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Shire of Northam

Lot 0 Jennapullin Road (Reserve 3203), Southern Brook

Basic Fauna and Targeted Black Cockatoo Survey

Prepared For:	Shire of Northam
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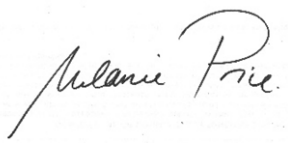
Reviewed by:	Melanie Price Principal Environmental Scientist		5 April 2024
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EXECUTIVE SUMMARY

The Shire of Northam (the Shire) are undertaking native vegetation clearing for road works and have proposed Lot 0 Jennapullin Road, Southern Brook (the Site) as an offset. The Shire commissioned Aurora Environmental to determine the suitability of the Site as an offset and undertake a Basic Fauna Survey and Targeted Black Cockatoo Habitat Assessment.

The field components of the survey were carried out from 21 to 23 February 2024. The conclusions of the survey are:

- The desktop survey identified 17 conservation significant species with suitable habitat present at the site. Of these, 14 were considered 'Possible' and one species (Carnaby's Cockatoo; *Zanda latirostris*) was considered 'Likely' to occur. Habitat condition and distance from other vegetation were limiting factors that reduced the likelihood of species being present.
- Four fauna habitat types were present at the site:
    - Open Eucalypt Woodland. This habitat provided suitable nesting habitat for Carnaby's Cockatoos (*Zanda latirostris*; Endangered) as well as some foraging habitat in areas identified as Very Good condition. Other potential conservation significant species include Western Rosella [inland] (*Platycercus icterotis xanthogenys*; P4), Masked Owl [Southwest] (Tyto novaehollandiae novaehollandiae; P3), Western Brush Wallaby (*Notamacropus irma*; P4), Red-tailed Phascogale (*Phascogale calura; Vulnerable*), South-western Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*), Black-striped Snake (*Neelaps calonotos*; P3) and Western Spiny-tailed Skink (*Egernia stokesii badia*; Endangered). These species may or may not be present depending on their dispersal capabilities and their persistence at the Site post gravel extraction activities;
    - Acacia/Allocasuarina Low Open Woodland;
    - Allocasuarina Low Woodland; and
    - Allocasuarina/Acacia/Banksia Low Woodland. This habitat provides foraging habitat for Carnaby's Cockatoos (*Zanda latirostris*; Endangered).
- Approximately 11.1 ha of Black Cockatoo foraging habitat is available at the Site in Good to Very Good condition.
- Historical gravel extraction at the site has lowered the quality of the vegetation. However, Black Cockatoo foraging species such as *Banksia sessilis* and *B. prionotes* are naturally regenerating in parts of the Site.
- There were 251 potential Black Cockatoo habitat trees in the survey area.
- Thirty-three trees had large hollows that appeared suitable for Black Cockatoos.
- Ninety-one trees contained hollows that were too small or too low for Black Cockatoo nesting. These trees provide suitable habitat for other fauna species including conservation-significant species that may be present at the site such as the Western Rosella [inland] (*Platycercus icterotis xanthogenys*; P4), Masked Owl [Southwest] (*Tyto novaehollandiae novaehollandiae*;

P3), Red-tailed Phascogale (*Phascogale calura*; Vulnerable) and South-western Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*).

- It is the opinion of Aurora Environmental that Lot 0 Jennapullin Road, Southern Book more than meets the requirements of the offset calculations and that the Site is an appropriate offset for clearing activities.

1 INTRODUCTION

1.1 PROJECT BACKGROUND

The Shire of Northam (the Shire) has lodged a clearing application under Part V of the *Environmental Protection Act 1986* (EP Act) to clear native vegetation for the purpose of road widening. The Shire has proposed Lot 0 Jennapullin Road (Reserve 3203) as a potential environmental offset and are required to determine its suitability as an offset for the vegetation that is to be cleared.

The offset calculations include the following:

- Twenty wandoo and York gum trees, equivalent to 0.20 hectares, that provide foraging and future breeding habitat for Carnaby's Cockatoos; and
- Thirty-one trees equivalent to 0.31 hectares, that are a part of a significant remnant within an extensively cleared landscape.

The Shire has commissioned Aurora Environmental (Aurora) to assess the fauna values of the survey area by undertaking a basic reconnaissance fauna survey and a targeted Black Cockatoo habitat assessment.

1.2 PURPOSE AND SCOPE OF WORK

The purpose of the project was to assess the fauna values within the site and to identify any significant fauna populations including a targeted assessment for Black Cockatoo habitat. The scope of work included:

- Basic fauna survey compliant with the EPA (2020) *Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment*. The fauna survey scope included the following:
    - A desktop study to gather contextual information using the Department of Biodiversity, Conservation and Attractions' (DBCA's) threatened and priority fauna database, NatureMap, the Department of Climate Change, Energy, the Environment and Water's (DCCEEW) Protected Matters Search Tool, existing surveys and other publicly available literature and spatial data;
    - A basic fauna survey and habitat assessment to validate the findings from the desktop study, assess habitat types and condition and record opportunistic sightings of fauna species involving a day-time survey and night-time spotlighting; and
    - Documenting the results of the assessment including the preparation of relevant spatial data.
- Black cockatoo habitat assessment in accordance with the Department of Climate Change, Energy, the Environment and Water (DCCEEW) *Referral guideline for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black cockatoo* (Department of Agriculture, Water and the Environment, 2022). The Black Cockatoo habitat assessment scope included the following:

- A desktop assessment including a review of DBCA records of Black Cockatoos in the vicinity of the survey areas and other publicly available literature and spatial data;
- A site survey to investigate evidence of black cockatoo activity and assess the presence of breeding, foraging and roosting habitat within each survey area; and
- Documenting the results of the assessment including the preparation of relevant spatial data.

2 SITE CHARACTERISTICS

2.1 SURVEY AREA

Lot 0 Jennapullin Road (Reserve 3203) (the Site) is a 31.2618 ha parcel of land in the Shire of Northam (Figure 1). The Site is zoned for Public Purposes – Quarry. Active quarries are not currently present at the Site. However, historical aerial photography shows that parts of the Site have been cleared in the past. Currently the Site is predominantly vegetated. Previous clearing is evident, but vegetation is reclaiming these areas. Multiple unsealed vehicle tracks dissect the Site.

The Site is bounded by Jennapullin Road on the west from the northern to southern tips of the Site. Property boundaries on the eastern and southern sides are clearly defined and firebreaks are actively managed. The surrounding land is zoned 'Rural' and is predominantly cleared for agriculture. Remnants of native vegetation exist as small pockets in a highly cleared landscape.

FIGURE 1: SITE AND SURROUNDING LAND USE

Source: Google Earth (2024)

2.2 PHYSICAL ENVIRONMENT

2.2.1 Climate

The climate is semi-arid (dry) warm Mediterranean (Beecham, 2001) with hot, dry summers and cool, wet winters. The mean annual rainfall for Northam is 426 mm with the majority of rainfall occurring between May and September (Bureau of Meteorology, 2024).

Summer temperatures are hot with average maximum temperatures for December to February above 30 °C and average minimum temperatures above 16 °C (Bureau of Meteorology, 2024). Average winter maximums range from 17 to 18 °C and average minimums from 3 to 5 °C (Bureau of Meteorology, 2024).

2.2.2 Geology

The Shire of Northam is situated on the Yilgarn Craton (Beecham, 2001). The Site is part of the South-west Terrane Greenstones unit described as "Quartz-feldspar-biotite gneiss (predominantly metasedimentary in origin; may include orthogneiss" (Landgate, 2024; DMIRS-016).

2.2.3 Soils

The soils of the Site are part of the Northern Zone of Rejuvenated Drainage consisting of gently undulating rises and low hills (DPIRD, 2024). The Site also intersects the Morbinning System and the Jelcobine System and both the Quailing 1 Phase and Jelcobine York Subsystem (Table A; Figure 2). The Ewarts 1 Phase soil type is immediately adjacent to the Site along the northern boundary.

TABLE A: SOIL CHARACTERISTICS

MAP UNIT	DESCRIPTION
Northen Zone of Rejuvenated Drainage	Erosional surface of gently undulating rises to low hills. Continuous stream channels that flow in most years. Colluvial processes are active. Soils formed in colluvium or in-situ weathered rock. Mainly from Jimperding Metamorphic Rocks (DPIRD, 2024).
Morbinning System	Undulating sandplain remnants, breakaways and slopes, in the northern Zone of Rejuvenated Drainage, with grey deep sandy duplex (often alkaline), pale deep sand and yellow sandy earth. Wandoo-jam-salmon gum woodland and heath (PDIRD, 2024).
Jelcobine System	Isolated steep low hills with undulating low granite hills and isolated lateritic remnants in the Zone of Rejuvenated Drainage. Gravels, and grey shallow to deep sandy duplexes. Wandoo, York gum, Jam and Casuarina woodland predominate (DPIRD, 2024).
Quailing 1 Phase	Yellow and pale sandplain and gravelly soils of the central wheatbelt that are often found above a breakaway (DPIRD, 2024).
Jelcobine York Subsystem	Areas of soil derived from freshly exposed rock. This unit is typified by the red soils of the Avon Valley but also includes areas of similar, but often greyer and lighter textured soils to the east of the valley (DPIRD, 2024).

MAP UNIT	DESCRIPTION
Ewarts 1 Phase	Hillslopes containing sand and loamy sand over yellowish clay soils, with some gravel ridges, and some heavier soils that often occur immediately below a breakaway (DPIRD, 2024).

FIGURE 2: SOIL TYPES

Green: Morbinning System; Yellow: Jelcobine System

Source: DPIRD, 2024 https://dpird.maps.arcgis.com/apps/webappviewer/index.html?id=662e8cbf2def492381fc915aaf3c6a0f

2.2.4 Surface Water and Catchments

The site is within the Avon River Basin (DWER-027) and the Swan-Avon-Mortlock Catchment (Landgate, 2024; DWER-028). There are no wetlands or rivers within the survey area. A non-perennial minor watercourse is situated 90 m to the south of the Site. This watercourse is a tributary of the Mortlock River.

2.3 BIOLOGICAL ENVIRONMENT

2.3.1 Interim Biogeographic Regionalisation of Australia

The Interim Biogeographic Regionalisation for Australia (IBRA version 7) divides the Australian continent into 89 bioregions and 419 subregions. IBRA regions represent a landscape-based approach to classifying the land surface, including attributes of climate, geomorphology, landform, lithology, and characteristic flora and fauna.

The survey area is within the Katanning subregion of the Avon Wheatbelt bioregion (DPIRD, 2023). The Katanning subregion is the subregion of Rejuvenated Drainage. It is an area of active drainage on the Yilgarn craton characterised by proteaceous scrub-heaths on the residual lateritic uplands and derived sandplains and mixed eucalypts, *Allocasuarina huegeliana* and Jam-York Gum woodlands on the Quaternary alluvials and eluvials (Beecham 2001).

2.3.2 Pre-European Vegetation

The survey area intersects two pre-European vegetation types (Figure 3). York_694 is scrub-heath comprising a mixed heath with scattered tall shrubs of *Acacia* spp., Proteaceae and Myrtaceae and in the northern portion of the site. York_352 is 'Woodland other' comprising species such as York Gum (*Eucalyptus loxophleba*) and Salmon Gum (*E. salmonophloia*) (DPIRD, 2024).

FIGURE 3: PRE-EUROPEAN VEGETATION MAPPING

Source: NRInfo, 2024 https://dpird.maps.arcgis.com/apps/webappviewer/index.html?id=662e8cbf2def492381fc915aaf3c6a0f

2.3.3 Black Cockatoos

Black Cockatoos are protected under Commonwealth and State legislation and may occur in the survey area. Baudin's Black Cockatoo (*Zanda baudinii* (also known as *Calyptorhynchus baudinii*)) and Carnaby's Black Cockatoo (*Zanda latirostris* (also known as *Calyptorhynchus latirostris*)) are listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the Western Australian *Biodiversity Conservation Act 2016.* The Red-Tailed Black Cockatoo (*Calyptorhynchus banksii naso*) is listed as Vulnerable. The populations of all three species are declining and this is expected to continue (Department of Agriculture, Water and the Environment, 2022).

Black Cockatoos rely on suitable breeding, roosting and foraging habitats for survival. Black Cockatoos nest in tree hollows which can take over 200 years to develop (Department of Agriculture, Water and the Environment, 2022). Roosting trees provide suitable habitat in the non-breeding season close to food and water resources and a safe place to rest at night (Department of Agriculture, Water and the Environment, 2022). Black Cockatoos require foraging habitat within 12 km of their nest during the breeding season to successfully raise chicks (Department of Agriculture, Water and the Environment, 2022). During the non-breeding season, they prefer to forage within 20 km of their roosting site although this can be greater (Department of Agriculture, Water and the Environment, 2022).

Open woodlands including York Gum (*Eucalyptus loxophleba*), Wandoo (*E. accedens*), Salmon Gum (*E. salmonophloia*) and Flooded Gum (*E. rudis*) in the Wheatbelt region are utilised by Carnaby's Cockatoos for breeding (Department of Agriculture, Water and the Environment, 2022). Baudin's Cockatoos and Red-tailed Forest Black Cockatoos also utilise parts of the Wheatbelt for breeding including the eastern margins of the Jarrah forest (not applicable to the survey area) and some areas that meet the criteria for the Eucalypt Woodlands of the Western Australia Wheatbelt threatened ecological community (Department of Agriculture, Water and the Environment, 2022).

Eucalypt trees with appropriate hollows (dead or alive) are suitable as breeding trees for all three species and tall trees provide suitable roosting habitat (Department of Agriculture, Water and the Environment, 2022). The primary foraging habitat for Baudin's and Carnaby's Cockatoos includes native vegetation dominated by proteaceous species. In the Wheatbelt, areas of York Gum and Kwongkan Heath provide important foraging resources for Carnaby's Cockatoos (Department of Agriculture, Water and the Environment, 2022). Forest Red-tailed Black Cockatoos prefer foraging in areas of Jarrah, Marri or Karri forest as well as areas with Wandoo and Blackbutt trees (Department of Agriculture, Water and the Environment, 2022).

