



Natural Area
CONSULTING MANAGEMENT SERVICES

City of Wanneroo

Fauna Assessment Mather Drive, Neerabup WA



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Executive Summary

Natural Area Consulting Management Services (Natural Area) was commissioned by the City of Wanneroo in July 2020 to undertake basic fauna surveys at three sites on Mather Drive in the Neerabup Industrial Area (NIA), Neerabup. The Environmental Protection Authority has recently revised the name of this type of survey from a Level 1 fauna survey; it is now known as a Basic Fauna survey (EPA 2020). The three sites cover approximately 18 hectares and consist of Mather Drive Road Reserve, Lot 9100 and Lot 41 Mather Drive.

The surveys were undertaken to inform the City's obligations relating to clearing permit applications for Lot 41 and Mather Road Reserve, where future drainage expansion and a new road are proposed for the respective sites. A detailed and targeted flora and fauna assessment was last undertaken at Lot 9100 in May 2013. As this survey was conducted over 5 years ago, a new survey was required to reassess existing site conditions and inform environmental planning processes related with the subdivision and industrial development of the site.

Field survey works were undertaken during September and October 2020. Opportunistic sightings of fauna were recorded over a two day period while traversing the site (either direct observations or indications of their presence) including scats, tracks, calls and diggings. Five trail cameras were installed across the three sites to capture the presence of additional fauna species.

Survey outcomes confirmed the presence of a total of 29 vertebrate species and 11 invertebrate species including:

- 21 bird species
- four reptiles
- four mammals
- of the fauna species recorded, five are introduced, with the Red Fox classed as a declared pest under the *Biosecurity and Agriculture Management Act 2007* (WA).

Three conservation significant species were identified during the field survey, namely the Quenda, Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo. Cockatoo habitat is present within the three Mather Drive sites in both poor and good condition. Observations were made of individual Forest Red-tailed Black Cockatoos, with evidence of foraging by cockatoos identified in the form of chewed nuts as well as capturing trail camera photographs of Carnaby's Cockatoos foraging on grasses.

The close proximity of these conservation significant species to the survey sites will need to be considered in future clearing permit applications, further environmental approvals and any associated impacts on the foraging flora species within the offsets. Site 2, Lot 9100 contains more than 1 ha of good quality foraging habitat for black cockatoos; this triggers the referral guidelines in *EPBC Act Referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo, Baudin's cockatoo and Forest red-tailed black cockatoo* (EPA, 2012). As the other two sites are under 1 ha in area, they do not meet the minimum requirements for referral. A black cockatoo habitat survey undertaken by Ecoscape in 2019 also recorded 65 habitat trees at Lot 9100, and six within Lot 41.

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1.0 Introduction

Natural Area Consulting Management Services (Natural Area) was commissioned by the City of Wanneroo in July 2020 to undertake basic fauna surveys at three sites on Mather Drive in the Neerabup Industrial Area (NIA), Neerabup. The Environmental Protection Authority has recently revised the name of this type of survey from a Level 1 fauna survey; it is now known as a Basic Fauna survey (EPA 2020).

The surveys were undertaken to inform clearing permit approvals processes for Lot 41 and Mather Drive Road Reserve and development approvals for the proposed subdivision of Lot 9100, as well as to update previous biological surveys undertaken within Lot 9100, which has a current approved clearing permit in place (CPS 6359). A detailed and targeted flora and fauna assessment was last undertaken at Lot 9100 in May 2013. As this survey was conducted over 5 years ago, a new survey was required to reassess existing site conditions and inform environmental planning processes related with the subdivision and industrial development of the site.

1.1 Location

The Neerabup Industrial Area (NIA) is a general industrial estate within the suburb of Neerabup, located approximately 30 km north of the Perth Central Business District (Figure 1). The total survey area is approximately 18 hectares and is comprised of three separate sites:

- Site 1: Mather Drive road reserve (1.17 ha)
- Site 2: Lot 9100 (60) Mather Drive (16.2702 ha)
- Site 3: Lot 41 (34) Mather Drive (0.5879 ha).

