixobrychus flavicollis</i>	P1	-	Freshwater pools, swamps and lagoons, well screened with trees. Shelters in dense waterside vegetation.	No	Would Not Occur.	No impact.
Little Bittern <i>Ixobrychus minutus</i>	P4	-	Dense vegetation surrounding/within freshwater pools, swamps and lagoons, well screened with trees. Shelters in dense beds of <i>Typha</i> , <i>Baumea</i> and tall rushes in freshwater swamps around lakes and along rivers.	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.

Species	Conservation Status		Habitat Preferences	Habitat Present	Likelihood of Occurrence	Possible Impacts
	WC Act/ DBCA Priority	EPBC Act				
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 an area of 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 an area of 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	Possibly Occurs.	Loss/modification of an area of habitat.
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/Marginal	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	Possibly Occurs.	Loss/modification of an area of habitat. Death/injury of individuals during clearing.
Numbat <i>Myrmecobius fasciatus</i>	S3	VU	Open Woodlands generally dominated by eucalypts that provide hollow logs and branches for shelter and termites for food.	No	Would Not Occur – Locally extinct.	No impact.
Quenda <i>Isodon 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	VU	Coastal peppermint, coastal peppermint-tuart, jarrah-marri associations, sheoak woodland, and eucalypt woodland and mallee.	Yes	Possibly Occurs.	Loss/modification of an area of habitat. Death/injury of individuals during clearing.
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.

Species	Conservation Status		Habitat Preferences	Habitat Present	Likelihood of Occurrence	Possible Impacts
	WC Act/ DBCA Priority	EPBC Act				
Woylie <i>Bettongia penicillata ogibyi</i>	S1	EN	Open sclerophyll forest and woodland with a low, dense, understorey of tussock grasses or woody scrub.	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	Possibly Occurs.	Loss/modification of an area of habitat.
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 an area of habitat. Death/injury of individuals during clearing.
Water Rat <i>Hydromys chrysogaster</i>	P4	-	Permanent water, fresh, brackish or marine.	No	Would Not Occur.	No impact.

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 subject site was found to contain 57 potential “black cockatoo breeding habitat trees” (DBH \geq 50cm). Seven 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, though none showed any sign of current or previous use by cockatoos for this purpose. Sections of the subject site represent black cockatoo foraging habitat mainly given the presence of jarrah and to a much lesser extent *banksia* and marri, though the exact extent is difficult to quantify given the tree species in question vary in density from area to area. No existing roosting trees (trees used at night by black cockatoos to rest) were positively identified during the survey.

The subject site does contain what superficially looks like suitable habitat for the species, (i.e. peppermint trees) however no evidence of western ringtail possums utilising the subject site was found during the day or night surveys (i.e. dreys, scats or individuals). This would suggest that they were either absent from the area surveyed or present in very low densities. WRPs have therefore been listed as a potential species as a precautionary measure, but they may in fact not use the site except on rare occasions.

With respect to native vertebrate fauna, 14 mammal (including nine bat species), 73 bird, 20 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. Seven species of introduced animals could also frequent the area.

Of the 109 native animals that are listed as occurring or potentially occurring in the area, six 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, south-western brush-tailed phascogale and western ringtail possum). In addition, two DBCA priority species (i.e. western brush wallaby and 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.

8. REFERENCES

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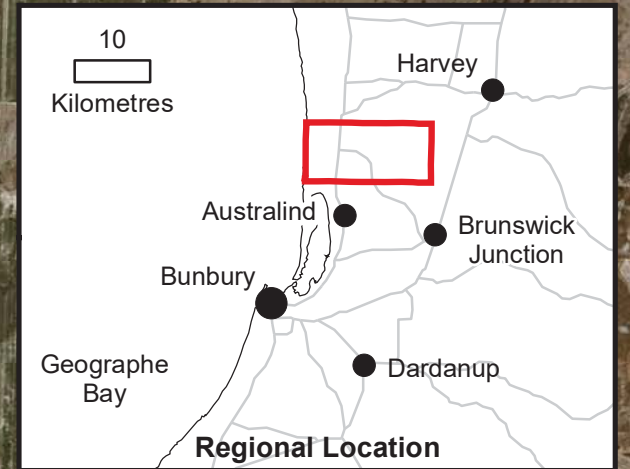
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FIGURES