Habitat loss and fragmentation is the main cause of Black Cockatoo population decline, primarily from loss of suitable nesting trees and foraging habitat and the distances between vegetation patches (Department of Agriculture, Water and the Environment, 2022). Black Cockatoos are a slow-breeding species (1 to 2 chicks per year) which means it is difficult to recover from population decline (Department of Agriculture, Water and the Environment, 2022).

There are confirmed roosting sites for Carnaby's Cockatoos ~25 km south and 33 km east of the Site (Landgate, 2024; DBCA-052). There is also a confirmed breeding area (buffered) ~22 km to the east of the Site (Landgate, 2024; DBCA-054).

3 METHODS

The basic fauna survey was completed to the standards set out in *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA, 2020).

3.1 LIKELIHOOD OF OCCURRENCE ASSESSMENT

State and Commonwealth database searches were conducted to identify fauna species that have been recorded within or in close proximity to the survey area and identify any protected species or communities (Table B). Results were interpreted to provide context to the potential values and threats associated with the survey area. Consideration was given to the likelihood of the species being present (unlikely, possible, likely) based on mapped distribution, specimens formerly identified or presence of suitable habitat.

TABLE B: FAUNA DATABASE SEARCHES

DATABASE	DATE SEARCH RESULTS RECEIVED	SEARCH FOCUS	SEARCH RESULT
Australian Government Protected Matters Search Tool (PMST)	02/02/2024	Matters of National Environmental Significance (MNES)	Survey area + 20 km buffer
DBCA NatureMap	30/01/2024	• Fauna species list • Conservation Significant Fauna	Survey area + 20 km buffer
DBCA Threatened and Priority Fauna Database	31/01/2024	• Conservation Significant Fauna	Survey area + 40 km buffer

3.2 BASIC FAUNA SURVEY

3.2.1 Field Survey and Habitat Assessment

The field survey was undertaken on 21 to 23 February 2024 by Melanie Price of Aurora Environmental, an experienced environmental scientist, qualified zoologist and Black Cockatoo specialist and Dr Catherine Hall of Aurora Environmental, an experienced environmental scientist. A total of 35 person hours were spent searching for fauna and assessing fauna habitat. All animals seen or heard were recorded as well as any evidence of disturbance such as diggings or burrows.

The habitat assessment documented the type, condition and extent of habitats within the survey area. Vegetation, landform and soil units present at the survey area were used to define broad fauna habitat types. Habitat suitability for conservation significant species identified in the database searches was assessed to inform the Likelihood of Occurrence Assessment.

The survey area was traversed on foot. Track logs are included in Appendix 1 but only show the records for one person.

3.2.2 Spotlighting

Spotlighting was also undertaken to locate nocturnal species on 21 February 2024 from 7:30 – 9:30 pm. A total of 4 person hours were spent actively searching for fauna at the site with a headtorch. All animals seen or heard were recorded.

3.2.3 Motion-detection Cameras

Motion detection cameras[1] were placed at four locations (Appendix 2) to observe fauna within the survey area and to aid in determining the presence of conservation significant fauna. Two cameras were located in Eucalyptus Woodland habitat and two cameras in Allocasuarina/Acacia/Banksia Woodland habitat. Two cameras were mounted trees ~1.5 m above the ground to observe arboreal fauna and two cameras were placed on the ground to observe ground-dwelling fauna. Each habitat type contained one tree-mounted and one ground camera.

The cameras were left for 40 hours from 5 pm 21 February to 9 am 23 February 2024 and were set to take pictures during the day and night. Cameras were mounted on a platform (Figure 3) with a lure to attract fauna to the location in accordance with methodology developed by Mark Cowan at DBCA. Universal bait (mixture of peanut butter, oats, honey and fish sauce) was used as the lure and capped with insect mesh. The mesh ensured fauna (including invertebrates) could not access the bait and that the bait would last longer without needing to be refreshed.

The cameras were removed on 23 February 2024 and the pictures analysed for fauna occurrences. All vertebrate fauna were recorded.

FIGURE 4: CAMERA MOUNTINGS A) TREE-MOUNTED B) GROUND

[1] Pet & Livestock HQ, Solar Powered Trail Camera for Wildlife Watching with Solar Panel, HH-632

3.3 TARGETED BLACK COCKATOO SURVEY

The targeted Black Cockatoo habitat survey was undertaken in conjunction with the basic fauna survey on 21 to 23 February 2024. The site was assessed to determine the likelihood that Black Cockatoos utilise the survey area for breeding, roosting or foraging in accordance with the referral guidelines (Department of Agriculture, Water and the Environment, 2022).

Breeding Habitat

Assessment of black cockatoo breeding habitat involves the identification of all hollow forming trees species within the survey area that have a diameter at breast height (DBH) of over 50 cm. Species such as Wandoo and Salmon Gums are considered potential habitat trees if the DBH is greater than 30 cm. If potential breeding trees were present, the DBH of each tree was measured using a tape measure. The location of each potential breeding tree identified was recorded with a GPS and details of the tree species and the number and size of hollows (if any) were recorded. Target tree species include Salmon Gum, Wandoo or any other hollow forming species (e.g. *Corymbia/Eucalyptus*) of a suitable size that were present. Peppermint, *Banksia*, Sheoak and *Melaleuca* tree species (for example) were not assessed as they do not develop hollows that are used by black cockatoos.

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

> *Any tree which is alive or dead that contains one or more visible hollows (cavities within the trunk or branches) suitable for occupation by black cockatoo for the purpose of nesting/breeding. Hollows with an entrance greater than 12 cm in diameter and would allow the entry of a black cockatoo into a suitably oriented and sized branch/trunk, will be recorded as a 'potential 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). The calls of chicks were also listened for if a suitable hollow was present.

Night Roosting Habitat

Direct and indirect evidence of black cockatoos roosting within trees in the survey area was noted if observed. This included searching for branch clippings, droppings and moulted feathers.

Foraging Habitat

The location and nature of black cockatoo foraging evidence (e.g. chewed fruits around base of trees) observed during the field survey was recorded, if present. The nature and extent of potential foraging habitat present was also documented irrespective of the presence of any actual foraging evidence based on the foraging habitat descriptions provided in the *Referral Guidelines for 3 WA Threatened Black Cockatoo Species* (Department of Agriculture, Water and the Environment, 2022).

3.4 LIMITATIONS

Following completion of the desktop assessment and field surveys, a review of any limitations that may have affected a complete assessment of the survey area was conducted.

4 RESULTS AND DISCUSSION

4.1 DESKTOP ASSESSMENT

The NatureMap database search identified 352 species recorded within the search area comprising seven amphibians, 187 birds, six fish, 107 invertebrates, 10 mammals and 35 reptiles (Appendix 3).

4.1.1 Conservation Significant Fauna

The PMST Database (Appendix 4) and DBCA Threatened and Priority Fauna Database (Appendix 5) identified 37 conservation significant fauna species comprising 21 birds, one fish, four invertebrates, nine mammals and two reptiles. The likelihood of occurrence of these species in the survey area was assessed (Appendix 6) and 17 species were identified as having suitable habitat present. Of these, 14 were considered 'Possible' and one species (Carnaby's Cockatoo; *Zanda latirostris*) was considered 'Likely' to occur (Table C). Historical vegetation clearing and habitat disturbance due to quarry activities was a significant factor that reduced the likelihood of many species being present.

4.1.2 Limitations

The EPBC Act PMST is based on bioclimatic modelling for the potential presence of species. As such, the mapping does not represent actual records of the species in the area.

The records from the DBCA searches of threatened and priority fauna provide more accurate information for the area as these are generally based upon historic records. However, some records of collections, sightings or trappings cannot be dated or verified due to inadequate information accompanying the records and may therefore misrepresent the current range of some conservation significant species.

TABLE C: CONSERVATION SIGNIFICANT FAUNA WITH SUITABLE HABITAT

SPECIES	COMMON NAME	CONSERVATION STATUS	LIKELIHOOD OF OCCURENCE
BIRDS			
Apus pacificus	Fork-tailed Swift, Pacific Swift	Migratory	Possible
Aphelocephala leucopsis	Southern Whiteface	Vulnerable	Unlikely. Habitat potentially suitable but there are no records of this species within 100 km of the site (ALA, 2024).
Falco peregrinus	Peregrine Falcon	Other specially protected	Possible but unlikely to rely on survey area
Leipoa ocellata	Malleefowl	Vulnerable	Possible to unlikely. Habitat is marginal.
Platycercus icterotis xanthogenys	Western Rosella [inland]	Priority 4	Possible
Tyto novaehollandiae novaehollandiae	Masked Owl [Southwest]	Priority 3	Possible
Zanda latirostris	Carnaby's Cockatoo	Endangered	Likely
INVERTEBRATES			
Idiosoma mcclementsorum	Julimar Shield-backed Trapdoor Spider	Priority 2	Possible to unlikely. Ground has been extensively disturbed.
Idiosoma nigrum	Shield-backed Trapdoor Spider	Endangered	Possible to unlikely. Ground has been extensively disturbed.
Idiosoma schoknechtorum	Mortlock River Shield-backed Trapdoor Spider	Priority 3	Possible to unlikely. Ground has been extensively disturbed.
MAMMALS			
Dasyurus geoffroii	Chuditch, Western Quoll	Endangered	Possible to unlikely. Habitat is very disturbed.
Myrmecobius fasciatus	Numbat	Endangered	Unlikely. Habitat is very disturbed, and site falls outside current distribution estimates.
Notamacropus irma	Western Brush Wallaby	Priority 4	Possible
Phascogale calura	Red-tailed Phascogale	Vulnerable	Possible
Phascogale tapoatafa wambenger	South-western Brush-tailed Phascogale	Conservation Dependent	Possible
REPTILES			
Neelaps calonotos	Black-striped Snake	Priority 3	Possible
Egernia stokesii badia	Western Spiny-tailed Skink	Endangered	Possible

4.2 FIELD SURVEY

4.2.1 Seasonal Conditions

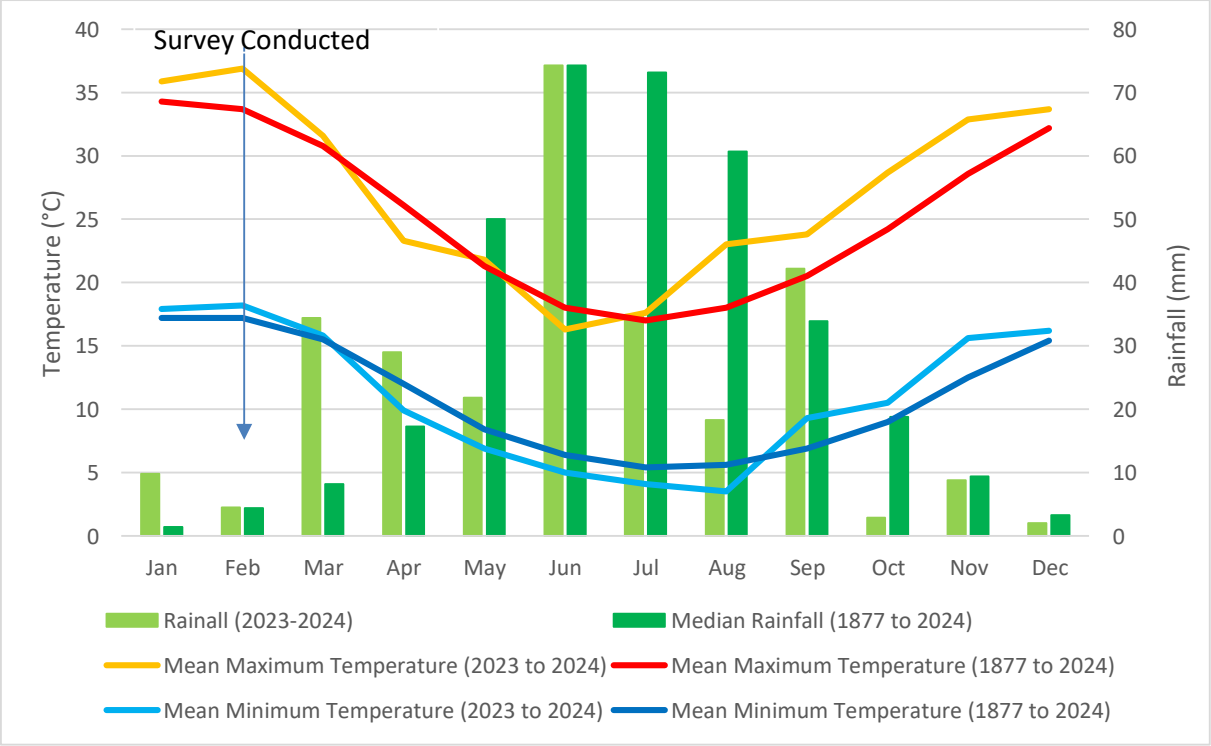
Daily weather observations recorded at Northam weather station (BOM Station 010111), were used to describe local rainfall and temperatures preceding and during the field survey.

The rainfall in the 12 months preceding the survey was typical of the Mediterranean climate with higher rainfall in winter and lower rainfall in summer (Figure 5). The rainfall for these 12 months (282.9 mm) was below the median[2] (416.8 mm; BOM, 2023) for Northam. It is likely that Northam was considered to have a 'dry' year. This may impact flowering, foraging and the fauna present at the site.

Temperatures followed the typical Mediterranean pattern although average monthly temperatures from September 2023 to February 2024 were 1-3 °C warmer than average (Figure 5).

Weather conditions during the survey were hot with maximum temperatures ranging from 31 – 45 °C and dry.

FIGURE 5: CLIMATE STATISTICS



[2] Monthly rainfall at Northam is highly variable and therefore the median values were used rather than the mean.

4.2.2 Fauna Observations

There were sighting or evidence of 16 vertebrate fauna species comprising 13 birds and three mammals (Table D). Two species (Rabbit and Cat) are not native to Australia. Photos of some species are provided in Appendix 7).