1.2 Scope

Activities undertaken by Natural Area included:

- desktop database searches to identify potential conservation significant fauna species potentially occurring within the site
- a basic fauna survey to record opportunistic sightings of fauna or evidence of their presence including scats, tracks and diggings
- reporting outcomes of the survey in this report.

1.3 Objectives

The main objective of the fauna survey was to determine the biological values of the survey area including fauna species present, which can be considered in future management of the sites and to inform clearing permit applications.

The City is proposing the development of Lot 9003 (85) and Lot 9100 (60) Mather Drive for industrial land development purposes. Lot 9100 is already included in the current approved clearing permit for the City, with the survey works providing updated biological survey outcomes to inform development approvals. The Mather Drive Road Reserve runs partially through Lot 9003 and will be used for a vehicle access road once Lot 9003 is subdivided. The City also requires the clearing and expansion of the drainage reserve located at Lot 41 (34) Mather Drive. The road reserve and drainage reserve do not currently form part of the City's approved Clearing Permit CPS 6359 and thus this survey is required to enable lodgement of a new clearing permit application.

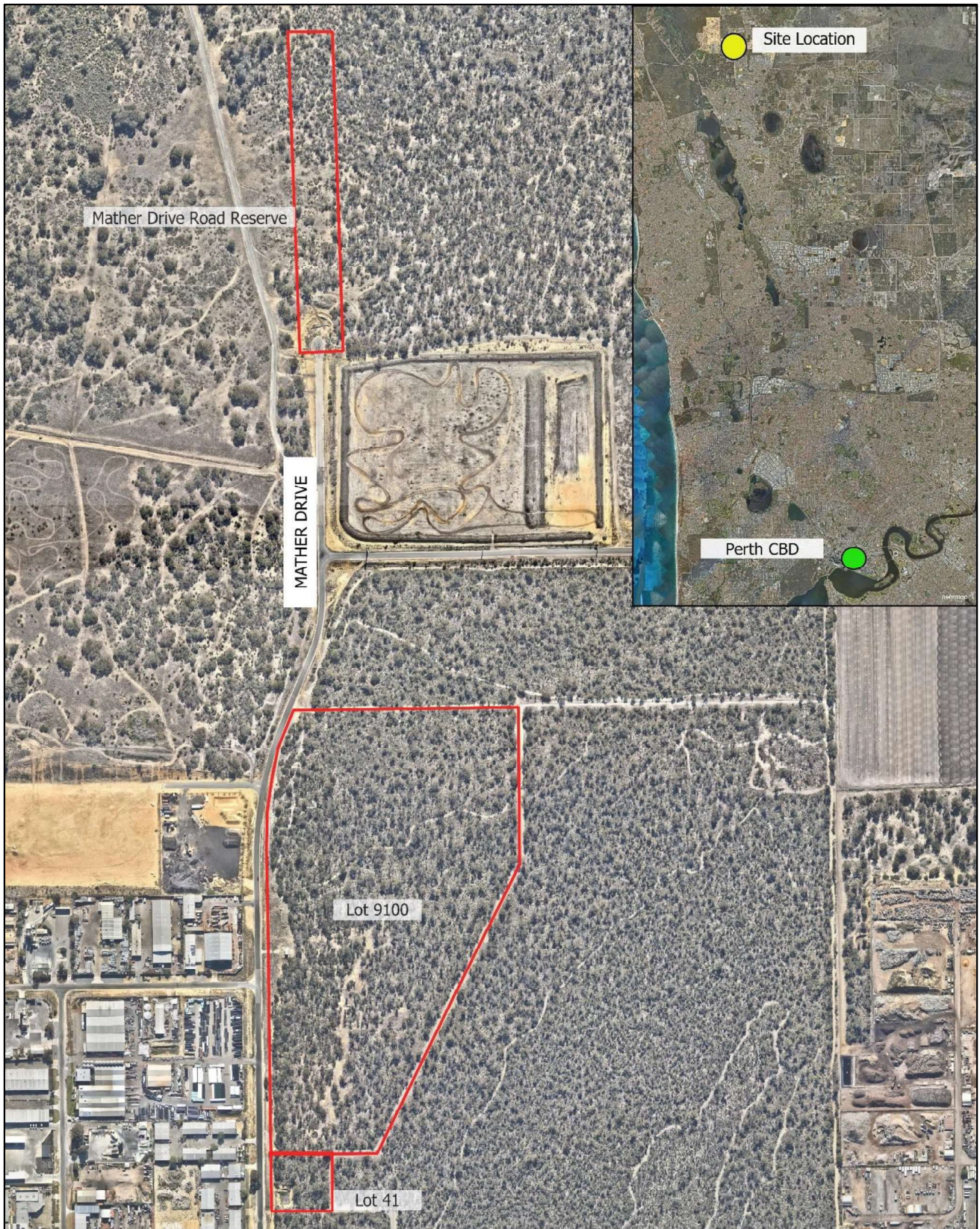
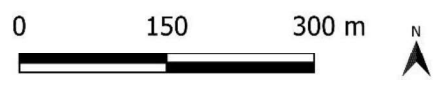