Legend

 Subject Site




Drawn: G Harewood
Date: April 2018
Scale: 1:50,000

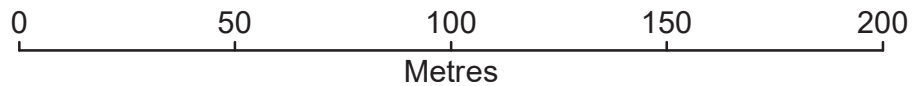
Lot 5 Wellesley Road
Wellesley

**Subject Site
&
Surrounds**



Legend

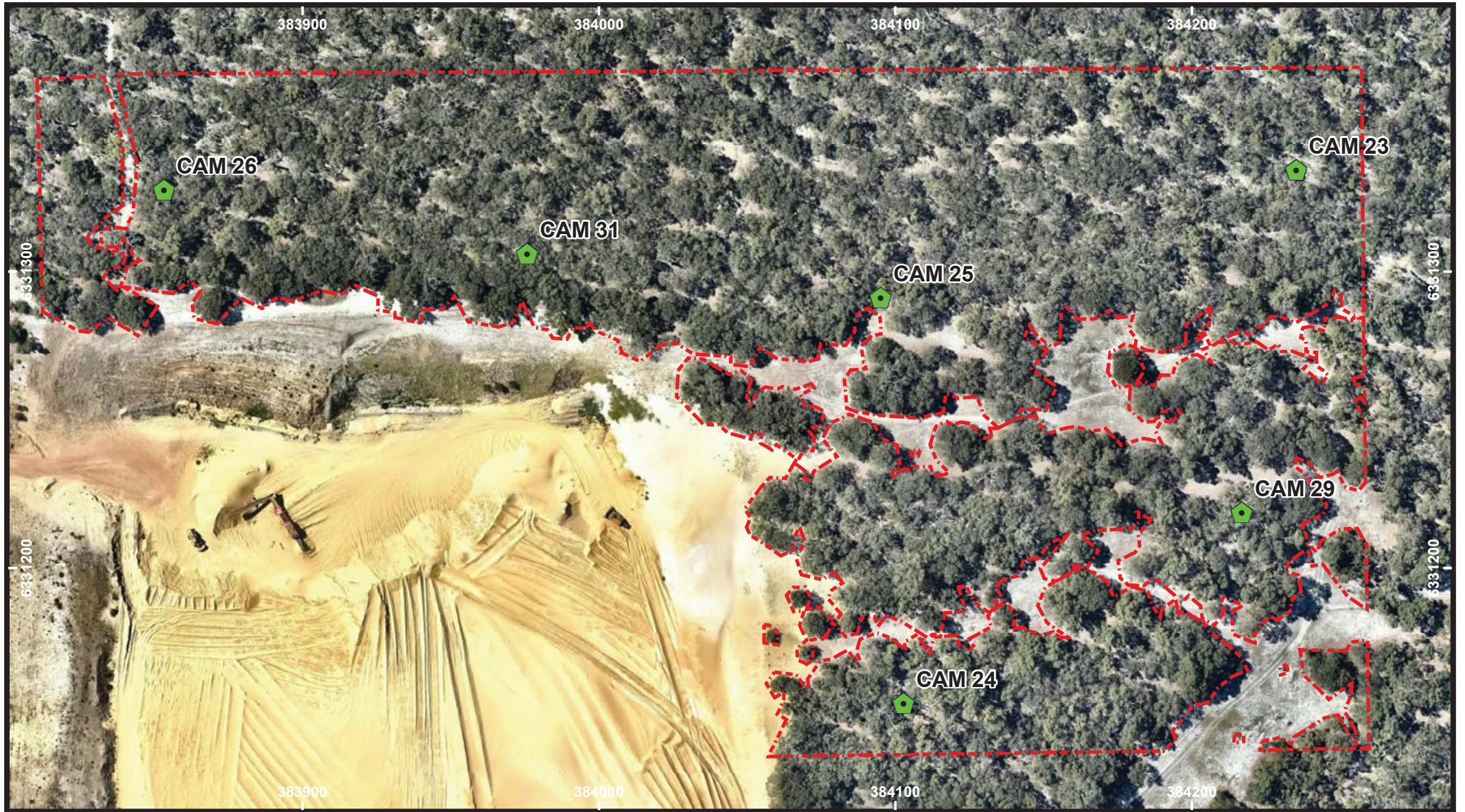
 Subject Site



Fauna Assessment
 Drawn: G Harewood
 Date: April 2018
 Scale: 1:1,750

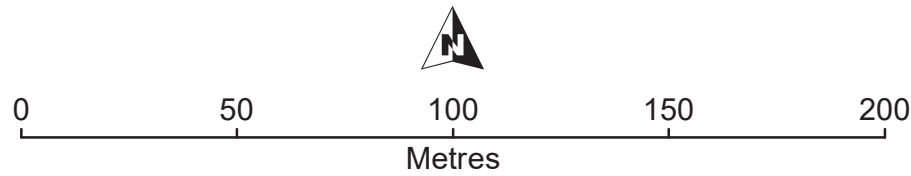
Lot 5 Wellesley Road
 Wellesley

**Subject Site
 Air Photo**



Legend

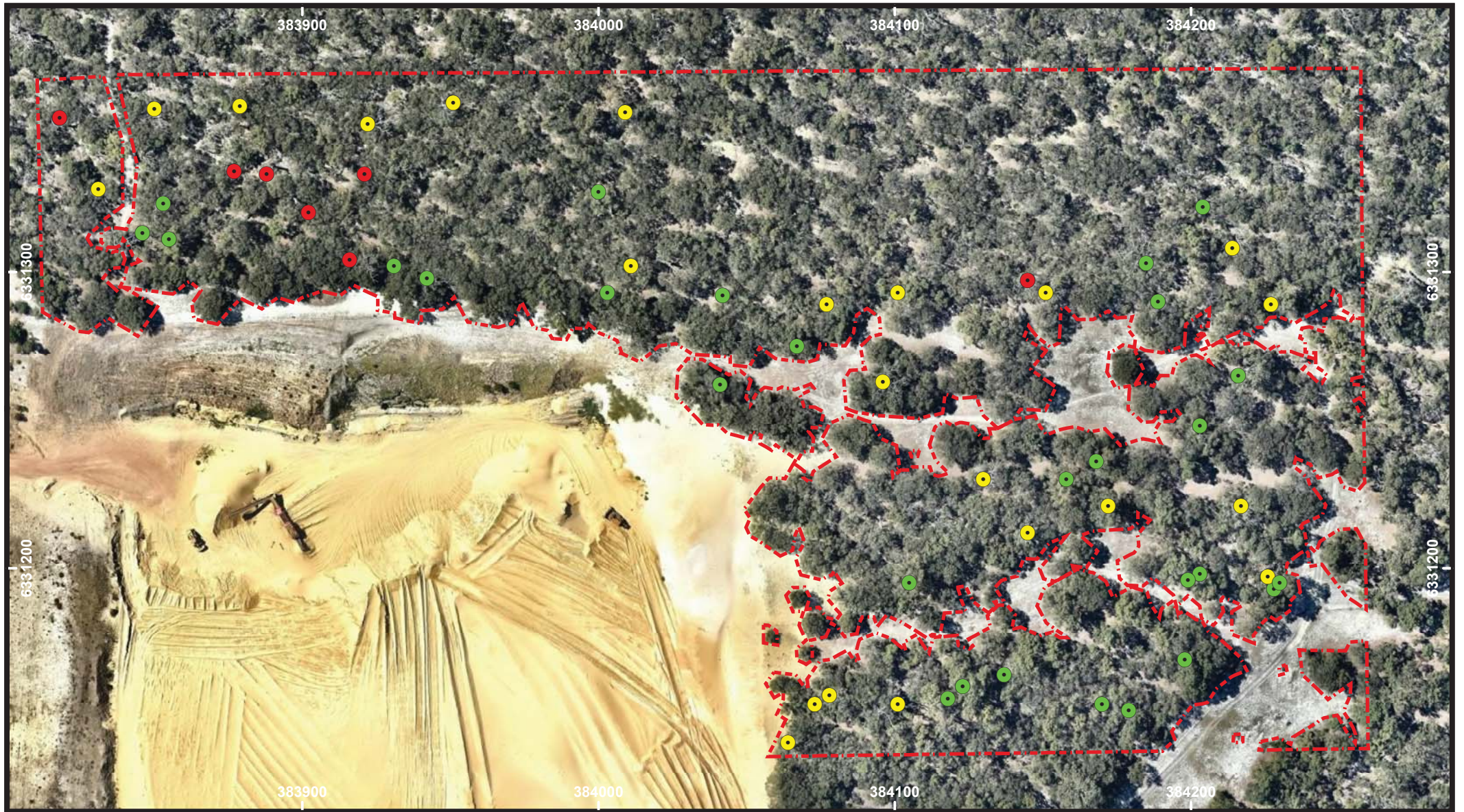
- Subject Site
- ⬠ Camera Trap Location





Fauna Assessment
 Drawn: G Harewood
 Date: April 2018
 Scale: 1:1,750




Lot 5 Wellesley Road
 Wellesley

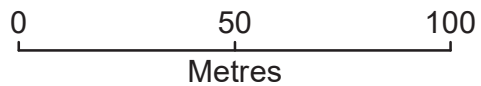
Camera Trap Locations



Legend

 Subject Site

-  Habitat Tree - One or more large hollows possibly suitable for black cockatoos
-  Habitat Tree - One or more possible small/medium hollows
-  Habitat Tree - No hollows seen



Drawn: G Harewood
Date: April 2018
Scale: 1:1,750

Lot 5 Wellesley Road
Wellesley

**Habitat Trees
(DBH >50cm)**

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

*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

Compiled by Greg Harewood - April 2018

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

Approximate centroid = 33.15085° and 115.75704°

Lot 5 (part) Wellesley Road, Wellesley

A = Harewood, G. (2018). Fauna Assessment Lot 5 Wellesley Road (CPS 8007/1) Wellesley. Unpublished report for Carbone Bros. Pty Ltd.

B = GHD (2017). Biological Assessment - Additional Area Assessment - Kemerton Strategic Industrial Area. Unpublished letter report for Albemarle Lithium Pty Ltd

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

D = GHD (2015). Waterloo Urban and Industrial Expansion. Flora and Fauna Survey. Unpublished report for Shire of Dardanup.

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

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

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

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

I = ATA Environmental (2005). Lot 1001 Mardo Avenue, Australind, Environmental Assessment. Unpublished report for Marist Brothers.

J = DBCA (2018). NatureMap Database search. "By Circle" Centre - 115° 45' 25" E, 33° 09' 03" S; Accessed 10/04/2018.