An owl was seen briefly flying past and multiple owl pellets (regurgitations) were found under a tree (Figure 3 of Appendix 7). Five species of owl have been recorded within 20 km of the survey area including the Australian Boobook (*Ninox boobook*), Southern Boobook (*Ninox novaeseelandiae*), Masked Owl [southwest] (*Tyto novaehollandiae subsp. Novaehollandiae*), Eastern Barn Owl (*Tyto javanica*) and Barn Owl (*Tyto alba*) (ALA, 2024; NatureMap, 2024). Masked Owl [southwest] is listed as Priority 3 under WA state legislation. There was not enough evidence to confirm which species was present. However, there is suitable habitat for the Masked Owl [southwest] at the site.

TABLE D: FAUNA SPECIES OBSERVED IN SURVEY AREA

COMMON NAME	SPECIES NAME
BIRDS	
Australian Magpie	*Gymnorhina tibicen*
Australian Raven	*Corvus coronoides*
Australian Ringneck, Twenty-eight	*Barnardius zonarius*
Bronzewing Pigeon	*Phaps chalcoptera*
Grey Butcherbird	*Cracticus torquatus*
Laughing Kookaburra	*Dacelo novaeguineae*
Owl (pellets and briefly sighted)	Order: Strigiformes
Pink and Grey Galah	*Eolophus roseicapilla*
Rufous Whistler	*Pachycephala rufiventris*
Tawny Frogmouth	*Podargus strigoides*
Willie Wagtail	*Rhipidura leucophrys*
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
Zebra Finch	*Taeniopygia castanotis*
INVERTEBRATES	
Scorpion (burrow)	*Urodacus* sp.
MAMMALS	
Cat	*Felis catus*
Common Wallaroo, Euro	*Osphranter robustus*
European Rabbit	*Oryctolagus cuniculus*

4.2.3 Fauna Habitat Descriptions

Four habitat types were identified and mapped at the Site (Table E; Figure 6). Habitat 1 comprised Open Eucalypt Woodland. The dominant species was Powderbark Wandoo with small groves of Salmon Gum and York Gum. This habitat had a substorey of Jam Wattle and Rock Sheoak. Areas in Very Good condition had emergent Parrot Bush and Acorn Banksia. Historical gravel extraction has impacted the condition of the vegetation. There are large mounds around the bases of many trees where gravel has been extracted but the tree remains. Understorey species are very sparse.

The historical disturbance (including extensive ground disturbance in some areas) means that the likelihood that conservation significant fauna are present is greatly reduced. However, the Site is a significant patch of vegetation in a highly cleared landscape which means that it may be the only habitat available for species that still live in the area. Wandoo, Salmon Gum and York Gum are hollow-bearing trees and therefore Habitat 1 provides suitable nesting habitat for Carnaby's Cockatoos. Areas in Very Good condition also provide Good to Very Good foraging habitat for Carnaby's Cockatoos. There were also numerous large hollow logs and trees with small or low hollows that were unsuitable for Cockatoos. These hollows and logs are suitable habitat for other fauna.

Other conservation significant species that may be present or may return to the Site as the vegetation improves include the Western Rosella [inland], Masked Owl [Southwest] and Western Brush Wallaby. If the vegetation condition improves, the habitat would most likely be more suitable for the Red-tailed Phascogale, South-western Brush-tailed Phascogale, Black-striped Snake and Western Spiny-tailed Skink. There is a small possibility that these species persist at the Site despite the previous disturbances. However, they have low dispersal capabilities and are not likely to return naturally to the Site without human intervention.

Habitat 2 was Low open woodland of Rock Sheoak and Jam Wattle. This habitat was considered Good fauna habitat and provides some foraging species for Carnaby's Cockatoos.

Habitat 3 was an Allocasuarina Low Open Woodland dominated by Rock Sheoak. Habitat 3 may provide suitable foraging habitat for the Red-tailed Phascogale which may utilise hollow-bearing trees in adjacent habitat types.

Habitat 4 was a Low Woodland comprising Rock Sheoak, Jam Wattle and Acorn Banksia. Other proteaceous species were also present. This habitat was in Very Good condition. Habitat 4 provides a Good to Very Good foraging resource for Carnaby's Cockatoos.

Additional site photos are provided in Appendix 8.

TABLE E: FAUNA HABITAT SUMMARY

ASPECT		REPRESENTATIVE PHOTO
HABITAT 1: OPEN EUCALYPTUS WOODLAND		
Habitat Structure	*Eucalyptus accedens* (Powderbark Wandoo) Open Woodland. Occasionally patches of *E. salmonophloia* (Salmon Gum) or *E. loxophleba* (York Gum). Over low woodland of *Acacia acuminata* (Jam Wattle) and *Allocasuarina huegeliana* (Rock Sheoak). Areas in Very Good condition had emergent *Banksia sessilis* (Parrot Bush) and *B. prionotes* (Acorn Banksia)	
Presence or absence of refugia	Moderate to high refugia. Many hollow trees and logs. Leaf-litter variable from absent to dense under some trees.	
Presence of absence of wetlands/ waterways	None	
Location of habitat within survey area compared to surrounding landscape	Within Site in highly cleared agricultural landscape. Trees extend along road sides north and south of the site.	
Habitat connectivity	Highly cleared landscape. Trees in road reserve provide habitat corridor to other small patches of native vegetation (mostly revegetation) in the region.	
Current land use and disturbance	Current purpose is for gravel extraction but signposted as a fauna and flora reserve. Historically used for gravel extraction which has left large mounds around the base of some trees that were not removed in the pits. Much of the mid/understorey vegetation is relatively young regrowth. Some very small areas have been burnt in the past 10 years and show signs of regeneration of tree species.	
Evaluation of likelihood of occurrence of conservation significant fauna	Provides many suitable and potential habitat trees for Carnaby's Cockatoos (*Zanda latirostris*). Provides some suitable habitat characteristics for Western Rosella [inland] (*Platycercus icterotis xanthogenys*), Masked Owl [Southwest] (*Tyto novaehollandiae novaehollandiae*), Red-tailed Phascogale (*Phascogale calura*) and South-western Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*).	
Vegetation/ habitat condition	Total: 12.07 ha; Degraded: 3.95 ha; Good: 6.13 ha; Very Good: 1.99 ha	
HABITAT 2: ACACIA/ALLOCASUARINA LOW OPEN WOODLAND		
Habitat Structure	Low open woodland of *Acacia acuminata* (Jam Wattle) and *Allocasuarina huegeliana* (Rock Sheoak).	
Presence or absence of refugia	Moderate refugia. Dense, thick leaflitter under *A. huegeliana* thickets. Low shrubs and grasses.	
Presence of absence of wetlands/ waterways	None	
Location of habitat within survey area compared to surrounding landscape	Within reserve in highly cleared landscape. Does not extend beyond the boundaries of the survey area.	
Habitat connectivity	Low habitat connectivity. Trees in road reserve provide habitat corridor to other small patches of native vegetation (mostly revegetation) in the area.	
Current land use and disturbance	Current purpose is gravel extraction but sign posted as fauna and flora reserve. Historically used for gravel extraction which has left mounds and cleared tracks. Not recently burnt.	
Evaluation of likelihood of occurrence of conservation significant fauna	No obvious species.	
Vegetation/ habitat condition	Total: 2.51 ha in Good condition	

ASPECT		REPRESENTATIVE PHOTO
HABITAT 3: ALLOCASUARINA LOW WOODLAND		
Habitat Structure	Low woodland of *Allocasuarina huegeliana* (Rock Sheoak)	
Presence or absence of refugia	Low to moderate refugia. Some fallen branches. Sparse to high leaf litter depending on density of trees.	
Presence of absence of wetlands/ waterways	None	
Location of habitat within survey area compared to surrounding landscape	Restricted to survey area.	
Habitat connectivity	Low habitat connectivity. Trees in road reserve provide habitat corridor to other small patches of native vegetation (mostly revegetation) in the region.	
Current land use and disturbance	Currently fauna and flora reserve. Historically used for gravel extraction which has left mounds and cleared tracks. Not recently burnt.	
Evaluation of likelihood of occurrence of conservation significant fauna	Provides some suitable habitat for Red-tailed Phascogale (*Phascogale calura*) that may utilise hollow-bearing trees in adjacent habitat types.	
Vegetation/ habitat condition	Total: 9.15 ha; Degraded: 2.51 ha; Good: 6.64 ha	
HABITAT 4: ALLOCASUARINA/ACACIA/BANKSIA LOW WOODLAND		
Habitat Structure	Low Woodland of *Allocasuarina huegeliana* (Rock Sheoak), *Acacia acuminata* (Jam Wattle) and *Banksia prionotes* (Acorn Banksia)	
Presence or absence of refugia	Moderate refugia. Some fallen branches. Areas in higher condition provide some dense shrubs.	
Presence of absence of wetlands/ waterways	None	
Location of habitat within survey area compared to surrounding landscape	Restricted to survey area.	
Habitat connectivity	Low habitat connectivity. Trees in road reserve provide habitat corridor to other small patches of native vegetation (mostly revegetation) in the region.	
Current land use and disturbance	Currently fauna and flora reserve. Historically used for gravel extraction which has left mounds and cleared tracks. Not recently burnt.	
Evaluation of likelihood of occurrence of conservation significant fauna	Good to Very Good foraging for Carnaby's Cockatoos (*Zanda latirostris*).	
Vegetation/ habitat condition	Total: 6.91 ha; Degraded: 0.47 ha; Good: 4.51 ha; Very Good: 1.94 ha Provides additional foraging for many fauna species.	

479400 479600 479800 480000 480200

6504200 6504000 6503800 6503600 6503400 6503200

Legend

R_3203

Condition	Habitat
Degraded	Acacia/Allocasuarina Low Open Woodland
Good	Allocasuarina Low Woodland
Very Good	Allocasuarina/Acacia/Banksia Low Woodland
	Eucalyptus Open Woodland

N

0 40 80 m

Scale: 1:3,500
MGA94 (Zone 50)

CAD Ref: a3022F003

Date: Mar 2024 | Rev: A | A3

Aurora environmental
ASSESS • ADVISE • APPLY

Author: C. Hall | AU Ref: SNO-AP00672

Drawn: CAD Resources ~ www.cadresources.com.au
Tel: (08) 9246 3242 ~ Fax (08) 9246 3202

Fauna Habitat Types and Condition

Figure: 6

4.3 BLACK COCKATOOS

4.3.1 Black Cockatoos

The DBCA database indicated that there are confirmed Black Cockatoo nesting trees within 20 – 30 km from the survey area. This increases the likelihood that Black Cockatoos are present in or around the survey area if appropriate resources are available. Based on the desktop assessment, the Black Cockatoos in this region are likely to be Carnaby's Cockatoos.

Foraging Habitat

Carnaby's Cockatoos feed primarily on proteaceous species in native shrubland, Kwongkan heathland and woodland (Department of Agriculture, Water and the Environment, 2022). *Banksia prionotes* and *B. sessilis* are proteaceous species that were dominant shrubs in parts of the Site. These species are an excellent foraging resource for Black Cockatoos (Groom, 2011). Other foraging species present at the site include *Grevillea vestita* and *Adenanthos* sp..

Approximately 11.1 ha of Black Cockatoo foraging habitat is available at the Site in Good to Very Good condition (Figure 7). There was no evidence of Black Cockatoo foraging at the site. Historical disturbance from gravel extraction has resulted in lower-quality vegetation. However, some species are naturally regenerating including *B. prionotes* and *B. sessilis* in the northern portion of the Site. The condition of the vegetation is likely to improve provided no new disturbances are introduced weeds, fire, earthworks). Despite historical disturbance, the foraging vegetation at the Site provides an important foraging resource for Carnaby's Cockatoos in a highly cleared landscape.

In addition, the reserve managed by Main Roads (MRWA) is a low woodland over shrubland with *B. prionotes* and *B. sessilis* occurring as dominant species. The vegetation in this area was fairly young but was dense and less disturbed than adjacent survey areas. The MRWA reserve provides an additional 0.72 ha of Very Good to Excellent Carnaby's Cockatoo foraging habitat although it is not part of the Site and the proposed offset.