Figure 1:
Mather Drive Reserves
Neerabup, WA



Client: City of Wanneroo
Date: 23/11/2020
Created by: K. Sadgrove
Image Source: Nearmap 2020
Datum: GDA 94

2.0 Site Characteristics

Site characteristics have an influence on the fauna present within an area. Key characteristics of the Mather Drive survey sites are outlined below.

2.1 Regional Context

According to the Interim Biogeographical Regionalisation of Australia (IBRA) descriptions, the three Mather Drive sites are located within the Swan Coastal Plain (SWA 2 – Swan Coastal Plain subregion) (Department of Primary Industries and Regional Development, 2020). This area is described as a low-lying coastal plain with sands of colluvial and aeolian origin, as well as alluvial river flats and coastal limestone. The region is dominated by *Banksia* and/or Jarrah Woodland over sandy soils associated with the dune systems, with Paperbark (*Melaleuca*) in swampy/damp areas and Jarrah Woodland to the east where the Swan Coastal Plain rises (Mitchell, Williams & Desmond, 2002).

2.2 Previous Land Use and Tenure

A review of aerial imagery from Nearmap (2021) shows that there has been no land use changes to the three survey sites from December 2007 to the present, with all sites remaining in the vegetated state. Clearing to Mather Drive Road Reserve occurred between 1964 to 1975. The southern portion of Mather Drive was cleared with the road installed in 1985 this was extended to the southern boundary of the Mather Drive Road Reserve in 2003 (Landgate 2021). Both Lot 9100 and Lot 41 are zoned as Industrial Development with Mather Drive Road Reserve zoned as Industrial under the District Planning Scheme (DPS) Number 2 (City of Wanneroo 2021).

2.3 Climate

The climate experienced in the area is Mediterranean, with dry, hot summers and cool, wet winters.

According to the Bureau of Meteorology (Perth Airport, Station ID 009021, 2020):

- average rainfall is 762.1 mm per annum, with the majority falling between May and August
- average maximum temperatures range from 18.0 °C in winter to 32.0 °C in summer, with the highest recorded maximum being 46.7 °C
- average minimum temperatures range from 8.0 °C in winter to 17.5 °C in summer, with the lowest recorded minimum being -1.3 °C
- predominant wind directions include morning easterlies and westerly sea breezes during summer months, with average windspeeds up to 22.7 km/h and gusts greater than 100km/h.

2.4 Topography and Soils

Topography across the site ranges from 58 to 72 m AHD, with lower elevations to the south of the site rising to the north (Figure 2). Two soil types are present within the three sites, namely Karrakatta Sand Yellow Phase and the Karrakatta Sand Grey Phase as identified using the NRInfo Portal (Department of Primary Industries and Regional Development, 2020) (Table 1, Figure 2).

Table 1: Soil type descriptions

Name	Symbol	Description
Karrakatta Sand Yellow Phase	211Sp_Ky	Low hilly to gently undulating terrain with yellow sand over limestone at 1-2 m. <i>Banksia</i> spp. woodland with scattered emergent <i>Eucalyptus gomphocephala</i> and <i>Eucalyptus marginata</i> and a dense shrub layer.
Karrakatta Sand Grey Phase	211Sp_Kg	Low hilly to gently undulating terrain. Iron podzols. <i>Banksia</i> spp. woodland with <i>Eucalyptus todtiana</i> and depauperate <i>Eucalyptus marginata</i> ; dense shrub layer.