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

Myobatrachidae

Ground or Burrowing Frogs

<i>Heleioporus eyrei</i>	Moaning Frog	LC			X	X	X	X	X	X	X	X
<i>Limnodynastes dorsalis</i>	Western Banjo Frog	LC			X	X	X	X	X	X	X	X

Reptilia

Gekkonidae

Geckoes

<i>Christinus marmoratus</i>	Marbled Gecko				X		X	X	X	X	X	X
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WAWC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA 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 / 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
Pygopodidae Legless Lizards												
<i>Aprasia repens</i>	Sandplain Worm Lizard											
<i>Lialis burtonis</i>	Burton's Legless Lizard				X		X	X	X	X		X
Agamidae Dragon Lizards												
<i>Pogona minor</i>	Western Bearded Dragon				X		X	X	X	X		X
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

WAWC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA 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 1 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
Scincidae												
Skinks												
<i>Acritoscincus trilineatum</i>	Southwestern Cool Skink				X		X			X		
<i>Cryptoblepharus buchananii</i>	Buchanan's Snake-eyed Skink			X	X		X			X	X	X
<i>Ctenotus fallens</i>	West Coast Ctenotus							X				X
<i>Egernia kingii</i>	King's Skink					X		X				X
<i>Egernia napoleonis</i>	Salmon-bellied Skink				X	X	X					X
<i>Hemiergis quadrilineata</i>	Two-toed Mulch Skink		X	X			X	X	X	X	X	X
<i>Lerista elegans</i>	West Coast Four-toed Lerista				X		X	X	X	X	X	X
<i>Menetia greyii</i>	Dwarf Skink		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
<i>Tiliqua rugosa</i>	Bobtail		X	X			X	X	X	X	X	X
Typhlopidae												
Blind Snakes												
<i>Anilius australis</i>	Southern Blind Snake						X	X		X	X	
Elapidae												
Elapid Snakes												
<i>Notechis scutatus</i>	Tiger Snake				X		X	X				X
<i>Pseudonaja affinis</i>	Dugite				X	X	X	X				X
<i>Simoselaps bertholdi</i>	Jan's Banded Snake				X			X		X	X	X

WAWC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA 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 / 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
Aves												
Casuariidae Emus, Cassowaries												
<i>Dromaius novaehollandiae</i>	Emu	Bp LC			X		X					X
Phasianidae Quails, Pheasants												
<i>Coturnix pectoralis</i>	Stubble Quail	LC										X
Accipitridae Kites, Goshawks, Eagles, Harriers												
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk	Bp LC									X	X
<i>Accipiter fasciatus</i>	Brown Goshawk	Bp LC				X	X	X				X
<i>Aquila audax</i>	Wedge-tailed Eagle	Bp LC			X		X	X				X
<i>Aquila morphnoides</i>	Little Eagle	Bp LC							X	X		
<i>Elanus caeruleus</i>	Black-shouldered Kite	LC				X	X		X			
<i>Haliastur sphenurus</i>	Whistling Kite	Bp LC			X		X					X
<i>Hamirostra isura</i>	Square-tailed Kite	Bp LC		X			X		X	X	X	X

WAWC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA 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 / 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
Falconidae												
Falcons												
<i>Falco berigora</i>	Brown Falcon	Bp LC				X			X			X
<i>Falco cenchroides</i>	Australian Kestrel	LC			X	X	X	X	X		X	X
<i>Falco longipennis</i>	Australian Hobby	LC										X
<i>Falco peregrinus</i>	Peregrine Falcon	S7 Bp LC				X		X				X
Turnicidae												
Button-quails												
<i>Turnix varia</i>	Painted Button-quail	Bp LC			X			X		X		
Columbidae												
Pigeons, Doves												
<i>Ocyphaps lophotes</i>	Crested Pigeon	LC		X	X	X	X		X	X		X
<i>Phaps chalcoptera</i>	Common Bronzewing	Bh LC		X	X	X	X	X	X	X	X	X

WAWC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA 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 1 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
Psittacidae												
Parrots												
<i>Cacatua roseicapilla</i>	Galah	LC		X	X	X	X	X	X	X	X	X
<i>Cacatua sanguinea</i>	Little Corella	LC				X	X			X		X
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black-Cockatoo	S3 VU Be LC		X	X	X	X			X		X
<i>Calyptorhynchus baudinii</i>	Baudin's Black-Cockatoo	S2 EN Bp EN A3cde					X					X
<i>Calyptorhynchus latirostris</i>	Carnaby's Black-Cockatoo	S2 EN Bp EN A2bcde			X		X	X	X			X
<i>Neophema elegans</i>	Elegant Parrot	LC			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
<i>Platycercus zonarius</i>	Australian Ringneck	LC	X	X	X	X	X	X	X	X	X	X
<i>Polytelis anthopeplus</i>	Regent Parrot	LC			X	X	X		X		X	X
Cuculidae												
Parasitic Cuckoos												
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	LC								X		X
<i>Chrysococcyx basalis</i>	Horsfield's Bronze Cuckoo	LC		X								
<i>Chrysococcyx lucidus</i>	Shining Bronze Cuckoo	LC			X		X	X		X		X
<i>Cuculus pallidus</i>	Pallid Cuckoo	LC				X						

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
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
Podargidae Frogmouths												
<i>Podargus strigoides</i>	Tawny Frogmouth	LC					X			X		X
Aegothelidae Owlet-nightjars												
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar	LC										X
Halcyonidae Tree Kingfishers												
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Introduced		X	X	X	X		X	X	X	X
<i>Todiramphus sanctus</i>	Sacred Kingfisher	LC			X	X	X			X		X
Meropidae Bee-eaters												
<i>Merops ornatus</i>	Rainbow Bee-eater	JA LC		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

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Acanthizidae												
Thornbills, Geryones, Fieldwrens & Whitefaces												
<i>Acanthiza apicalis</i>	Broad-tailed Thornbill	Bh LC		X	X		X	X	X	X	X	X
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Bh LC	X		X	X	X			X		X
<i>Acanthiza inornata</i>	Western Thornbill	Bh LC										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
<i>Smicrornis brevirostris</i>	Weebill	Bh LC	X	X	X	X	X	X	X	X		X
Pardalotidae												
Pardalotes												
<i>Pardalotus punctatus</i>	Spotted Pardalote	LC			X	X						X
<i>Pardalotus striatus</i>	Striated Pardalote	LC		X	X	X	X	X	X	X	X	X
Meliphagidae												
Honeyeaters, Chats												
<i>Acanthorhynchus superciliosus</i>	Western Spinebill	LC		X	X	X	X				X	X
<i>Anthochaera carunculata</i>	Red Wattlebird	LC	X	X	X	X	X	X	X	X	X	X
<i>Lichenostomus virescens</i>	Singing Honeyeater	LC		X		X		X		X		
<i>Lichmera indistincta</i>	Brown Honeyeater	LC		X	X	X	X	X		X	X	X
<i>Phylidonyris nigra</i>	White-cheeked Honeyeater	Bp LC									X	
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	Bp LC		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
Petroicidae												
Australian Robins												
<i>Eopsaltria australis</i>	Western Yellow Robin	Bh LC					X					
<i>Petroica multicolor</i>	Scarlet Robin	Bh LC		X	X		X					
Neosittidae												
Sitellas												
<i>Daphoenositta chrysoptera</i>	Varied Sittella	Bh LC										X
Pachycephalidae												
Crested Shrike-tit, Crested Bellbird, Shrike Thrushes, Whistlers												
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	Bh LC			X	X	X	X		X		X
<i>Pachycephala pectoralis</i>	Golden Whistler	Bh LC	X	X	X		X	X	X	X		
<i>Pachycephala rufiventris</i>	Rufous Whistler	LC		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	
<i>Rhipidura leucophrys</i>	Willie Wagtail	LC		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