Habitat Trees

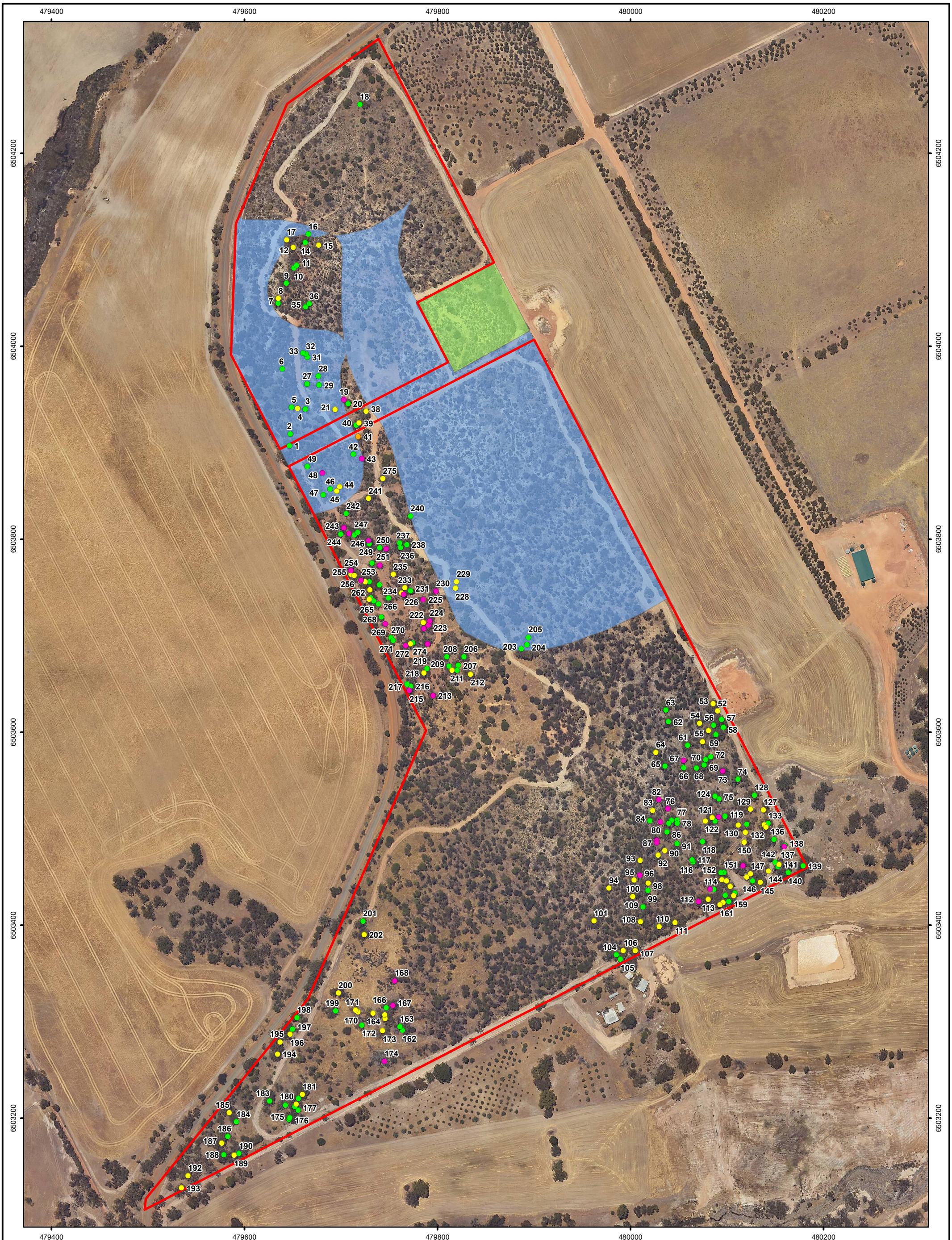
There were 251 potential habitat trees in the survey area with a DBH >30/>50 cm depending on species (Figure 7). Large hollows were present in 33 trees. From the ground, these hollows appeared large enough for Black Cockatoo nesting. An additional four trees contained large hollows that were too low for Black Cockatoos and one tree has an incipient large hollow. Eighty-seven trees contained hollows that were too small for Black Cockatoos but would be suitable for other fauna.

One tree had hollows that showed signs of use from a parrot species. However, the beak marks were too small to have been from Black Cockatoos. No other tree hollows showed signs of use.

Location and details potential habitat trees are provided in Appendix 9.

479400 479600 479800 480000 480200

6504200 6504000 6503800 6503600 6503400 6503200



Legend					
R_3203 Potential Habitat Trees	Cockatoo Foraging Condition	N	0 40 80 m Scale: 1:3,500 MGA94 (Zone 50)	Aurora environmental	Figure:
Potentially Suitable Hollow	Good to Very Good		CAD Ref: a3022F001	Author: C. Hall | AU Ref: SNO-AP00672	**Black Cockatoo Habitat**
Incipient Hollows	Very Good to Excellent		Date: Mar 2024 | Rev: A | A3	Drawn: CAD Resources ~ www.cadresources.com.au Tel: (08) 9246 3242 ~ Fax (08) 9246 3202	**7**
Small Hollows					
No Hollows					

4.4 OFFSET SUITABILITY

The purpose of the survey was to determine whether Lot 0 Jennapullin Road would constitute a suitable offset for native vegetation clearing undertaken by the Shire of Northam. To be considered appropriate the offset had to include the following:

- Twenty wandoo and York gum trees, equivalent to 0.20 hectares, that provide foraging and future breeding habitat for Carnaby's Cockatoos; and
- Thirty-one trees equivalent to 0.31 hectares, that are a part of a significant remnant within an extensively cleared landscape.

The survey identified 251 potential habitat trees across the site including 33 trees with potentially suitable large hollows. The trees were predominantly Powderbark Wandoo (*Eucalyptus accedens*) with occasional Salmon Gums (*E. salmonophloia*) and York Gums (*E. loxophleba*). This habitat type comprised 12.07 ha of which 1.99 ha was in Very Good condition and provided additional proteaceous foraging species. The site also provides an additional 9.11 ha of Good to Very Good Black Cockatoo foraging habitat. The Site is a significant remnant within an extensively cleared landscape.

In addition, the site comprises suitable habitat (now or in the future) for the Western Rosella [inland] (*Platycercus icterotis xanthogenys*; P4) and Masked Owl [Southwest] (*Tyto novaehollandiae novaehollandiae*; P3). Depending on access and connectivity, the site also has suitable habitat for the Western Brush Wallaby (*Notamacropus irma*; P4), Red-tailed Phascogale (*Phascogale calura*; Vulnerable), South-western Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*), Black-striped Snake (*Neelaps calonotos*; P3) and Western Spiny-tailed Skink (*Egernia stokesii badia*; Endangered). The habitat for these species is likely to improve as the vegetation regenerates.

4.5 LIMITATIONS

Seasonal sampling has not been carried out as part of this fauna assessment. The conclusions presented are based on information from Western Australian and Commonwealth databases and field data collected from a limited period of time. Therefore, the data and interpreted outcomes are indicative of the environmental conditions on the site at the time of the field assessment. It is recognised that site conditions may change over time.

The survey effort has not been subject to any constraints that affect the thoroughness of the assessment and the conclusions that have been formed (Table F).

TABLE F: POTENTIAL SURVEY LIMITATIONS

ASPECT	LIMITATION	COMMENT
Sources of information and availability of contextual information.	Nil	Adequate information is available for the survey area, including broadscale mapping and other information (DBCA database, NatureMap).
Scope (what life forms were sampled etc.)	Nil	Following desktop review, the field survey targeted conservation significant fauna most likely to be present in the survey area.
Proportion of fauna identified, recorded and/or collected	Minor	The basic fauna survey was undertaken in February 2024. The fauna assessment sampled those species that can be easily seen, heard or have distinctive signs, such as tracks, scats, diggings, etc. Cryptic species would not have been identified during the survey and seasonal variation within species often requires targeted surveys at a particular time of the year. The weather was hot and dry and less species may have been present at the time of the survey than normal. The fauna assessment was aimed at identifying habitat types and conservation significant terrestrial vertebrate fauna likely to be utilising the survey area.
Completeness and further work which might be needed (e.g. was the relevant area fully surveyed)	Nil	Adequate coverage of the survey areas was undertaken.
Timing / weather / season / cycle	Nil	The weather for the survey was hot and dry. The rainfall in the preceding 12 months was less than average. Although the vegetation was dry, it did not impact upon identifying habitat types for conservation significant fauna.
Disturbances (fire)	Nil	The survey area has not been recently burnt.
Intensity (in retrospect, was the intensity adequate)	Nil	The survey area was sufficiently covered by the scientists during the survey.
Resources	Nil	Adequate resources were employed during the field survey.
Access restrictions	Nil	The survey area was accessed on foot. All areas could be accessed.
Experience levels	Nil	The scientists who executed the survey were experienced in assessing vegetation and fauna habitat.

5 CONCLUSIONS

- The desktop survey identified 17 species with suitable habitat present at the site. Of these, 14 were considered 'Possible' and one species (Carnaby's Cockatoo; *Zanda latirostris*) was considered 'Likely' to occur. Habitat condition and connectivity to other areas of native vegetation were the limiting factors that reduced the likelihood of species being present.
- Four fauna habitat types were present at the site:
    - Open Eucalypt Woodland. This habitat provided suitable nesting habitat for Carnaby's Cockatoos (*Zanda latirostris*; Endangered) as well as some foraging habitat in areas identified as Very Good condition. Other potential conservation significant species include Western Rosella [inland] (*Platycercus icterotis xanthogenys*; P4), Masked Owl [Southwest] (Tyto novaehollandiae novaehollandiae; P3), Western Brush Wallaby (*Notamacropus irma*; P4), Red-tailed Phascogale (*Phascogale calura; Vulnerable*), South-western Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*), Black-striped Snake (*Neelaps calonotos*; P3) and Western Spiny-tailed Skink (*Egernia stokesii badia*; Endangered). These species may or may not be present depending on their dispersal capabilities and their persistence at the Site post gravel extraction activities;
    - Acacia/Allocasuarina Low Open Woodland;
    - Allocasuarina Low Woodland; and
    - Allocasuarina/Acacia/Banksia Low Woodland. This habitat provided foraging habitat for Carnaby's Cockatoos (*Zanda latirostris*; Endangered).
- Approximately 11.1 ha of Black Cockatoo foraging habitat is available in the Site in Good to Very Good condition.
- Historical gravel extraction at the site has lowered the quality of the vegetation. However, foraging species such as *Banksia sessilis* and *B. prionotes* are naturally regenerating in parts of the Site.
- There were 251 potential habitat trees in the survey area.
- 33 trees had large hollows that appeared suitable for Black Cockatoos.
- 91 trees contained hollows that were too small or too low for Black Cockatoo nesting. These trees provide suitable habitat for other fauna species including conservation-significant species that may be present at the site such as the Western Rosella [inland] (*Platycercus icterotis xanthogenys*; P4), Masked Owl [Southwest] (*Tyto novaehollandiae novaehollandiae*; P3), Red-tailed Phascogale (*Phascogale calura*; Vulnerable) and South-western Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*).
- It is the opinion of Aurora Environmental that Lot 0 Jennapulin Road, Southern Brook more than meets the requirements of the offset calculations and that the Site is an appropriate offset for clearing activities. The area is suitable for additional offset opportunities should the need arise.

6 REFERENCES

Beecham, B. (2001) Avon Wheatbelt 2 (AW2 - Re-juvenated Drainage subregion) in *A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002*. Department of Conservation and Land Management, Government of Western Australia.

Bureau of Meteorology (2024) Climate Data Online. http://www.bom.gov.au/climate/data/?ref=ftr Accessed 11 March 2024.

Department of Agriculture, Water and the Environment (2022) *Referral guideline for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black cockatoo*, Department of Agriculture, Water and the Environment, Canberra.

Department of Primary Industries and Regional Development (DPIRD) (2024) NRInfo (natural resource information) for Western Australia https://www.agric.wa.gov.au/resource-assessment/nrinfo-natural-resource-information-western-australia Accessed 5 February 2024.

Environmental Protection Authority (EPA) (2016) Technical Guidance – Sampling of short range endemic invertebrate fauna. EPA, Western Australia.

Environmental Protection Authority (EPA) (2020) Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment. EPA, Western Australia.

Groom, C. (2011) Plants Used by Carnaby's Black Cockatoo. Prepared for Department of the Environment and Conservation.

Landgate (2024) Locate V5. https://maps.slip.wa.gov.au/landgate/locate Accessed 5 February 2025.

APPENDIX 1

Track Logs

Appendix 1 – Track Logs

APPENDIX 2

Motion Detection Camera Locations

Appendix 2 – Motion-Detection Camera Locations

CAMERA	EASTING	NORTHING	LOCATION	HABITAT
1	479919	6503889	Tree-mounted. Banksia ~1.5 m above ground	Allocasuarina/Acacia/Banksia Low Woodland
2	479996	6503577	Ground. Under shrubs	Allocasuarina/Acacia/Banksia Low Woodland
3	479931	6503897	Ground. Under shrubs	Open Eucalypt Woodland
4	480025	6503580	Tree-mounted. Wandoo ~1.5 m above ground	Open Eucalypt Woodland

APPENDIX 3

NatureMap Database Search Results

Appendix 3 – Naturemap Database Search Results

SPECIES	COUNT
AMPHIBIANS	**30**
Crinia pseudinsignifera	1
Heleioporus albopunctatus	10
Heleioporus eyrei	1
Limnodynastes dorsalis	3
Litoria moorei	1
Pseudophryne guentheri	13
Pseudophryne occidentalis	1
BIRDS	**35092**
Acanthagenys rufogularis	233
Acanthiza apicalis	2
Acanthiza chrysorrhoa	847
Acanthiza inornate	5
Acanthiza uropygialis	93
Acanthorhynchus superciliosus	1
Accipiter cirrocephalus	43
Accipiter fasciatus	92
Acrocephalus australis	64
Actitis hypoleucos	79
Aegotheles cristatus	7
Anas castanea	15
Anas gracilis	864
Anas platyrhynchos	173
Anas platyrhynchos subsp. domesticus	18
Anas rhynchotis	72
Anas superciliosa	787
Anhinga novaehollandiae	29
Anthochaera carunculate	736
Anthochaera lunulate	5
Apus pacificus	2
Aquila audax	196
Aquila morphnoides subsp. morphnoides	1
Ardea intermedia	1
Ardea modesta	186
Ardea pacifica	10
Ardeotis australis	1
Artamus cinereus	330

SPECIES	COUNT
BIRDS CONT.	
Artamus cinereus subsp. melanops	1
Artamus personatus	2
Aythya australis	341
Barnardius zonarius	431
Biziura lobata	22
Burhinus grallarius	2
Cacatua pastinator	421
Cacatua sanguinea	36
Cacatua tenuirostris	1
Cacomantis flabelliformis	9
Cacomantis pallidus	341
Calidris ruficollis	1
Calyptorhynchus banksia	13
Charadrius melanops	1
Charadrius ruficapillus	3
Chenonetta jubata	613
Cheramoeca leucosterna	37
Chroicocephalus novaehollandiae	75
Cincloramphus cruralis	38
Cincloramphus mathewsi	174
Circus assimilis	22
Cladorhynchus leucocephalus	4
Climacteris rufa	57
Colluricincla harmonica	579
Columba livia	390
Coracina novaehollandiae	557
Corvus coronoides	1540
Corvus coronoides subsp. perplexus	1
Coturnix pectoralis	40
Cracticus nigrogularis	472
Cracticus tibicen	1225
Cracticus tibicen subsp. dorsalis	1
Cracticus torquatus	265
Cygnus atratus	184
Cygnus olor	354
Dacelo novaeguineae	400