Source: Department of Primary Industries and Regional Development, 2020

2.5 Vegetation Complex

The WALGA Environmental Planning Tool (2020) indicates that the vegetation complex within the three sites is Cottesloe Complex – Central and South (WALGA, 2020). The Cottesloe Complex – Central and South is comprised of heaths on limestone outcrops. Areas with deeper sands consists of Tuart woodlands and open forests of Tuart, Jarrah and Marri (Heddle, Loneragan & Havel, 1980).

The pre-European extent of this vegetation complex remaining is 15815.73 ha (35.22%) for the Swan Coastal Plain (Western Australian Local Government Association (WALGA) 2013). The Pre-European extent remaining for this complex within the City of Wanneroo local government area is 6122.77 ha (46%) (WALGA 2010)

2.6 Hydrology

No wetland or other water courses were identified within the study areas through a search on the City of Wanneroo's online IntraMaps tool. The three sites are approximately 9 km east of the ocean and approximately 4.5 km north of Lake Joondalup and Mariginiup Lake.

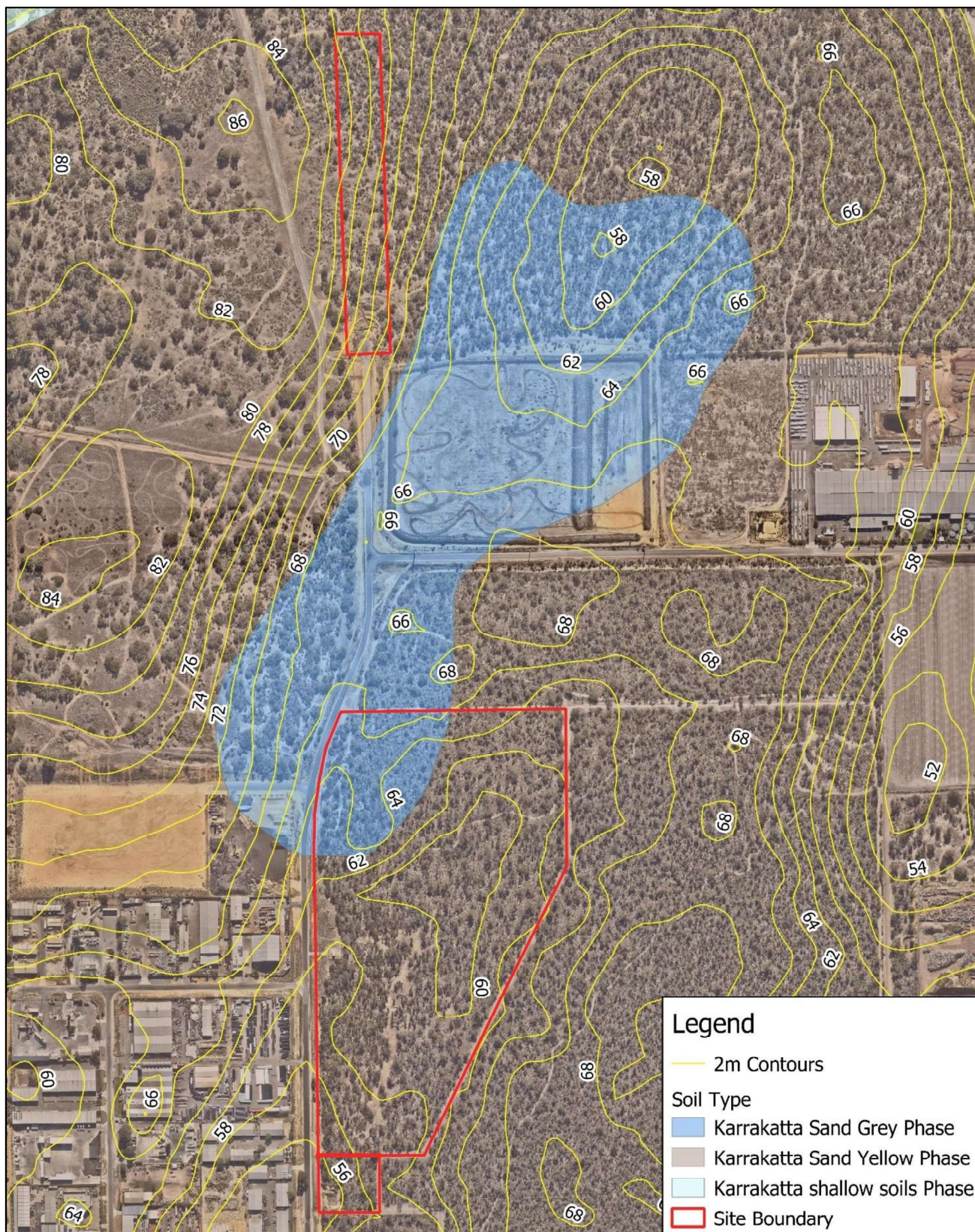
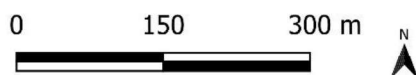