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G	H	I	J
Artamidae												
Woodswallows, Butcherbirds, Currawongs												
<i>Artamus cinereus</i>	Black-faced Woodswallow	Bp LC		X		X	X					X
<i>Artamus cyanopterus</i>	Dusky Woodswallow	Bp LC			X	X						X
Cracticidae												
Currawongs, Magpies & Butcherbirds												
<i>Cracticus tibicen</i>	Australian Magpie	LC	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
<i>Strepera versicolor</i>	Grey Currawong	Bp LC				X	X					X
Corvidae												
Ravens, Crows												
<i>Corvus coronoides</i>	Australian Raven	LC	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
Hirundinidae												
Swallows, Martins												
<i>Hirundo neoxena</i>	Welcome Swallow	LC		X	X	X	X			X	X	X
<i>Hirundo nigricans</i>	Tree Martin	LC		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
Sylviidae												
Old World Warblers												
<i>Cincloramphus cruralis</i>	Brown Songlark	LC										
<i>Cincloramphus mathewsi</i>	Rufous Songlark	LC			X	X						
Zosteropidae												
White-eyes												
<i>Zosterops lateralis</i>	Silvereye	LC		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
Pseudocheiridae												
Ringtail Possums												
<i>Pseudocheirus occidentalis</i>	Western Ringtail Possum	S1 VU CR A2bce+3bce+4bc				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
<i>Macropus irma</i>	Western Brush Wallaby	P4 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
Molossidae												
Freetail Bats												
<i>Austronomus australis</i>	White-striped Free-tailed Bat	LC			X		X	X	X			
<i>Ozimops kitcheneri</i>	Western Free-tailed Bat	LC			X		X	X	X			
Vespertilionidae												
Ordinary Bats												
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	LC			X		X	X			X	X
<i>Chalinolobus morio</i>	Chocolate Wattled Bat	LC			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
<i>Nyctophilus gouldi</i>	Gould's Long-eared Bat	LC			X							X
<i>Nyctophilus major major</i>	Western Long-eared Bat	LC			X		X				X	
<i>Vespadelus regulus</i>	Southern Forest Bat	LC			X		X		X		X	X
Muridae												
Rats, Mice												
<i>Mus musculus</i>	House Mouse	Introduced			X			X	X	X	X	X
<i>Rattus rattus</i>	Black Rat	Introduced			X							X
Canidae												
Dogs, Foxes												
<i>Vulpes vulpes</i>	Red Fox	Introduced	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
Felidae Cats												
<i>Felis catus</i>	Cat	Introduced			X	X	X		X	X	X	X
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

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APPENDIX C

DBCA NATUREMAP & PROTECTED MATTERS SEARCH TOOL RESULTS

NatureMap - Wellesley

Created By Greg Harewood on 10/04/2018

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115° 45' 25" E, 33° 09' 03" S
Buffer 20km
Group By Species Group

Species Group	Species	Records
Amphibian	9	241
Bird	191	6402
Fish	15	96
Invertebrate	104	369
Mammal	40	1114
Reptile	38	832
TOTAL	397	9054