SPECIES	COUNT
BIRDS CONT.	
Daphoenositta chrysoptera	56
Dendrocygna arcuate	3
Dicaeum hirundinaceum	453
Egretta garzetta	1
Egretta novaehollandiae	147
Elanus axillaris	80
Elanus caeruleus subsp. axillaris	1
Elseyornis melanops	352
Eolophus roseicapillus	276
Epthianura albifrons	45
Erythrogonys cinctus	35
Eurostopodus argus	1
Falco berigora	75
Falco cenchroides	372
Falco longipennis	67
Falco peregrinus	30
Fulica atra	710
Fulica atra subsp. australis	1
Gallinula tenebrosa	214
Gallus gallus	1
Gavicalis virescens	3
Geopelia cuneata	4
Gerygone fusca	606
Glossopsitta porphyrocephala	2
Grallina cyanoleuca	976
Haliastur sphenurus	34
Hamirostra isura	1
Hieraaetus morphnoides	10
Himantopus himantopus	438
Hirundo neoxena	623
Ixobrychus flavicollis subsp. australis (southwest subpop.)	1
Lalage tricolor	1
Leipoa ocellata	1
Lichenostomus leucotis	3
Lichenostomus ornatus	16

SPECIES	COUNT
BIRDS CONT.	
Lichenostomus virescens	1413
Lichmera indistincta	1167
Malacorhynchus membranaceus	71
Malurus leucopterus	32
Malurus pulcherrimus	1
Malurus splendens	173
Manorina flavigula	282
Megalurus gramineus	42
Melithreptus brevirostris	215
Melithreptus lunatus	2
Melopsittacus undulatus	9
Merops ornatus	220
Microcarbo melanoleucos	97
Microeca fascinans	38
Milvus migrans	2
Myiagra inquieta	8
Neophema elegans	82
Ninox novaeseelandiae	15
Nycticorax caledonicus	18
Nymphicus hollandicus	10
Ocyphaps lophotes	757
Oxyura australis	5
Pachycephala pectoralis	1
Pachycephala rufiventris	867
Pachycephala rufiventris subsp. rufiventris	1
Pardalotus punctatus	2
Pardalotus striatus	992
Pelecanus conspicillatus	183
Petrochelidon ariel	37
Petrochelidon nigricans	686
Petroica boodang	2
Petroica goodenovii	379
Phalacrocorax carbo	2
Phalacrocorax sulcirostris	464
Phalacrocorax varius	1
Phaps chalcoptera	220

SPECIES	COUNT
BIRDS CONT.	
Phaps elegans	1
Phylidonyris niger	62
Phylidonyris novaehollandiae	234
Platalea flavipes	441
Platalea regia	3
Platycercus icterotis	3
Platycercus spurius	1
Platycercus zonarius	2
Platycercus zonarius subsp. zonarius	4
Podargus strigoides	34
Poliocephalus poliocephalus	396
Polytelis anthopeplus	1
Pomatostomus superciliosus	288
Pomatostomus superciliosus subsp. ashbyi	2
Porphyrio porphyrio	75
Porzana fluminea	3
Porzana pusilla	2
Porzana tabuensis	1
Pterodroma macroptera subsp. macoptera	1
Purnella albifrons	10
Purpureicephalus spurius	1
Recurvirostra novaehollandiae	9
Rhipidura albiscapa	565
Rhipidura leucophrys	1338
Sericornis frontalis	12
Smicrornis brevirostris	998
Stictonetta naevosa	2
Strepera versicolor	3
Streptopelia chinensis	3
Streptopelia senegalensis	743
Tachybaptus novaehollandiae	421
Tachybaptus novaehollandiae subsp. novaehollandiae	1
Tadorna tadornoides	450
Taeniopygia guttata	20
Taeniopygia guttata subsp. castanotis	1

SPECIES	COUNT
BIRDS CONT.	
Threskiornis Molucca	246
Threskiornis spinicollis	31
Todiramphus pyrrhopygius	1
Todiramphus sanctus	218
Tribonyx ventralis	73
Trichoglossus haematodus	2
Tringa glareola	13
Turnix varius	14
Turnix velox	13
Tyto alba subsp. delicatula	2
Tyto novaehollandiae subsp. novaehollandiae	1
Vanellus tricolor	39
Zanda baudinii	1
Zanda latirostris	76
Zosterops lateralis	551
FISH	**31**
Bostockia porosa	2
Carassius auratus	1
Craterocephalus sp.	14
Galaxias occidentalis	11
Gambusia sp.	2
Pseudogobius olorum	1
INVERTEBRATES	**240**
Acariformes sp.	3
Agraptocorixa eurynome	1
Agraptocorixa sp.	3
Alboa worooa	1
Aname mainae	1
Anax papuensis	2
Anisops baylii	1
Anopheles annulipes s.l.	1
Argiope trifasciata	1
Austrochiltonia subtenuis	5
Austrolestes annulosus	2
Austrolestes io	1

SPECIES	COUNT
INVERTEBRATES CONT.	
Berosus dallasae	3
Berosus sp.	1
Boeckella triarticulata	1
Brachionus plicatilis s.l.	1
Brentidae sp.	1
Candonocypris novaezelandiae	1
Ceinidae sp.	8
Ceratopogonidae sp.	5
Cherax cainii	2
Cherax destructor	3
Cherax quinquecarinatus	6
Chironominae sp.	9
Chironomus aff. alternans (V24) (CB)	1
Chironomus occidentalis	1
Cladopelma curtivalva	1
Cladotanytarsus sp.	1
Cladotanytarsus sp. A (SAP)	1
Cletocamptus dietersi	2
Coenagrionidae sp.	1
Corduliidae sp.	2
Corixidae sp.	3
Culicidae sp.	2
Culicoides sp.	2
Daphnia carinata	1
Dasyhelea sp.	1
Dytiscidae sp.	9
Ephydridae sp.	1
Eucypris virens	2
Fluviolanatus subtorta	4
Hemicordulia tau	1
Hydraenidae sp.	3
Hydrobiidae sp.	4
Hydrophilidae sp.	7
Hyriidae sp.	1
Idiosoma nigrum	6
Ilyocypris australiensis	1

SPECIES	COUNT
INVERTEBRATES CONT.	
Ischnura heterosticta heterosticta	2
Ischnura sp.	1
Lampona cylindrata	2
Lancetes lanceolatus	1
Latrodectus hasseltii	1
Leptoceridae sp.	2
Lestidae sp.	3
Limbodessus inornatus	1
Lycosa dimota	1
Megaporus sp.	1
Mesocyclops brooksi	1
Micronecta robusta	4
Missulena granulosa	2
Missulena occatoria	1
Mytilocypris mytiloides	5
Naididae (ex Tubificidae)	1
Necterosoma penicillatus	3
Necterosoma regulare	1
Necterosoma sp.	2
Nematoda sp.	3
Nephila edulis	1
Notalina spira	1
Notonectidae sp.	1
Ochthebius sp.	2
Oecetis sp.	4
Oligochaeta sp.	5
Onychocamptus bengalensis	3
Opisthopora sp.	1
Orthocladiinae sp.	1
Orthocladiinae sp. G (SAP)	1
Palaemonetes australis	2
Palaemonidae sp.	1
Paranais litoralis	1
Parastacidae sp.	2
Pezidae sp.	1
Plesiocypridopsis sp.	1

SPECIES	COUNT
INVERTEBRATES CONT.	
Pomatiopsidae sp.	2
Procladius paludicola	4
Pyralidae sp. 40 of JHH (PSW)	1
Sarscypridopsis aculeata	2
Simuliidae sp.	1
Staphylinidae sp.	1
Sternopriscus multimaculatus	2
Sternopriscus sp.	1
Storena Formosa	1
Stratiomyidae sp.	3
Sulcanus conflictus	1
Synsphyronus callus	1
Tanypodinae sp.	8
Tanytarsus fuscithorax/semibarbitarsus	4
Tasmanicosa leuckartii	5
Thiaridae sp.	1
Tipulidae sp.	2
Triplectides australis	2
Urodacus novaehollandiae	6
Urodacus planimanus	1
Venator immansueta	1
Venatrix pullastra	1
Xanthagrion erythroneurum	2
MAMMALS	**15**
Cercartetus concinnus	1
Chalinolobus gouldii	2
Chalinolobus morio	1
Dasyurus geoffroii	2
Macrotis lagotis	4
Myrmecobius fasciatus	1
Pteropus scapulatus	1
Sminthopsis crassicaudata	1
Tachyglossus aculeatus	1
Trichosurus vulpecula subsp. vulpecula	1
REPTILES	**135**
Antaresia stimsoni subsp. stimsoni	1

SPECIES	COUNT
REPTILES CONT.	
Aprasia repens	9
Aspidites ramsayi	1
Christinus marmoratus	1
Crenadactylus ocellatus subsp. ocellatus	1
Cryptoblepharus buchananii	2
Ctenophorus ornatus	11
Ctenophorus reticulatus	7
Ctenotus fallens	2
Delma fraseri	8
Demansia psammophis subsp. reticulata	1
Diplodactylus polyophthalmus	1
Diplodactylus pulcher	9
Eremiascincus richardsonii	2
Gehyra variegata	35
Hesperoedura reticulata	2
Lerista distinguenda	1
Lialis burtonis	2
Menetia greyii	2
Morelia spilota subsp. imbricata	2
Neelaps bimaculatus	1
Parasuta gouldii	2
Pogona minor subsp. minor	2
Pseudechis australis	5
Pseudonaja affinis subsp. affinis	1
Pseudonaja mengdeni	8
Pseudonaja modesta	1
Ramphotyphlops australis	1
Ramphotyphlops pinguis	1
Ramphotyphlops waitii	1
Tiliqua occipitalis	1
Tiliqua rugosa subsp. rugosa	2
Underwoodisaurus milii	6
Varanus gouldii	1
Varanus tristis	2

APPENDIX 4

Protected Matters Search Tool Results

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 02-Feb-2024

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment 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:	1
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	36
Listed Migratory Species:	6

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 https://www.dcceew.gov.au/parks-heritage/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 Lands:	20
Commonwealth Heritage Places:	1
Listed Marine Species:	11
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	5
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	6
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Historic			
Goldfields Water Supply Scheme, Western Australia	WA	Listed place	In buffer area only

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.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Eucalypt Woodlands of the Western Australian Wheatbelt	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Leipoa ocellata			
Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Rostratula australis			
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
Zanda latirostris listed as Calyptorhynchus latirostris			
Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Species or species habitat known to occur within area	In feature area
MAMMAL			
Dasyurus geoffroii			
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area	In feature area
Myrmecobius fasciatus			
Numbat [294]	Endangered	Species or species habitat known to occur within area	In buffer area only
Phascogale calura			
Red-tailed Phascogale, Red-tailed Wambenger, Kenngoor [316]	Vulnerable	Species or species habitat likely to occur within area	In feature area
PLANT			
Acacia aphylla			
Leafless Rock Wattle [13553]	Vulnerable	Species or species habitat known to occur within area	In feature area
Acacia ataxiphylla subsp. magna			
Large-fruited Tammin Wattle [64823]	Endangered	Species or species habitat likely to occur within area	In feature area
Acacia cochlocarpa subsp. cochlocarpa			
Spiral-fruited Wattle [23877]	Endangered	Species or species habitat may occur within area	In buffer area only
Acacia cochlocarpa subsp. velutinosa			
Velvety Spiral Pod Wattle [65112]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Acacia volubilis			
Tangled Wattle, Tangle Wattle [6476]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area	In buffer area only
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat may occur within area	In buffer area only
Conospermum densiflorum subsp. unicephalatum One-headed Smokebush [64871]	Endangered	Species or species habitat may occur within area	In buffer area only
Dasymalla axillaris Native Foxglove [38829]	Critically Endangered	Species or species habitat may occur within area	In feature area
Daviesia euphorbioides Wongan Cactus [3477]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Gastrolobium hamulosum Hook-point Poison [9212]	Endangered	Species or species habitat likely to occur within area	In feature area
Grevillea christineae Christine's Grevillea [64520]	Endangered	Species or species habitat known to occur within area	In feature area
Grevillea dryandroides subsp. hirsuta Hairy Phalanx Grevillea [64577]	Endangered	Species or species habitat may occur within area	In buffer area only
Grevillea flexuosa Zig Zag Grevillea [2957]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Hemiandra rutilans Sargents Snakebush, Colourful Snakebush [17932]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lysiosepalum abollatum Woolly Lysiosepalum [83216]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Melaleuca sciotostyla Wongan Melaleuca [24324]	Endangered	Species or species habitat may occur within area	In buffer area only
Roycea pycnophylloides Saltmat [21161]	Endangered	Species or species habitat likely to occur within area	In feature area
Thelymitra stellata Star Sun-orchid [7060]	Endangered	Species or species habitat may occur within area	In buffer area only
Thomasia glabripetala Sandplain Thomasia [56547]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Verticordia hughanii Hughan's Featherflower [11434]	Endangered	Species or species habitat may occur within area	In buffer area only
Verticordia staminosa subsp. staminosa Wongan Featherflower [55825]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Egernia stokesii badia Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat may occur within area	In buffer area only
SPIDER			
Idiosoma nigrum Shield-backed Trapdoor Spider, Black Rugose Trapdoor Spider [66798]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla cinerea			
Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

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

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - NORTHAM CAMP [50167]	WA	In buffer area only
Defence - NORTHAM CAMP [50168]	WA	In buffer area only
Defence - NORTHAM CAMP [50165]	WA	In buffer area only
Defence - NORTHAM CAMP [50170]	WA	In buffer area only
Defence - NORTHAM CAMP [50166]	WA	In buffer area only
Defence - NORTHAM CAMP [50169]	WA	In buffer area only
Defence - NORTHAM RIFLE RANGE [50160]	WA	In buffer area only
Defence - NORTHAM RIFLE RANGE [50164]	WA	In buffer area only
Defence - NORTHAM RIFLE RANGE [50163]	WA	In buffer area only