Name ID	Species Name	Naturalised	Conservation Code	¹ 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 Owllet-nightjar)			
20.	24310 <i>Anas castanea</i> (Chestnut Teal)			
21.	24312 <i>Anas gracilis</i> (Grey Teal)			
22.	24313 <i>Anas platyrhynchos</i> (Mallard)			
23.	24315 <i>Anas rhynchotis</i> (Australasian Shoveler)			
24.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
25.	47414 <i>Anhinga novaehollandiae</i> (Australasian Darter)			
26.	24506 <i>Anous tenuirostris</i> subsp. <i>melanops</i> (Australian Lesser Noddy)		T	
27.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
28.	24562 <i>Anthochaera lunulata</i> (Western Little Wattlebird)			
29.	25670 <i>Anthus australis</i> (Australian Pipit)			
30.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
31.	25558 <i>Ardea ibis</i> (Cattle Egret)		IA	
32.	41324 <i>Ardea modesta</i> (great egret, white egret)		IA	
33.	24340 <i>Ardea novaehollandiae</i> (White-faced Heron)			
34.	24341 <i>Ardea pacifica</i> (White-necked 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.	24345 <i>Botaurus poiciloptilus</i> (Australasian Bittern)		T	
43.	24721 <i>Cacatua galerita subsp. galerita</i> (Sulphur-crested Cockatoo)	Y		
44.	25714 <i>Cacatua pastinator</i> (Western Long-billed Corella)			
45.	25715 <i>Cacatua roseicapilla</i> (Galah)			
46.	25716 <i>Cacatua sanguinea</i> (Little Corella)			
47.	25598 <i>Cacomantis flabelliformis</i> (Fan-tailed Cuckoo)			
48.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
49.	24779 <i>Calidris acuminata</i> (Sharp-tailed Sandpiper)		IA	
50.	25738 <i>Calidris canutus</i> (Red Knot, knot)		IA	
51.	24784 <i>Calidris ferruginea</i> (Curllew Sandpiper)		T	
52.	24788 <i>Calidris ruficollis</i> (Red-necked Stint)		IA	
53.	24790 <i>Calidris tenuirostris</i> (Great Knot)		T	
54.	25717 <i>Calyptorhynchus banksii</i> (Red-tailed Black-Cockatoo)			
55.	24731 <i>Calyptorhynchus banksii subsp. naso</i> (Forest Red-tailed Black-Cockatoo)		T	
56.	24733 <i>Calyptorhynchus baudinii</i> (Baudin's Cockatoo (long-billed black-cockatoo), Baudin's Cockatoo)		T	
57.	24734 <i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo (short-billed black-cockatoo), Carnaby's Cockatoo)		T	
58.	48400 <i>Calyptorhynchus sp.</i> (white-tailed black cockatoo)		T	
59.	25575 <i>Charadrius leschenaultii</i> (Greater Sand Plover)		IA	
60.	24377 <i>Charadrius ruficapillus</i> (Red-capped Plover)			
61.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
62.	<i>Chroicocephalus novaehollandiae</i>			
63.	25601 <i>Chrysococcyx lucidus</i> (Shining Bronze Cuckoo)			
64.	24432 <i>Chrysococcyx lucidus subsp. plagosus</i> (Shining Bronze Cuckoo)			
65.	24288 <i>Circus approximans</i> (Swamp Harrier)			
66.	24774 <i>Cladorhynchus leucocephalus</i> (Banded Stilt)			
67.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
68.	24399 <i>Columba livia</i> (Domestic Pigeon)	Y		
69.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
70.	25592 <i>Corvus coronoides</i> (Australian Raven)			
71.	24417 <i>Corvus coronoides subsp. perplexus</i> (Australian Raven)			
72.	<i>Corvus splendens subsp. protegatus</i>			
73.	24671 <i>Coturnix pectoralis</i> (Stubble Quail)			
74.	25701 <i>Coturnix ypsilophora</i> (Brown Quail)			
75.	24420 <i>Cracticus nigrogularis</i> (Pied Butcherbird)			
76.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
77.	24422 <i>Cracticus tibicen subsp. dorsalis</i> (White-backed Magpie)			
78.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
79.	24322 <i>Cygnus atratus</i> (Black Swan)			
80.	30901 <i>Dacelo novaeguineae</i> (Laughing Kookaburra)	Y		
81.	25673 <i>Daphoenositta chrysoptera</i> (Varied Sittella)			
82.	24470 <i>Dromaius novaehollandiae</i> (Emu)			
83.	<i>Egretta garzetta</i>			
84.	<i>Egretta novaehollandiae</i>			
85.	<i>Elanus axillaris</i>			
86.	47937 <i>Eiseyornis melanops</i> (Black-fronted Dotterel)			
87.	<i>Eolophus roseicapillus</i>			
88.	24651 <i>Eopsaltria australis subsp. griseogularis</i> (Western Yellow Robin)			
89.	24652 <i>Eopsaltria georgiana</i> (White-breasted Robin)			
90.	24567 <i>Epthianura albifrons</i> (White-fronted Chat)			
91.	24379 <i>Erythronyctes cinctus</i> (Red-kneed Dotterel)			
92.	25746 <i>Eudyptula minor</i> (Little Penguin)			
93.	24818 <i>Eudyptula minor subsp. novaehollandiae</i> (Little Penguin)			
94.	25621 <i>Falco berigora</i> (Brown Falcon)			
95.	25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
96.	24472 <i>Falco cenchroides subsp. cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
97.	25623 <i>Falco longipennis</i> (Australian Hobby)			
98.	25624 <i>Falco peregrinus</i> (Peregrine Falcon)		S	
99.	25727 <i>Fulica atra</i> (Eurasian Coot)			
100.	24761 <i>Fulica atra subsp. australis</i> (Eurasian Coot)			
101.	25729 <i>Gallinula tenebrosa</i> (Dusky Moorhen)			
102.	24763 <i>Gallinula tenebrosa subsp. tenebrosa</i> (Dusky Moorhen)			
103.	25730 <i>Gallirallus philippensis</i> (Buff-banded Rail)			
104.	24765 <i>Gallirallus philippensis subsp. mellori</i> (Buff-banded Rail)			
105.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
106.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
107.	24487 <i>Haematopus longirostris</i> (Pied Oystercatcher)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
108.	24293 <i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)			
109.	24295 <i>Haliastur spheurnus</i> (Whistling Kite)			
110.	24296 <i>Hamirostra isura</i> (Square-tailed Kite)			
111.	47965 <i>Hieraaetus morphnoides</i> (Little Eagle)			
112.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
113.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
114.	<i>Hydroprogne caspia</i>			
115.	47975 <i>Ixobrychus dubius</i> (Australian Little Bittern)		P4	
116.	24511 <i>Larus novaehollandiae</i> subsp. <i>novaehollandiae</i> (Silver Gull)			
117.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
118.	30932 <i>Limosa lapponica</i> (Bar-tailed Godwit)		IA	
119.	24690 <i>Macronectes giganteus</i> (Southern Giant Petrel)		IA	
120.	24326 <i>Malacorhynchus membranaceus</i> (Pink-eared Duck)			
121.	25650 <i>Malurus elegans</i> (Red-winged Fairy-wren)			
122.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
123.	25758 <i>Megalurus gramineus</i> (Little Grassbird)			
124.	24587 <i>Melithreptus chloropsis</i> (Western White-naped Honeyeater)			
125.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)		IA	
126.	<i>Microcarbo melanoleucos</i>			
127.	48008 <i>Morus serrator</i> (Australasian Gannet)			
128.	25610 <i>Myiagra inquieta</i> (Restless Flycatcher)			
129.	24738 <i>Neophema elegans</i> (Elegant Parrot)			
130.	24739 <i>Neophema petrophila</i> (Rock Parrot)			
131.	24798 <i>Numenius madagascariensis</i> (Eastern Curlew)		T	
132.	25742 <i>Numenius phaeopus</i> (Whimbrel)		IA	
133.	25564 <i>Nycticorax caledonicus</i> (Rufous Night Heron)			
134.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
135.	24328 <i>Oxyura australis</i> (Blue-billed Duck)		P4	
136.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
137.	24624 <i>Pachycephala rufiventris</i> subsp. <i>rufiventris</i> (Rufous Whistler)			
138.	24693 <i>Pachyptila desolata</i> (Antarctic Prion)			
139.	<i>Pandion cristatus</i>			
140.	25681 <i>Pardalotus punctatus</i> (Spotted Pardalote)			
141.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
142.	24648 <i>Pelecanus conspicillatus</i> (Australian Pelican)			
143.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
144.	48066 <i>Petroica boodang</i> (Scarlet Robin)			
145.	24659 <i>Petroica goodenovii</i> (Red-capped Robin)			
146.	25697 <i>Phalacrocorax carbo</i> (Great Cormorant)			
147.	24664 <i>Phalacrocorax carbo</i> subsp. <i>novaehollandiae</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.	48071 <i>Phylidonyris niger</i> (White-cheeked Honeyeater)			
153.	24596 <i>Phylidonyris novaehollandiae</i> (New Holland Honeyeater)			
154.	24841 <i>Platalea flavipes</i> (Yellow-billed Spoonbill)			
155.	25720 <i>Platycercus icterotis</i> (Western Rosella)			
156.	24747 <i>Platycercus spurius</i> (Red-capped Parrot)			
157.	25721 <i>Platycercus zonarius</i> (Australian Ringneck, Ring-necked Parrot)			
158.	24750 <i>Platycercus zonarius</i> subsp. <i>semitorquatus</i> (Twenty-eight Parrot)			
159.	24843 <i>Plegadis falcinellus</i> (Glossy Ibis)		IA	
160.	24382 <i>Pluvialis fulva</i> (Pacific Golden Plover)		IA	
161.	24383 <i>Pluvialis squatarola</i> (Grey Plover)		IA	
162.	25703 <i>Podargus strigoides</i> (Tawny Frogmouth)			
163.	24679 <i>Podargus strigoides</i> subsp. <i>brachypterus</i> (Tawny Frogmouth)			
164.	25704 <i>Podiceps cristatus</i> (Great Crested Grebe)			
165.	24681 <i>Poliocephalus poliocephalus</i> (Hoary-headed Grebe)			
166.	25722 <i>Polytelis anthopeplus</i> (Regent Parrot)			
167.	25731 <i>Porphyrio porphyrio</i> (Purple Swamphen)			
168.	24767 <i>Porphyrio porphyrio</i> subsp. <i>bellus</i> (Purple Swamphen)			
169.	24769 <i>Porzana fluminea</i> (Australian Spotted Crake)			
170.	25732 <i>Porzana pusilla</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.	25534 <i>Sericornis frontalis</i> (White-browed Scrubwren)			
177.	30948 <i>Smicronis brevirostris</i> (Weebill)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
178.	24522 <i>Sterna bergii</i> (Crested Tern)			
179.	25644 <i>Sterna nereis</i> (Fairy Tern)			
180.	24329 <i>Stictonetta naevosa</i> (Freckled Duck)			
181.	25597 <i>Strepera versicolor</i> (Grey Currawong)			
182.	25589 <i>Streptopelia chinensis</i> (Spotted Turtle-Dove)	Y		
183.	25590 <i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)	Y		
184.	25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
185.	24682 <i>Tachybaptus novaehollandiae</i> subsp. <i>novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
186.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
187.	<i>Thalasseus bergii</i>			
188.	48135 <i>Thinornis rubricollis</i> (Hooded Plover, Hooded Dotterel)		P4	
189.	24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)			
190.	25549 <i>Todiramphus sanctus</i> (Sacred Kingfisher)			
191.	24309 <i>Todiramphus sanctus</i> subsp. <i>sanctus</i> (Sacred Kingfisher)			
192.	24803 <i>Tringa brevipes</i> (Grey-tailed Tattler)		IA	
193.	24806 <i>Tringa glareola</i> (Wood Sandpiper)		IA	
194.	24808 <i>Tringa nebularia</i> (Common Greenshank, greenshank)		IA	
195.	24809 <i>Tringa stagnatilis</i> (Marsh Sandpiper, little greenshank)		IA	
196.	48147 <i>Turnix varius</i> (Painted Button-quail)			
197.	24852 <i>Tyto alba</i> subsp. <i>delicatula</i> (Barn Owl)			
198.	24855 <i>Tyto novaehollandiae</i> subsp. <i>novaehollandiae</i> (Masked Owl (southwest))		P3	
199.	24386 <i>Vanellus tricolor</i> (Banded Lapwing)			
200.	25765 <i>Zosterops lateralis</i> (Grey-breasted White-eye, Silvereye)			