Commonwealth Land Name	State	Buffer Status
Defence - NORTHAM RIFLE RANGE [50162]	WA	In buffer area only
Defence - NORTHAM RIFLE RANGE [50161]	WA	In buffer area only
Unknown		
Commonwealth Land - [52023]	WA	In buffer area only
Commonwealth Land - [52027]	WA	In buffer area only
Commonwealth Land - [51390]	WA	In buffer area only
Commonwealth Land - [51544]	WA	In buffer area only
Commonwealth Land - [51389]	WA	In buffer area only
Commonwealth Land - [50979]	WA	In buffer area only
Commonwealth Land - [51982]	WA	In buffer area only
Commonwealth Land - [50973]	WA	In buffer area only
Commonwealth Land - [50972]	WA	In buffer area only

Commonwealth Heritage Places			[Resource Information]
Name	State	Status	Buffer Status
Historic			
Northam Post Office	WA	Listed place	In buffer area only

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
[Chalcites osculans as Chrysococcyx osculans](#) Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In buffer area only
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
[Motacilla cinerea](#) Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
[Rostratula australis as Rostratula benghalensis (sensu lato)](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Cartamulligan Well	Nature Reserve	WA	In buffer area only
Meenaar	Nature Reserve	WA	In buffer area only
Mortlock	Nature Reserve	WA	In buffer area only
Throssell	Nature Reserve	WA	In buffer area only
Unnamed WA01563	Nature Reserve	WA	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Goldfields Water Supply Scheme Project	2019/8547	Controlled Action	Post-Approval	In buffer area only
Widening maintenance zones for 3 roads, Wheatbelt region, WA	2016/7698	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Northam Pithara realignment and Northam bypass, WA	2015/7555	Not Controlled Action	Completed	In buffer area only
Toodyay-Goomalling-Bejoording intersection upgrade, WA	2014/7302	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Construction of a new detention facility	2011/5799	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and 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

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

Where little information is available for a 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 detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

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

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

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

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

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APPENDIX 5

DBCA Threatened and Priority Fauna Database Results

Appendix 5 – Conservation Significant Fauna – DBCA Database

SPECIES	COMMON NAME	COUNT	WA STATUS	EPBC STATUS	FIRST RECORD	MOST RECENT RECORD
BIRDS						
Actitis hypoleucos	Common Sandpiper	1	Migratory	Migratory	2000	-
Apus pacificus	Fork-tailed Swift	4	Migratory	Migratory	1981	2000
Calidris ruficollis	Red-necked Stint	5	Migratory	Migratory	1979	2010
Calyptorhynchus banksii naso	Forest Red-tailed Black Cockatoo	9	Vulnerable	Vulnerable	1950	2020
Falco peregrinus	Peregrine Falcon	67	Other Specially Protected	-	1956	2013
Ixobrychus flavicollis australis (southwest subpopulation)	Black Bittern (southwest subpopulation)	2	Priority 2	-	1938	1940
Leipoa ocellata	Malleefowl	14	Vulnerable	Vulnerable	1971	2004
Oxyura australis	Blue-billed Duck	22	Priority 4	-	1977	2012
Platycercus icterotis xanthogenys	Western Rosella (inland)	2	Priority 4	-	1984	1992
Tringa glareola	Wood Sandpiper	3	Migratory	Migratory	2012	-
Tringa nebularia	Common Greenshank	2	Migratory	Migratory	1977	2010
Tyto novaehollandiae novaehollandiae	Masked Owl (southwest)	2	Priority 3	-	1971	1972
Zanda baudinii	Baudin's Cockatoo	16	Endangered	Endangered	1930	2023
Zanda latirostris	Carnaby's Cockatoo	287	Endangered	Endangered	1998	2022
FISH						
Galaxiella munda	Mud Minnow, Western Dwarf Galaxias	2	Vulnerable	-	2009	-
INVERTEBRATES						
Idiosoma mcclementsorum	Julimar Shield-backed Trapdoor Spider	2	Priority 2	-	1993	1997
Idiosoma nigrum	Shield-backed Trapdoor Spider	3	Endangered	Vulnerable	1952	1998
Idiosoma schoknechtorum	Mortlock River Shield-backed Trapdoor Spider	24	Priority 3	-	1952	2016
Westralunio carteri	Carter's Freshwater Mussel	8	Vulnerable	Vulnerable	1930	1973
MAMMALS						
Dasyurus geoffroii	Chuditch, Western Quoll	11	Vulnerable	Vulnerable	1990	2023
Hydromys chrysogaster	Water-rat, Rakali	7	Priority 4	-	1924	2023

Appendix 5 – Conservation Significant Fauna – DBCA Database

SPECIES	COMMON NAME	COUNT	WA STATUS	EPBC STATUS	FIRST RECORD	MOST RECENT RECORD
Isoodon fusciventer	Quenda, Southwestern Brown Bandicoot	1	Priority 4	-	2018	-
Lagostrophus fasciatus fasciatus	Banded Hare-wallaby, Mernine	1	Vulnerable	Vulnerable	1922	-
Macrotis lagotis	Bilby, Dalgyte, Ninu	10	Vulnerable	Vulnerable	1918	1974
Myrmecobius fasciatus	Numbat, Walpurti	3	Endangered	Endangered	1979	2007
Notamacropus irma	Western Brush Wallaby	12	Priority 4	-	1927	2015
Phascogale calura	Red-tailed Phascogale, Kenngoor	1	Conservation Dependent	Vulnerable	2007	-
Phascogale tapoatafa wambenger	South-western Brush-tailed Phascogale	3	Conservation Dependent	-	2007	2019
REPTILES						
Neelaps calonotos	Black-striped Snake	1	Priority 3	-	-	-

APPENDIX 6

Likelihood of Occurrence Assessment

Appendix 6 – Likelihood of Occurrence Assessment

SPECIES (COMMON NAME)	STATUS	HABITAT	HABITAT PRESENT	LIKELIHOOD OF OCCURENCE
BIRDS				
Actitis hypoleucos (Common Sandpiper)	Migratory	Coastal wetlands and some inland wetlands, with varying levels of salinity. Mostly found around muddy margins or rocky shores and rarely on mudflats.	No	Unlikely
Apus pacificus (Fork-tailed Swift, Pacific Swift)	Migratory	Mostly inland plains but sometimes above foothills or in coastal areas. Cliffs, beaches and islands. Also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh, treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. Occasionally above rainforests, wet sclerophyll forest or open forest or plantations of pines.	Marginal	Possible but unlikely to rely on survey area.
Aphelocephala leucopsis (Southern Whiteface)	Vulnerable	Open woodlands and shrublands with an understorey of grasses or shrubs or both. Usually habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains. Forage almost exclusively on the ground favouring habitat with low tree densities and an herbaceous understorey and litter cover.	Yes	Unlikely – outside known distribution of species.
Calidris acuminata (Sharp-tailed Sandpiper)	Migratory	Muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation including lagoons, swamps, lakes pools near the coast, dams, waterholes, soaks, bore drains, bore swamps, saltpans and hypersaline saltlakes inland. Also occur in saltworks and sewage farms. Utilise flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. Use coastal mudflats after ephemeral terrestrial wetlands have dried out. Occasionally occur on rocky shores and rarely on exposed reefs.	No	Unlikely
Calidris ferruginea (Curlew Sandpiper)	Critically Endangered	Intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. Less often, recorded inland around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. Fresh and brackish water. Occasionally recorded around floodwaters.	No	Unlikely
Calidris ruficollis (Red-necked Stint)	Migratory	Coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and occasionally protected sandy or coralline shores. Have been recorded on exposed or ocean beaches, stony or rocky shores, reefs or shoals. Also occur in saltworks and sewage farms; saltmarsh; ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in saltflats. Sometimes use flooded paddocks or damp grasslands. Occasionally recorded on dry gibber plains, with little or no perennial vegetation.	No	Unlikely

Appendix 6 – Likelihood of Occurrence Assessment

SPECIES (COMMON NAME)	STATUS	HABITAT	HABITAT PRESENT	LIKELIHOOD OF OCCURENCE
Calidris melanotos (Pectoral Sandpiper)	Migratory	Coastal or near coastal habitat but occasionally found further inland. Prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. Also recorded in swamp overgrown with lignum.	No	Unlikely
Calyptorhynchus banksii naso (Forest red-tailed Black Cockatoo)	Vulnerable	Dense Eucalypt forests receiving >600 mm rainfall especially of *Eucalyptus marginata* (jarrah), *E. diversicolor* (karri) and *Corymbia calophylla* (marri).	No	Unlikely
Falco hypoleucos (Grey Falcon)	Vulnerable	Timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses. Occurs in arid and semi-arid zones with <500 mm rainfall.	No	Unlikely – outside known distribution of species.
Falco peregrinus (Peregrine Falcon)	Other specially protected	Found in most habitat types. Nests on coastal and inland cliffs, open woodlands near water, high artificial structures.	Yes	Possible but unlikely to rely on survey area.
Ixobrychus flavicollis australis (southwest subpopulation) (Black Bittern (southwest subpopulation))	Priority 2	Tree-lined wetlands and in mangroves. Forage from shady trees over water but may be seen in open areas of short marshy vegetation and along creeks in shrubby vegetation.	No	Unlikely
Leipoa ocellata (Malleefowl)	Vulnerable	Semi-arid to arid zones in shrubland and woodland dominated by mallee and wattle species and occasionally Wandoo, Marri and Mallet woodlands.	Marginal	Possible to unlikely
Motacilla cinerea (Grey Wagtail)	Migratory	Strong association with water, particularly rocky substrates along water courses but also lakes and marshes.	No	Unlikely
Oxyura australis (Blue-billed Duck)	Priority 4	Completely aquatic. Deep water in large permanent wetlands and swamps with dense aquatic vegetation.	No	Unlikely
Platycercus icterotis xanthogenys (Western Rosella (inland))	Priority 4	Open eucalypt forests and timbered areas, including cultivated land and orchards. Dry woodland with heath understorey.	Yes	Possible
Rostratula australis (Australian Painted Snipe)	Endangered	Shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans, inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains.	No	Unlikely

Appendix 6 – Likelihood of Occurrence Assessment

SPECIES (COMMON NAME)	STATUS	HABITAT	HABITAT PRESENT	LIKELIHOOD OF OCCURENCE
Tringa glareola (Wood Sandpiper)	Migratory	Well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. Typically associated with emergent, aquatic plants or grass, dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees. Inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops. Small wetlands only when they are drying. Rarely found at brackish wetlands, or dry stunted saltmarsh. Occasionally stony wetlands. Artificial wetlands, including open sewage ponds, reservoirs, large farm dams, and bore drains.	No	Unlikely
Tringa nebularia (Common Greenshank)	Migratory	Coastal and inland environments, in estuaries and mudflats, mangrove swamps and lagoons, and in billabongs, swamps, sewage farms and flooded crops.	No	Unlikely
Tyto novaehollandiae novaehollandiae (Masked Owl (Southwest))	Priority 3	Range of habitats including wet sclerophyll forest, dry sclerophyll forest, non-eucalypt dominated forest, scrub and cleared land with remnant old growth trees. Common habitat characteristics include large hollows in old growth eucalypts, dense understorey comprising dense and sparse ground cover and areas near gullies and along watercourses.	Yes	Possible
Zanda baudinii (Baudin's Black Cockatoo, Long-billed Black Cockatoo)	Endangered	Eucalypt forests, especially jarrah, marri and karri forest.	No	Unlikely
Zanda latirostris (Carnaby's Black Cockatoo, Short-billed Black Cockatoo)	Endangered	Uncleared or remnant native eucalypt woodlands, especially those that contain salmon gum and wandoo, and in shrubland or kwongan heathland dominated by hakea, dryandra, banksia and grevillea species. It also occurs in remnant patches of native vegetation on land otherwise cleared for agriculture.	Yes	Likely
FISH				
Galaxiella munda (Dwarf Spotted Galaxias)	Vulnerable	Swift-flowing streams within karri forest, typically near submerged vegetation. Occasionally in still water of ponds, swamps and roadside drains.	No	Unlikely
INVERTEBRATES				
Idiosoma mcclementsorum (Julimar Shield-backed Trapdoor Spider)	Priority 2	Sandy substrates overlaying laterite in the Avon Wheatbelt, Jarrah Forest and Swan Coastal Plain bioregions.	Yes	Possible to unlikely
Idiosoma nigrum (Shield-backed Trapdoor Spider)	Endangered	Avon Wheatbelt bioregion roughly corresponding to the area south and west of the 300 mm annual rainfall isohyet.	Yes	Possible to unlikely

Appendix 6 – Likelihood of Occurrence Assessment

SPECIES (COMMON NAME)	STATUS	HABITAT	HABITAT PRESENT	LIKELIHOOD OF OCCURENCE
Idiosoma schoknechtorum (Mortlock River Shield-backed Trapdoor Spider)	Priority 3	Central-western Wheatbelt and north-eastern Jarrah Forest bioregion.	Yes	Possible to unlikely
Westralunio carteri (Carter's Freshwater Mussel)	Vulnerable	Freshwater streams, rivers, reservoirs and lakes within 50-100 km of the coast in the south west of Western Australia	No	Unlikely
MAMMALS				
Dasyurus geoffroii (Chuditch, Western Quoll)	Vulnerable	Jarrah forests and woodlands in south-west WA and woodlands, mallee shrublands and heaths along south coast. Occasional records from drier woodland and mallee shrubland in Wheatbelt and Goldfields.	Yes	Possible to unlikely
Hydromys chrysogaster (Water-rat, Rakali)	Priority 4	Burrows on low banks of rivers, lakes, wetlands, estuaries. Requires intact riparian vegetation and bank stability.	No	Unlikely
Isoodon fusciventer (Quenda, Southwestern Brown Bandicoot)	Priority 4	Scrubby, often swampy, vegetation with dense cover up to 1 m high. Often associated with water courses and wetlands.	No	Unlikely
Lagostrophus fasciatus fasciatus (Banded Hare-wallaby, Mernine)	Vulnerable	Areas of dense heath and shrub thickets including Dune Wattle (*Acacia ligulata*), Wirewood (*A. coriacea*), Bullock Bush (*Alectryon oleifolius*) and *Diplolaena dampieri* on sandplains and dunes. Currently restricted to offshore islands.	No	Unlikely – not within current known distribution
Macrotis lagotis (Bilby, Dalgyte, Ninu)	Vulnerable	Three main habitats: open tussock grassland on uplands and hills, *Acacia aneura* (mulga) woodland/shrubland growing on ridges and rises, and hummock grassland in plains and alluvial areas.	No	Unlikely – not within current known distribution
Myrmecobius fasciatus (Numbat)	Endangered	Woodland dominated by *Eucalyptus* species, with abundant hollow logs and branches for shelter and termites for food.	Yes	Unlikely. Habitat is very disturbed, and site falls outside current distribution estimates.
Notamacropus Irma (Western Brush Wallaby)	Priority 4	Open forest or woodland, particularly open, seasonally-wet flats with low grasses and open scrubby thickets. Occasionally found in mallee and heath-land. Uncommon in karri forest.	Marginal	Possible