Fish

201.	<i>Carassius auratus</i>			
202.	34031 <i>Carcharodon carcharias</i> (Great White Shark)		T	
203.	<i>Edelia vittata</i>			
204.	<i>Elops hawaiiensis</i>			
205.	34028 <i>Galaxias occidentalis</i> (Western Minnow)			
206.	34027 <i>Galaxiella nigrostriata</i> (Black-stripe Minnow, black-striped dwarf galaxias)		T	
207.	<i>Gambusia affinis</i>			
208.	34030 <i>Geotria australis</i> (Pouched Lamprey)		P1	
209.	<i>Macroramphosus scolopax</i>			
210.	<i>Muraenichthys tasmaniensis</i>			
211.	<i>Ophisurus serpens</i>			
212.	<i>Parablennius postocolomaculatus</i>			
213.	<i>Pseudogobius olorum</i>			
214.	<i>Rachycentron canadum</i>			
215.	<i>Scobinichthys granulatus</i>			

Invertebrate

216.	<i>Acariformes</i> sp.			
217.	<i>Aeshnidae</i> sp.			
218.	<i>Aganippe rhapsiduca</i>			
219.	<i>Amblyomma triguttatum</i>			
220.	<i>Aname mainae</i>			
221.	<i>Aname tepperi</i>			
222.	<i>Arachnura higginsi</i>			
223.	<i>Araneus cyphoxis</i>			
224.	<i>Araneus eburneiventris</i>			
225.	<i>Araneus senicaudatus</i>			
226.	<i>Araneus senicaudatus</i> subsp. <i>simplex</i>			Y
227.	<i>Argiope protensa</i>			
228.	<i>Argiope trifasciata</i>			
229.	<i>Austracantha minax</i>			
230.	<i>Backbourkia brounii</i>			
231.	<i>Backbourkia heroine</i>			
232.	<i>Badumna insignis</i>			
233.	<i>Baetidae</i> sp.			
234.	<i>Caenidae</i> sp.			
235.	<i>Calamoecia clitellata</i>			
236.	<i>Ceratopogonidae</i> sp.			
237.	33939 <i>Cherax cainii</i> (Marron)			
238.	<i>Cherax quinquecarinatus</i>			
239.	<i>Chironominae</i> sp.			
240.	<i>Coenagrionidae</i> sp.			
241.	<i>Corduliidae</i> sp.			
242.	<i>Corixidae</i> sp.			
243.	<i>Cormocephalus aurantiipes</i>			