Appendix 6 – Likelihood of Occurrence Assessment

SPECIES (COMMON NAME)	STATUS	HABITAT	HABITAT PRESENT	LIKELIHOOD OF OCCURENCE
Phascogale calura (Red-tailed Phascogale, Kenngoor)	Vulnerable	Woodlands with hollow-producing Eucalypts, particularly Wandoo (*Eucalyptus wandoo*) and York gum (*E. loxophleba*) and is often with associated Rock Sheoak (*Allocasuarina huegeliana*).	Yes	Possible
Phascogale tapoatafa wambenger (South-western Brush-tailed Phascogale, Wambenger)	Conservation Dependent	Dry sclerophyll forests and open woodlands that contain hollow-bearing trees.	Yes	Possible
REPTILES				
Neelaps calonotos (Black-striped Snake)	Priority 3	Banksia woodlands and sandy areas of the Perth region.	Yes	Possible
Egernia stokesii badia (Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink)	Endangered	York Gum (*Eucalyptus loxophleba*) with some records in Gimlet (*E. salubris*) and Salmon Gum (*E. salmonophloia*) woodland.	Yes	Possible

APPENDIX 7

Fauna Photos

Appendix 7 - Fauna Photos

FIGURE 1: CAT INVESTIGATING BAIT AT CAMERA

FIGURE 2: EURO INVESTIGATING BAIT AT CAMERA

Appendix 7 - Fauna Photos

FIGURE 3: OWL REGURITATION PELLETS. SKELETONS OF SMALL VERTEBRATES INCLUDING A VERY SMALL BIRD SKULL

APPENDIX 8

Site Photos

Appendix 8 – Site Photos

Aerial Photographs

Appendix 8 – Site Photos

Appendix 8 – Site Photos

Open Eucalyptus Woodland

Appendix 8 – Site Photos

Regeneration after fire

Appendix 8 – Site Photos

Acacia/Allocasuarina Low open Woodland

Allocasuarina Woodland. Emergent *Banksia prionotes* and *B. sessilis*

Appendix 8 – Site Photos

Allocasuarina/Acacia/Banksia Low Woodland

Appendix 8 – Site Photos

Mounding around base of Eucalypt

Allocasuarina Woodland

APPENDIX 9

Potential Habitat Trees

Appendix 9 – Cockatoo Habitat Trees

Tree Number	Tree Species	Easting	Northing	Hollows	Tree Height (m)	Circumference (cm)	Hollow height (m)	Notes	Photo Reference
1	Powderbark Wandoo	479647	6503897	No		150			R3203_Tree_1
2	Powderbark Wandoo	479648	6503909	No	7	144			R3203_Tree_2
3	Powderbark Wandoo	479663	6503935	No	8	138			R3203_Tree_3
4	Powderbark Wandoo	479655	6503936	Small	8	100			R3203_Tree_4
5	Powderbark Wandoo	479649	6503937	No	6	95			R3203_Tree_5
6	Powderbark Wandoo	479639	6503976	No	7	103			R3203_Tree_6
7	Powderbark Wandoo	479635	6504045	No	8	114			R3203_Tree_7
8	Powderbark Wandoo	479635	6504050	Small	6	194			R3203_Tree_8
9	Powderbark Wandoo	479643	6504065	No	9	113			R3203_Tree_9
10	Powderbark Wandoo	479651	6504081	No	7	240			R3203_Tree_10
11	Dead	479654	6504084	No	6	130			R3203_Tree_11
12	Powderbark Wandoo	479651	6504102	Small	7	152			R3203_Tree_12
14	Powderbark Wandoo	479663	6504107	No	7	124			R3203_Tree_14
15	Powderbark Wandoo	479677	6504105	Small	8	185			R3203_Tree_15
16	Powderbark Wandoo	479666	6504116	No	8	166			R3203_Tree_16
17	Powderbark Wandoo	479644	6504110	Small	6	200			R3203_Tree_17
18	Powderbark Wandoo	479719	6504251	No	9	94			R3203_Tree_18
19	Powderbark Wandoo	479703	6503945	Yes	9	350	10		R3203_Tree_19
20	Powderbark Wandoo	479707	6503940	No	10	132			R3203_Tree_20
21	Powderbark Wandoo	479694	6503934	Small	8	120			R3203_Tree_21
27	Powderbark Wandoo	479665	6503961	No	7	102			R3203_Tree_27
28	Powderbark Wandoo	479677	6503969	No	12	195		Beehive	R3203_Tree_28
29	Powderbark Wandoo	479677	6503960	No	7	96			R3203_Tree_29
31	Powderbark Wandoo	479665	6503989	No	7	134			R3203_Tree_31
32	Powderbark Wandoo	479664	6503992	No	8	106			R3203_Tree_32
33	Powderbark Wandoo	479661	6503993	No	7	113			R3203_Tree_33

Appendix 9 – Cockatoo Habitat Trees

Tree Number	Tree Species	Easting	Northing	Hollows	Tree Height (m)	Circumference (cm)	Hollow height (m)	Notes	Photo Reference
35	Powderbark Wandoo	479663	6504041	No	8	120			R3203_Tree_35
36	Powderbark Wandoo	479667	6504044	No	8	132			R3203_Tree_36
38	Powderbark Wandoo	479726	6503933	Small	8	137			R3203_Tree_38
39	Powderbark Wandoo	479719	6503920	Small	8	170			R3203_Tree_39
40	Powderbark Wandoo	479716	6503918	No	10	172			R3203_Tree_40
41	Powderbark Wandoo	479718	6503907	Incipient	9	170	4	Will be suitable soon. Other incipient cockatoo hollows	R3203_Tree_41
42	Powderbark Wandoo	479713	6503888	No	11	184			R3203_Tree_42
43	Powderbark Wandoo	479722	6503883	Yes	10	250	5		R3203_Tree_43
44	Powderbark Wandoo	479698	6503854	Small	7	109			R3203_Tree_44
45	Powderbark Wandoo	479696	6503850	Small	8	96			R3203_Tree_45
46	Dead	479689	6503852	No	6	100		Termites	R3203_Tree_46
47	Powderbark Wandoo	479682	6503846	No	6	94			R3203_Tree_47
48	Powderbark Wandoo	479681	6503869	Yes	10	215	4, 5	At least 3 hollows	R3203_Tree_48
49	Powderbark Wandoo	479665	6503875	No	7	96			R3203_Tree_49
52	Powderbark Wandoo	480090	6503622	Small	7	204			R3203_Tree_52
53	Powderbark Wandoo	480086	6503630	Small	6	96			R3203_Tree_53
54	Powderbark Wandoo	480072	6503609	Small	6	110			R3203_Tree_54
55	Powderbark Wandoo	480081	6503602	Small	7	250			R3203_Tree_55
56	Powderbark Wandoo	480086	6503607	No	10	108			R3203_Tree_56
57	Powderbark Wandoo	480095	6503613	No	10	108			R3203_Tree_57
58	Powderbark Wandoo	480096	6503605	No	8	112			R3203_Tree_58
59	Powderbark Wandoo	480089	6503597	No	8	126			R3203_Tree_59
60	Powderbark Wandoo	480075	6503590	Small	7	125			R3203_Tree_60
61	Powderbark Wandoo	480059	6503586	No	12	120			R3203_Tree_61
62	Powderbark Wandoo	480039	6503611	No	11	107			R3203_Tree_62
63	Powderbark Wandoo	480037	6503623	No	10	135			R3203_Tree_63

Appendix 9 – Cockatoo Habitat Trees

Tree Number	Tree Species	Easting	Northing	Hollows	Tree Height (m)	Circumference (cm)	Hollow height (m)	Notes	Photo Reference
64	Powderbark Wandoo	480026	6503579	Small	11	151			R3203_Tree_64
65	Powderbark Wandoo	480036	6503565	No	11	128			R3203_Tree_65
66	Powderbark Wandoo	480055	6503563	No	10	104			R3203_Tree_66
67	Powderbark Wandoo	480055	6503571	Yes	5	181		Large hollow but too low	R3203_Tree_67
68	Powderbark Wandoo	480068	6503563	No	10	135			R3203_Tree_68
69	Powderbark Wandoo	480076	6503566	No	8	102			R3203_Tree_69
70	Powderbark Wandoo	480078	6503572	No	9	97			R3203_Tree_70
72	Powderbark Wandoo	480083	6503574	No	10	106			R3203_Tree_72
73	Powderbark Wandoo	480096	6503560	Yes	12	307		Several large hollows	R3203_Tree_73
74	Powderbark Wandoo	480111	6503551	No	10	103			R3203_Tree_74
75	Powderbark Wandoo	480092	6503531	No	8	160			R3203_Tree_75
76	Dead	480039	6503521	Yes	6	153	3	Beehive	R3203_Tree_76
77	Powderbark Wandoo	480048	6503509	No	6	108			R3203_Tree_77
78	Powderbark Wandoo	480049	6503506	No	10	115			R3203_Tree_78
79	Powderbark Wandoo	480043	6503508	No	11	125			R3203_Tree_79
80	Dead	480031	6503507	Yes	4	136	3		R3203_Tree_80
82	Dead	480029	6503530	Yes		94	2	Deep hollow to base of tree, too low	R3203_Tree_82
83	Powderbark Wandoo	480023	6503519	Small	5	96			R3203_Tree_83
84	Powderbark Wandoo	480020	6503508	No	7	120			R3203_Tree_84
85	Powderbark Wandoo	480040	6503505	No	10	97			R3203_Tree_85
86	Powderbark Wandoo	480038	6503497	No	10	105			R3203_Tree_86
87	Powderbark Wandoo	480027	6503488	Yes	15	117	5, 6	2 hollows	R3203_Tree_87
88	Dead	480027	6503485	Yes	10	166	6		R3203_Tree_88
90	Powderbark Wandoo	480035	6503477	Small	6	180			R3203_Tree_90
91	Powderbark Wandoo	480048	6503485	No	10	132			R3203_Tree_91
92	Powderbark Wandoo	480029	6503473	Small	8	193		Has potential for large hollows in future	R3203_Tree_92

Appendix 9 – Cockatoo Habitat Trees

Tree Number	Tree Species	Easting	Northing	Hollows	Tree Height (m)	Circumference (cm)	Hollow height (m)	Notes	Photo Reference
93	Powderbark Wandoo	480010	6503467	Small	5	135			R3203_Tree_93
94	Powderbark Wandoo	479978	6503438	Small	10	144			R3203_Tree_94
95	Powderbark Wandoo	480004	6503447	Small	10	133			R3203_Tree_95
96	Powderbark Wandoo	480010	6503452	Yes	7	117	4		R3203_Tree_96
98	Powderbark Wandoo	480018	6503444	Small	8	101			R3203_Tree_98
99	Powderbark Wandoo	480018	6503436	No	11	161			R3203_Tree_99
100	Powderbark Wandoo	480002	6503430	Small	6	95			R3203_Tree_100
101	Powderbark Wandoo	479962	6503404	Small	11	176			R3203_Tree_101
104	Powderbark Wandoo	479985	6503369	No	11	118			R3203_Tree_104
105	Powderbark Wandoo	479990	6503365	No	10	104			R3203_Tree_105
106	Powderbark Wandoo	479993	6503373	Small	8	130			R3203_Tree_106
107	Powderbark Wandoo	480005	6503373	Small	12	152			R3203_Tree_107
108	Powderbark Wandoo	480010	6503403	Small	10	122			R3203_Tree_108
109	Powderbark Wandoo	480013	6503419	No	8	103			R3203_Tree_109
110	Powderbark Wandoo	480030	6503398	Small	10	151			R3203_Tree_110
111	Powderbark Wandoo	480046	6503403	Small	10	221			R3203_Tree_111
112	Powderbark Wandoo	480071	6503424	Yes	13	199		Big one forming, too low	R3203_Tree_112
113	Powderbark Wandoo	480081	6503427	Small	12	199			R3203_Tree_113
114	Powderbark Wandoo	480087	6503437	No	9	124			R3203_Tree_114
115	Powderbark Wandoo	480083	6503437	Yes	6	236	5	Multiple large hollows	R3203_Tree_115
116	Powderbark Wandoo	480065	6503466	No	12	174			R3203_Tree_116
117	Powderbark Wandoo	480064	6503468	No	10	122			R3203_Tree_117
118	Powderbark Wandoo	480075	6503487	No	8	211		Potential for good Cockatoo hollows in future	R3203_Tree_118
119	Powderbark Wandoo	480098	6503513	No	10	94			R3203_Tree_119
120	Dead	480091	6503512	Yes	10	221		Beehive	R3203_Tree_120
121	Powderbark Wandoo	480085	6503511	Small	10	106			R3203_Tree_121