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244.	<i>Cormocephalus strigosus</i>			
245.	<i>Culicidae sp.</i>			
246.	<i>Dolichopodidae sp.</i>			
247.	<i>Dugesidae sp.</i>			
248.	<i>Dytiscidae sp.</i>			
249.	<i>Ecnomidae sp.</i>			
250.	<i>Ephydriidae sp.</i>			
251.	<i>Eriophora biapicata</i>			
252.	<i>Erpobdellidae sp.</i>			
253.	<i>Gomphidae sp.</i>			
254.	<i>Gripopterygidae sp.</i>			
255.	<i>Gyrinidae sp.</i>			
256.	<i>Hemicorduliidae sp.</i>			
257.	<i>Henicops dentatus</i>			
258.	<i>Hogna crispipes</i>			
259.	<i>Hydrobiosidae sp.</i>			
260.	<i>Hydrophilidae sp.</i>			
261.	<i>Hydropsychidae sp.</i>			
262.	<i>Hydroptilidae sp.</i>			
263.	<i>Hypsimeletopodidae sp.</i>			
264.	<i>Hyriidae sp.</i>			
265.	<i>Isopeda leishmani</i>			
266.	<i>Ixodes australiensis</i>			
267.	<i>Kangarosa properipes</i>			
268.	<i>Laetesia mollita</i>			
269.	<i>Lampona cylindrata</i>			
270.	<i>Latrodectus hasseltii</i>			
271.	<i>Leptoceridae sp.</i>			
272.	<i>Leptophlebiidae sp.</i>			
273.	<i>Libellulidae sp.</i>			
274.	<i>Lymnaeidae sp.</i>			
275.	<i>Maratus pavonis</i>			
276.	<i>Mesoveliidae sp.</i>			
277.	<i>Missulena granulosa</i>			
278.	<i>Missulena occatoria</i>			
279.	<i>Mituliodon tarantulinus</i>			
280.	<i>Nephila edulis</i>			
281.	<i>Nicodamus mainae</i>			
282.	<i>Notonectidae sp.</i>			
283.	<i>Nunciella aspera</i>			
284.	<i>Oecobius navus</i>			
285.	<i>Oligochaeta sp.</i>			
286.	<i>Oniscidae sp.</i>			
287.	<i>Oniscigastridae sp.</i>			
288.	<i>Orthoclaeniinae sp.</i>			
289.	<i>Palaemonidae sp.</i>			
290.	<i>Parastacidae sp.</i>			
291.	<i>Pentastemon intermedium</i>			
292.	<i>Perthiidae sp.</i>			
293.	<i>Phryganoporus candidus</i>			
294.	<i>Physidae sp.</i>			
295.	<i>Raveniella arenacea</i>			
296.	<i>Raveniella peckorum</i>			
297.	<i>Scirtidae sp.</i>			
298.	<i>Scolopendra laeta</i>			
299.	<i>Simuliidae sp.</i>			
300.	<i>Sphaeriidae sp.</i>			
301.	<i>Steatoda capensis</i>			
302.	<i>Steatoda grossa</i>			
303.	<i>Styloniscidae sp.</i>			
304.	<i>Synsphyronus magnus</i>			
305.	<i>Synthemistidae sp.</i>			
306.	<i>Talitridae sp.</i>			
307.	<i>Tanypodinae sp.</i>			
308.	<i>Tasmanicosa leuckartii</i>			
309.	<i>Telephlebiidae sp.</i>			
310.	<i>Temnocephalidea sp.</i>			
311.	<i>Tetralycosa oraria</i>			
312.	<i>Tipulidae sp.</i>			
313.	<i>Trachycosmus sculptilis</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
314.	<i>Urodacus novaehollandiae</i>			
315.	<i>Urodacus similis</i>			
316.	<i>Veliidae</i> sp.			
317.	<i>Venator immansueta</i>			
318.	<i>Venatrix pullastra</i>			
319.	34113 <i>Westralunio carteri</i> (Carter's Freshwater Mussel)		T	
Mammal				
320.	24088 <i>Antechinus flavipes</i> subsp. <i>leucogaster</i> (Yellow-footed Antechinus, Mardo)			
321.	24208 <i>Arctocephalus forsteri</i> (New Zealand fur-seal, long-nosed fur-seal)		S	
322.	24209 <i>Arctocephalus tropicalis</i> (Subantarctic fur-seal)		T	
323.	24044 <i>Balaenoptera acutorostrata</i> (Dwarf Minke Whale)			
324.	25452 <i>Bettongia penicillata</i> (Woylie, Brush-tailed Bettong)		T	
325.	24162 <i>Bettongia penicillata</i> subsp. <i>ogilbyi</i> (Woylie, Brush-tailed Bettong)		T	
326.	25454 <i>Canis lupus</i> (Dog, Dingo)	Y		
327.	30883 <i>Canis lupus</i> subsp. <i>familiaris</i> (Dog)	Y		
328.	24086 <i>Cercartetus concinnus</i> (Western Pygmy-possum, Mundarda)			
329.	24186 <i>Chalinolobus gouldii</i> (Gould's Wattleed Bat)			
330.	24092 <i>Dasyurus geoffroyi</i> (Chuditch, Western Quoll)		T	
331.	24043 <i>Eubalaena australis</i> (Southern Right Whale)		T	
332.	24189 <i>Falsistrellus mackenziei</i> (Western False Pipistrelle, Western Falsistrelle)		P4	
333.	24041 <i>Felis catus</i> (Cat)	Y		
334.	24215 <i>Hydromys chrysogaster</i> (Water-rat, Rakali)		P4	
335.	25478 <i>Isoodon obesulus</i> (Southern Brown Bandicoot)		P4	
336.	24153 <i>Isoodon obesulus</i> subsp. <i>fusciventer</i> (Quenda, Southern Brown Bandicoot)		P4	
337.	24071 <i>Kogia sima</i> (Dwarf Sperm Whale)			Y
338.	24132 <i>Macropus fuliginosus</i> (Western Grey Kangaroo)			
339.	24133 <i>Macropus irma</i> (Western Brush Wallaby)		P4	
340.	24051 <i>Megaptera novaeangliae</i> (Humpback Whale)		S	
341.	24213 <i>Mirounga leonina</i> (Southern Elephant Seal)			
342.	24223 <i>Mus musculus</i> (House Mouse)	Y		
343.	24146 <i>Myrmecobius fasciatus</i> (Numbat, Walpurti)		T	
344.	24210 <i>Neophoca cinerea</i> (Australian Sea-lion)		T	
345.	24194 <i>Nyctophilus geoffroyi</i> (Lesser Long-eared Bat)			
346.	24195 <i>Nyctophilus gouldi</i> (Gould's Long-eared Bat)			
347.	24085 <i>Oryctolagus cuniculus</i> (Rabbit)	Y		
348.	48070 <i>Phascogale tapoatafa</i> subsp. <i>wambenger</i> (South-western Brush-tailed Phascogale, Wambenger)		T	
349.	24166 <i>Pseudocheirus occidentalis</i> (Western Ringtail Possum, ngwayiri)		T	
350.	24245 <i>Rattus rattus</i> (Black Rat)	Y		
351.	24145 <i>Setonix brachyurus</i> (Quokka)		T	
352.	24111 <i>Sminthopsis gilberti</i> (Gilbert's Dunnart)			
353.	<i>Sminthopsis murina</i>			
354.	24259 <i>Sus scrofa</i> (Pig)	Y		
355.	24158 <i>Trichosurus vulpecula</i> subsp. <i>vulpecula</i> (Common Brushtail Possum)			
356.	30954 <i>Tursiops aduncus</i> (Indo-Pacific Bottlenose Dolphin)			
357.	24069 <i>Tursiops truncatus</i> (Bottlenose Dolphin)			
358.	24206 <i>Vespadelus regulus</i> (Southern Forest Bat)			
359.	24040 <i>Vulpes vulpes</i> (Red Fox)	Y		
Reptile				
360.	42368 <i>Acritoscincus trilineatus</i> (Western Three-lined Skink)			
361.	25335 <i>Caretta caretta</i> (Loggerhead Turtle)		T	
362.	43380 <i>Chelodina colliei</i> (South-western Snake-necked Turtle)			
363.	24980 <i>Christinus marmoratus</i> (Marbled Gecko)			
364.	30893 <i>Cryptoblepharus buchananii</i>			
365.	25027 <i>Ctenotus australis</i>			
366.	25039 <i>Ctenotus fallens</i>			
367.	25047 <i>Ctenotus impar</i>			
368.	25049 <i>Ctenotus labillardieri</i>			
369.	41641 <i>Ctenotus ora</i> (Coastal Plains Skink)		P3	
370.	24939 <i>Diplodactylus polyophthalmus</i>			
371.	25251 <i>Echiopsis curta</i> (Bardick)			
372.	25096 <i>Egernia kingii</i> (King's Skink)			
373.	25100 <i>Egernia napoleonis</i>			
374.	25250 <i>Elapognathus coronatus</i> (Crowned Snake)			
375.	25119 <i>Hemiergis quadrilineata</i>			
376.	43384 <i>Hydrophis platurus</i> (Yellow-bellied Seasnake)			
377.	25131 <i>Lerista distinguenda</i>			
378.	25133 <i>Lerista elegans</i>			
379.	25147 <i>Lerista lineata</i> (Perth Slider, Lined Skink)		P3	

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
380.	25005 <i>Lialis burtonis</i>			
381.	25184 <i>Menetia greyii</i>			
382.	25240 <i>Morelia spilota subsp. imbricata</i> (Carpet Python)			
383.	25191 <i>Morethia lineocellata</i>			
384.	25192 <i>Morethia obscura</i>			
385.	25248 <i>Neelaps bimaculatus</i> (Black-naped Snake)			
386.	25252 <i>Notechis scutatus</i> (Tiger Snake)			
387.	25253 <i>Parasuta gouldii</i>			
388.	25510 <i>Pogona minor</i> (Dwarf Bearded Dragon)			
389.	24907 <i>Pogona minor subsp. minor</i> (Dwarf Bearded Dragon)			
390.	25511 <i>Pseudonaja affinis</i> (Dugite)			
391.	25259 <i>Pseudonaja affinis subsp. affinis</i> (Dugite)			
392.	25266 <i>Simoselaps bertholdi</i> (Jan's Banded Snake)			
393.	25519 <i>Tiliqua rugosa</i>			
394.	25207 <i>Tiliqua rugosa subsp. rugosa</i>			
395.	24983 <i>Underwoodisaurus milii</i> (Barking Gecko)			
396.	25218 <i>Varanus gouldii</i> (Bungarra or Sand Monitor)			
397.	25225 <i>Varanus rosenbergi</i> (Heath Monitor)			

Conservation Codes

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

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



EPBC Act Protected Matters Report

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

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

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

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[Summary](#)

[Details](#)

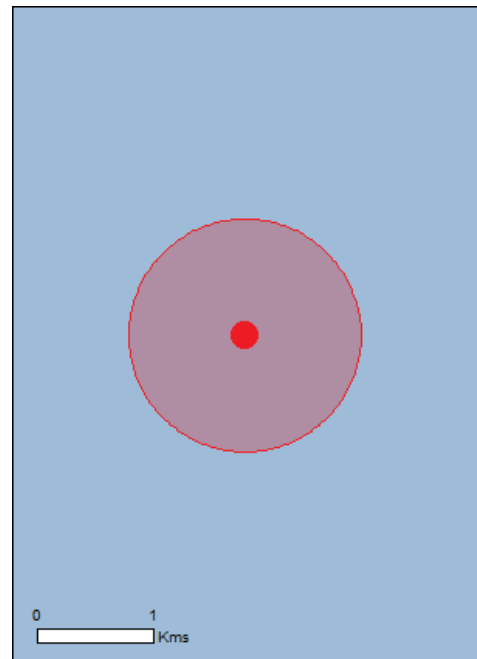
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[Extra Information](#)