Appendix 9 – Cockatoo Habitat Trees

Tree Number	Tree Species	Easting	Northing	Hollows	Tree Height (m)	Circumference (cm)	Hollow height (m)	Notes	Photo Reference
122	Powderbark Wandoo	480088	6503508	No	10	150			R3203_Tree_122
123	Powderbark Wandoo	480078	6503508	Small	6	122			R3203_Tree_123
124	Powderbark Wandoo	480088	6503534	No	9	163			R3203_Tree_124
127	York Gum	480138	6503520	Small	10	180			R3203_Tree_127
128	York Gum	480129	6503534	No	10	171			R3203_Tree_128
129	Powderbark Wandoo	480125	6503520	Small	8	119			R3203_Tree_129
130	Powderbark Wandoo	480112	6503504	Small	7	184			R3203_Tree_130
131	Powderbark Wandoo	480121	6503504	No	9	227			R3203_Tree_131
132	Powderbark Wandoo	480119	6503496	Small	13	183			R3203_Tree_132
133	York Gum	480143	6503505	No	6	159			R3203_Tree_133
134	Powderbark Wandoo	480139	6503504	Small	5	144			R3203_Tree_134
135	Dead	480140	6503502	Small	5	156			R3203_Tree_135
136	Powderbark Wandoo	480149	6503489	No	7	106			R3203_Tree_136
137	Dead	480159	6503482	Yes	10	194			R3203_Tree_137
138	Powderbark Wandoo	480160	6503482	No	6	101			R3203_Tree_138
139	Powderbark Wandoo	480179	6503461	No	10	102			R3203_Tree_139
140	Powderbark Wandoo	480163	6503455	No	8	100			R3203_Tree_140
141	Powderbark Wandoo	480154	6503463	Small	12	174			R3203_Tree_141
142	Powderbark Wandoo	480150	6503465	No	9	184			R3203_Tree_142
143	Powderbark Wandoo	480153	6503461	No	11	100			R3203_Tree_143
144	Powderbark Wandoo	480143	6503456	Small	8	116			R3203_Tree_144
145	Powderbark Wandoo	480134	6503444	Small	8	181			R3203_Tree_145
146	Powderbark Wandoo	480126	6503446	No	8	96			R3203_Tree_146
147	Powderbark Wandoo	480125	6503453	Small	8	97			R3203_Tree_147
148	Dead	480120	6503450	Small	5	187			R3203_Tree_148
149	Powderbark Wandoo	480117	6503462	Yes	9	304	5	Multiple potential hollows	R3203_Tree_149

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Tree Number	Tree Species	Easting	Northing	Hollows	Tree Height (m)	Circumference (cm)	Hollow height (m)	Notes	Photo Reference
150	Powderbark Wandoo	480118	6503486	Small	10	167			R3203_Tree_150
151	Powderbark Wandoo	480097	6503454	No	10	116			R3203_Tree_151
152	Powderbark Wandoo	480094	6503455	No	10	125			R3203_Tree_152
153	Powderbark Wandoo	480095	6503447	Small	10	119			R3203_Tree_153
154	Powderbark Wandoo	480099	6503446	Small	10	133			R3203_Tree_154
155	Powderbark Wandoo	480103	6503440	Small	9	118			R3203_Tree_155
156	Powderbark Wandoo	480108	6503433	No	8	125			R3203_Tree_156
157	Powderbark Wandoo	480107	6503430	Small	12	139			R3203_Tree_157
158	Powderbark Wandoo	480098	6503431	No	8	101			R3203_Tree_158
159	Powderbark Wandoo	480102	6503424	No	10	93			R3203_Tree_159
160	Powderbark Wandoo	480096	6503423	Small	9	106			R3203_Tree_160
161	Powderbark Wandoo	480093	6503421	Small	11	158			R3203_Tree_161
162	Powderbark Wandoo	479764	6503291	No	11	193			R3203_Tree_162
163	Powderbark Wandoo	479761	6503295	No	8	140			R3203_Tree_163
164	Powderbark Wandoo	479746	6503303	Small	10	142			R3203_Tree_164
165	Powderbark Wandoo	479745	6503307	Small	8	108			R3203_Tree_165
166	Powderbark Wandoo	479747	6503314	No	7	94			R3203_Tree_166
167	Powderbark Wandoo	479754	6503317	Yes	15	140		Chewed but not by Black Cockatoos	R3203_Tree_167
168	Powderbark Wandoo	479756	6503342	Yes	12	184		Burnt centre	R3203_Tree_168
169	Powderbark Wandoo	479733	6503309	Small	12	130			R3203_Tree_169
170	Dead	479717	6503310	Small	5	32			R3203_Tree_170
171	Powderbark Wandoo	479715	6503312	Small	6	126			R3203_Tree_171
172	Powderbark Wandoo	479722	6503296	No	6	108			R3203_Tree_172
173	Powderbark Wandoo	479743	6503291	Small	6	95			R3203_Tree_173
174	Dead	479745	6503259	Yes	8	151			R3203_Tree_174
175	Powderbark Wandoo	479646	6503199	No	10	198			R3203_Tree_175

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Tree Number	Tree Species	Easting	Northing	Hollows	Tree Height (m)	Circumference (cm)	Hollow height (m)	Notes	Photo Reference
176	Powderbark Wandoo	479647	6503200	No	8	140			R3203_Tree_176
177	Powderbark Wandoo	479656	6503208	No	8	110			R3203_Tree_177
178	Powderbark Wandoo	479652	6503212	No	10	98			R3203_Tree_178
179	Powderbark Wandoo	479654	6503215	Small	10	118			R3203_Tree_179
180	Powderbark Wandoo	479656	6503220	No	8	97			R3203_Tree_180
181	Powderbark Wandoo	479660	6503225	Small	10	151			R3203_Tree_181
182	Powderbark Wandoo	479642	6503213	No	9	157			R3203_Tree_182
183	Powderbark Wandoo	479626	6503218	No	10	174			R3203_Tree_183
184	Powderbark Wandoo	479592	6503196	No	8	110			R3203_Tree_184
185	Powderbark Wandoo	479584	6503205	Small	13	147			R3203_Tree_185
186	Powderbark Wandoo	479583	6503181	No	9	173			R3203_Tree_186
187	Powderbark Wandoo	479576	6503174	Small	9	104			R3203_Tree_187
188	Powderbark Wandoo	479579	6503162	No	10	139			R3203_Tree_188
189	Powderbark Wandoo	479589	6503161	Small	8	118			R3203_Tree_189
190	Powderbark Wandoo	479594	6503163	No	8	128			R3203_Tree_190
192	Powderbark Wandoo	479542	6503140	Small	8	135			R3203_Tree_192
193	York Gum	479535	6503128	Small	8	174			R3203_Tree_193
194	Powderbark Wandoo	479634	6503266	Small	13	209			R3203_Tree_194
195	Powderbark Wandoo	479637	6503279	Small	10	330			R3203_Tree_195
196	Powderbark Wandoo	479647	6503287	Small	8	205			R3203_Tree_196
197	Powderbark Wandoo	479650	6503292	No	9	208			R3203_Tree_197
198	Powderbark Wandoo	479654	6503304	No	6	130			R3203_Tree_198
199	Powderbark Wandoo	479694	6503311	No	8	129			R3203_Tree_199
200	Powderbark Wandoo	479697	6503330	Small	8	131			R3203_Tree_200
201	Powderbark Wandoo	479723	6503404	No	8	141			R3203_Tree_201
202	Powderbark Wandoo	479724	6503390	Small	10	124			R3203_Tree_202

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Tree Number	Tree Species	Easting	Northing	Hollows	Tree Height (m)	Circumference (cm)	Hollow height (m)	Notes	Photo Reference
203	Powderbark Wandoo	479887	6503686	No	11	108			R3203_Tree_203
204	Powderbark Wandoo	479893	6503691	No	9	116			R3203_Tree_204
205	Powderbark Wandoo	479894	6503698	No	6	99			R3203_Tree_205
206	Powderbark Wandoo	479827	6503678	No	7	156			R3203_Tree_206
207	Powderbark Wandoo	479821	6503669	No	5	118			R3203_Tree_207
208	Powderbark Wandoo	479810	6503678	No	6	119			R3203_Tree_208
209	Powderbark Wandoo	479812	6503668	No	6	99			R3203_Tree_209
210	Powderbark Wandoo	479815	6503664	Small	6	99			R3203_Tree_210
211	Powderbark Wandoo	479820	6503664	No	6	118			R3203_Tree_211
212	Powderbark Wandoo	479834	6503660	Small	8	156			R3203_Tree_212
213	Powderbark Wandoo	479795	6503638	Yes	10	302	6		R3203_Tree_213
215	Powderbark Wandoo	479771	6503643	Yes	6	162	5		R3203_Tree_215
216	Powderbark Wandoo	479772	6503648	No	6	99			R3203_Tree_216
217	Dead	479769	6503650	No	6	155			R3203_Tree_217
218	Powderbark Wandoo	479786	6503661	Small	7	102			R3203_Tree_218
219	Powderbark Wandoo	479789	6503666	No	6	98			R3203_Tree_219
220	Powderbark Wandoo	479790	6503691	Yes	7	240	4	Full of small hollows. Some likely to fall down.	R3203_Tree_220
221	Powderbark Wandoo	479786	6503707	Yes	8	280		Might not be big enough for Cockatoo to turn around	R3203_Tree_221
222	Powderbark Wandoo	479785	6503714	Small	6	145			R3203_Tree_222
223	Powderbark Wandoo	479791	6503711	Yes	6	220	4	1 large hollow too low, other potential hollows present	R3203_Tree_223
224	Powderbark Wandoo	479792	6503715	Yes	8	230	5	5m other small hollows	R3203_Tree_224
225	Powderbark Wandoo	479786	6503737	Small	5	101			R3203_Tree_225
226	Powderbark Wandoo	479785	6503738	Yes	5	166			R3203_Tree_226
228	Powderbark Wandoo	479819	6503749	Small	7	166			R3203_Tree_228
229	Dead	479820	6503756	Small	7	200			R3203_Tree_229
230	Powderbark Wandoo	479798	6503746	Yes	8	257	5		R3203_Tree_230

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Tree Number	Tree Species	Easting	Northing	Hollows	Tree Height (m)	Circumference (cm)	Hollow height (m)	Notes	Photo Reference
231	Powderbark Wandoo	479772	6503746	No	6	98			R3203_Tree_231
232	Salmon Gum	479765	6503743	Yes	15	230	5		R3203_Tree_232
233	Powderbark Wandoo	479766	6503750	Small	6	94			R3203_Tree_233
234	Powderbark Wandoo	479763	6503744	Small	6	101			R3203_Tree_234
235	Powderbark Wandoo	479754	6503764	Small	7	170			R3203_Tree_235
236	Powderbark Wandoo	479762	6503791	No	8	142			R3203_Tree_236
237	Powderbark Wandoo	479761	6503796	No	6	147			R3203_Tree_237
238	Powderbark Wandoo	479768	6503794	No	6	126			R3203_Tree_238
240	Powderbark Wandoo	479772	6503824	No	7	131			R3203_Tree_240
241	Powderbark Wandoo	479728	6503842	Small	7	130			R3203_Tree_241
242	Powderbark Wandoo	479705	6503827	No	6	141			R3203_Tree_242
243	Powderbark Wandoo	479703	6503812	Yes	10	240	7	Poor condition	R3203_Tree_243
244	Powderbark Wandoo	479700	6503805	No	7	111			R3203_Tree_244
245	Powderbark Wandoo	479708	6503806	Yes	9	198	3	Multiple potential hollows	R3203_Tree_245
246	Powderbark Wandoo	479714	6503804	No	8	108			R3203_Tree_246
247	Powderbark Wandoo	479717	6503807	No	8	147			R3203_Tree_247
248	Powderbark Wandoo	479729	6503799	Yes	8	204	3	Too low	R3203_Tree_248
249	Powderbark Wandoo	479729	6503795	No	8	103			R3203_Tree_249
250	Powderbark Wandoo	479740	6503791	No	7	120			R3203_Tree_250
251	Powderbark Wandoo	479747	6503790	Yes	9	255	4		R3203_Tree_251
252	Powderbark Wandoo	479740	6503773	Yes	7	195			R3203_Tree_252
253	Powderbark Wandoo	479732	6503775	No	6	111			R3203_Tree_253
254	Powderbark Wandoo	479711	6503767	Yes	10	305		At least 2 potentially suitable hollows	R3203_Tree_254
255	Powderbark Wandoo	479710	6503764	Small	6	104			R3203_Tree_255
256	Powderbark Wandoo	479714	6503762	Small	8	179			R3203_Tree_256
257	Salmon Gum	479721	6503757	Yes	8		5		R3203_Tree_257

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Tree Number	Tree Species	Easting	Northing	Hollows	Tree Height (m)	Circumference (cm)	Hollow height (m)	Notes	Photo Reference
258	Salmon Gum	479725	6503756	Small	15	171			R3203_Tree_258
259	Salmon Gum	479729	6503756	No	12	147			R3203_Tree_259
261	Salmon Gum	479740	6503753	No	12	148			R3203_Tree_261
262	Salmon Gum	479730	6503748	Small	12	138			R3203_Tree_262
263	Salmon Gum	479729	6503738	Small	12	165			R3203_Tree_263
264	Salmon Gum	479731	6503739	No	10	100			R3203_Tree_264
265	Powderbark Wandoo	479734	6503736	No	7	107			R3203_Tree_265
266	Powderbark Wandoo	479739	6503733	No	6	108			R3203_Tree_266
267	Powderbark Wandoo	479749	6503739	No	7	114			R3203_Tree_267
268	Powderbark Wandoo	479742	6503720	No	6	113			R3203_Tree_268
269	Powderbark Wandoo	479746	6503712	Yes	8	295	6		R3203_Tree_269
270	Powderbark Wandoo	479752	6503698	No	10	120			R3203_Tree_270
271	Powderbark Wandoo	479754	6503695	No	6	95			R3203_Tree_271
272	Powderbark Wandoo	479767	6503690	Yes	8	179	5		R3203_Tree_272
273	Powderbark Wandoo	479772	6503692	Small	7	126			R3203_Tree_273
274	Powderbark Wandoo	479774	6503692	No	8	157			R3203_Tree_274
275	Powderbark Wandoo	479743	6503863	Small	11	195			R3203_Tree_275