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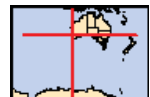
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Summary

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:	10

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:	16
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:	2
Regional Forest Agreements:	None
Invasive Species:	26
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Peel-yalgorup system	Within 10km of Ramsar

Listed Threatened Ecological Communities [Resource Information]

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

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

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
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Birds

Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
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Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
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Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
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Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat likely to occur within area
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Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Breeding likely to occur within area
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Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
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Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
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Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
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Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
--	------------	--

Mammals

Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
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Name	Status	Type of Presence
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Vulnerable	Species or species habitat likely to occur within area
Plants		
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
Austrostipa bronwenae [87808]	Endangered	Species or species habitat may occur within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat may occur within area
Caladenia procera Carbunup King Spider Orchid [68679]	Critically Endangered	Species or species habitat may occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat known to occur within area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat likely to occur within area
Drakaea elastica Glossy-leaved Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat known to occur within area
Synaphea sp. Fairbridge Farm (D. Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat may occur within area
Synaphea sp. Serpentine (G.R. Brand 103) [86879]	Critically Endangered	Species or species habitat may occur within area

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

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

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely 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]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely 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 may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species

Name	Threatened	Type of Presence
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	habitat may occur within area Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
NTWA Bushland covenant (0004)	WA
NTWA Bushland covenant (0095)	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 habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur

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

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

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-33.15085 115.75704

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 >50cm

Datum - GDA94

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
wpt073	50H	384101	6331154	Jarrah	15-20	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt074	50H	384073	6331154	Jarrah	10-15	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt075	50H	384064	6331141	Jarrah	15-20	>50	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt076	50H	384078	6331157	Jarrah	10-15	>50	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt077	50H	384118	6331156	Jarrah	15-20	>50	0					
wpt078	50H	384123	6331160	Jarrah	15-20	>50	0					
wpt079	50H	384137	6331164	Jarrah	15-20	>50	0					
wpt080	50H	384170	6331154	Jarrah	15-20	>50	0					
wpt081	50H	384179	6331152	Jarrah	15-20	>50	0					
wpt082	50H	384198	6331169	Jarrah	20+	>50	0					
wpt083	50H	384228	6331193	Marri	15-20	>50	0					
wpt084	50H	384226	6331197	Marri	15-20	>50	1	Large	No Signs	No Signs	No	Appears too shallow
wpt085	50H	384230	6331195	Marri	10-15	>50	0					
wpt086	50H	384217	6331221	Jarrah	15-20	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt087	50H	384203	6331198	Jarrah	15-20	>50	0					
wpt088	50H	384199	6331196	Jarrah	20+	>50	0					
wpt089	50H	384172	6331221	Jarrah	20+	>50	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt090	50H	384168	6331236	Jarrah	15-20	>50	0					
wpt091	50H	384158	6331230	Dead Jarrah	5-10	>50	0					
wpt092	50H	384130	6331230	Dead Jarrah	15-20	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt093	50H	384145	6331212	Jarrah	20+	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt094	50H	384105	6331195	Tuart	15-20	>50	0					
wpt095	50H	384096	6331263	Jarrah	20+	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt096	50H	384203	6331248	Jarrah	15-20	>50	0					
wpt097	50H	384216	6331265	Jarrah	15-20	>50	0					
wpt098	50H	384227	6331289	Jarrah	20+	>50	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt099	50H	384214	6331308	Dead Unknown	10-15	>50	1	Large	No Signs	No Signs	No	Appears too shallow
wpt100	50H	384204	6331322	Dead Jarrah	15-20	>50	0					
wpt101	50H	384185	6331303	Dead Jarrah	15-20	>50	0					
wpt102	50H	384189	6331290	Jarrah	15-20	>50	0					
wpt103	50H	384151	6331293	Jarrah	15-20	>50	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown

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
wpt104	50H	384145	6331297	Jarrah	15-20	>50	2+	Small-Large (cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt105	50H	384042	6331292	Jarrah	15-20	>50	0					
wpt106	50H	384041	6331262	Jarrah	15-20	>50	0					
wpt107	50H	384067	6331275	Jarrah	15-20	>50	0					
wpt108	50H	384077	6331289	Dead Unknown	0-5	>50	1	Large	No Signs	No Signs	No	Appears too low/shallow
wpt109	50H	384101	6331293	Dead Jarrah	5-10	>50	2+	Large	No Signs	No Signs	No	Appears too shallow
wpt110	50H	384009	6331354	Jarrah	15-20	>50	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt111	50H	383951	6331357	Dead Jarrah	15-20	>50	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt112	50H	383922	6331350	Jarrah	15-20	>50	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt113	50H	383921	6331333	Dead Unknown	10-15	>50	1	Large (cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt114	50H	383902	6331320	Dead Unknown	15-20	>50	2+	Medium-Large (cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt115	50H	383888	6331333	Dead Unknown	10-15	>50	1	Large (cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt116	50H	383879	6331356	Dead Jarrah	10-15	>50	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt117	50H	383850	6331355	Dead Unknown	15-20	>50	2+	Small-Medium	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt118	50H	383818	6331352	Dead Jarrah	15-20	>50	2+	Small-Large (cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt119	50H	383831	6331328	Dead Jarrah	15-20	>50	2+	Small	No Signs	No Signs	No	Internal dimensions of hollows unknown
wpt120	50H	383846	6331313	Dead Jarrah	15-20	>50	0					
wpt121	50H	383855	6331311	Jarrah	15-20	>50	0					
wpt122	50H	383853	6331323	Dead Jarrah	15-20	>50	0					
wpt123	50H	383877	6331334	Dead Jarrah	10-15	>50	1	Large (cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt124	50H	383916	6331304	Jarrah	15-20	>50	2+	Small-Large (cockatoo)	No Signs	No Signs	Yes	Internal dimensions of hollows unknown
wpt125	50H	383931	6331302	Jarrah	15-20	>50	0					
wpt126	50H	383942	6331298	Dead Jarrah	15-20	>50	0					
wpt127	50H	384000	6331327	Jarrah	15-20	>50	0					
wpt128	50H	384011	6331302	Dead Jarrah	0-5	>50	2+	Large	No Signs	No Signs	No	Appears too low/shallow
wpt129	50H	384003	6331293	Jarrah	15-20	>50	0					

APPENDIX E

CAMERA TRAP RESULTS

Camera Trap results

Camera Number	Date	Common Name	Species	Number
GH 21	07/04/2018	Common Brushtail Possum	Trichosurus vulpecula	1
GH 31	07/04/2018	Common Brushtail Possum	Trichosurus vulpecula	1
GH 29	08/04/2018	Western Grey Kangaroo	Macropus fuliginosus	1
GH 31	08/04/2018	Western Grey Kangaroo	Macropus fuliginosus	2
GH 31	10/04/2018	Common Brushtail Possum	Trichosurus vulpecula	1

DISCLAIMER

This fauna assessment report (“the report”) has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Greg Harewood (“the Author”). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints. In accordance with the scope of services, the Author has relied upon the data and has conducted environmental field monitoring and/or testing in the preparation of the report. The nature and extent of monitoring and/or testing conducted is described in the report.

The conclusions 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 preparing the report. Also it should be recognised that site conditions, can change with time.

Within the limitations imposed by the scope of services, the field assessment and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

In preparing the report, the Author has relied upon data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report (“the data”). Except as otherwise stated in the report, the Author has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (“conclusions”) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. The Author will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to the Author.

The report has been prepared for the benefit of the Client and no other party. The Author assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of the Author or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

The Author will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.