Figure 2:
Topography and Soils
Mather Drive Reserves
Neerabup, WA



Client: City of Wanneroo
Date: 23/11/2020
Created by: K. Sadgrove
Image Source: Nearmap 2020
Datum: GDA 94

3.0 Methodology

3.1 Desktop and Literature Review

Desktop surveys were undertaken to determine:

- likely native and non-native fauna species present
- likely presence of threatened or priority fauna species and their habitat.

The following databases were accessed to obtain relevant information:

- online databases on NationalMap to review fauna habitat via vegetation complexes, soils, topography and landscape
- NatureMap (Department of Biodiversity, Conservation and Attractions, 2020b) (Appendix 1)
- Protected Matters Search Tool (Department of Agriculture, Water and the Environment, 2020b), (Appendix 2)
- Department of Biodiversity, Conservation and Attractions database search for fauna previously recorded in the local area (DBCA, 2020c).

3.2 On-ground Fauna Survey

The on-ground fauna survey was completed in accordance with a Basic Fauna Survey as outlined in the *Environmental Protection Authority (EPA) Technical Guidance, Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA, 2020). A basic survey is a low-intensity survey which gathers broad fauna and habitat information including opportunistic fauna observations (EPA 2020). Natural Area Ecologist Sharon Hynes and assistants Lachlan Crossley and Eva Karikis traversed the survey sites on 3 and 4 September and 29 and 30 October 2020.

Each of the three sites were traversed on foot with the entire length of the sites searched during the September and October survey periods. Opportunistic sightings of fauna were recorded while traversing the site (either directly or indications of their presence) including scats, tracks, calls and diggings. Active searching in the form of turning over rocks, logs and raking through leaf litter was also conducted during the survey. Habitat was assessed based on vegetation types, vegetation condition, microhabitat present (logs/rocks and leaf litter). Larger habitat trees were assessed to record any hollow or nest that may be in use by native bird species. Five trail cameras were installed across the three sites to capture additional fauna species (Figure 3). Trail cameras were installed in the field from 4 September to 2 October 2020.

3.3 Limitations

Several limitations associated with both desktop and on-ground fauna surveys exist, including:

- database searches provide an indication of what species may be present, with on ground surveys required to confirm those present
- the differing databases are reliant on information submitted via various reporting mechanisms, so all records of a particular species within a specified area may not be complete
- information on species provided on some databases include out-of-date species names, meaning that names need to be checked for currency
- some fauna species are highly mobile and may utilise the site as part of their range but may not be present within the site at the time of the survey

- certain fauna species are shy or difficult to observe and may not be observed even though they are present on site
- species are active at different times and are not always able to be identified the weather during the September survey was cold and wet and therefore reduced rates of fauna, particularly reptiles were observed due to reduced mobility of fauna species. However, the second visit in October was undertaken during the optimal time to observed native fauna when it is warmer, and fauna is more active
- recent disturbance to vegetation in the area via salvaging of Grass Trees and Zamia palms in Lot 9100 may have reduced fauna numbers observed, due to disturbance of fauna species present during works (machinery/noise) and the degradation of fauna habitat in some areas.

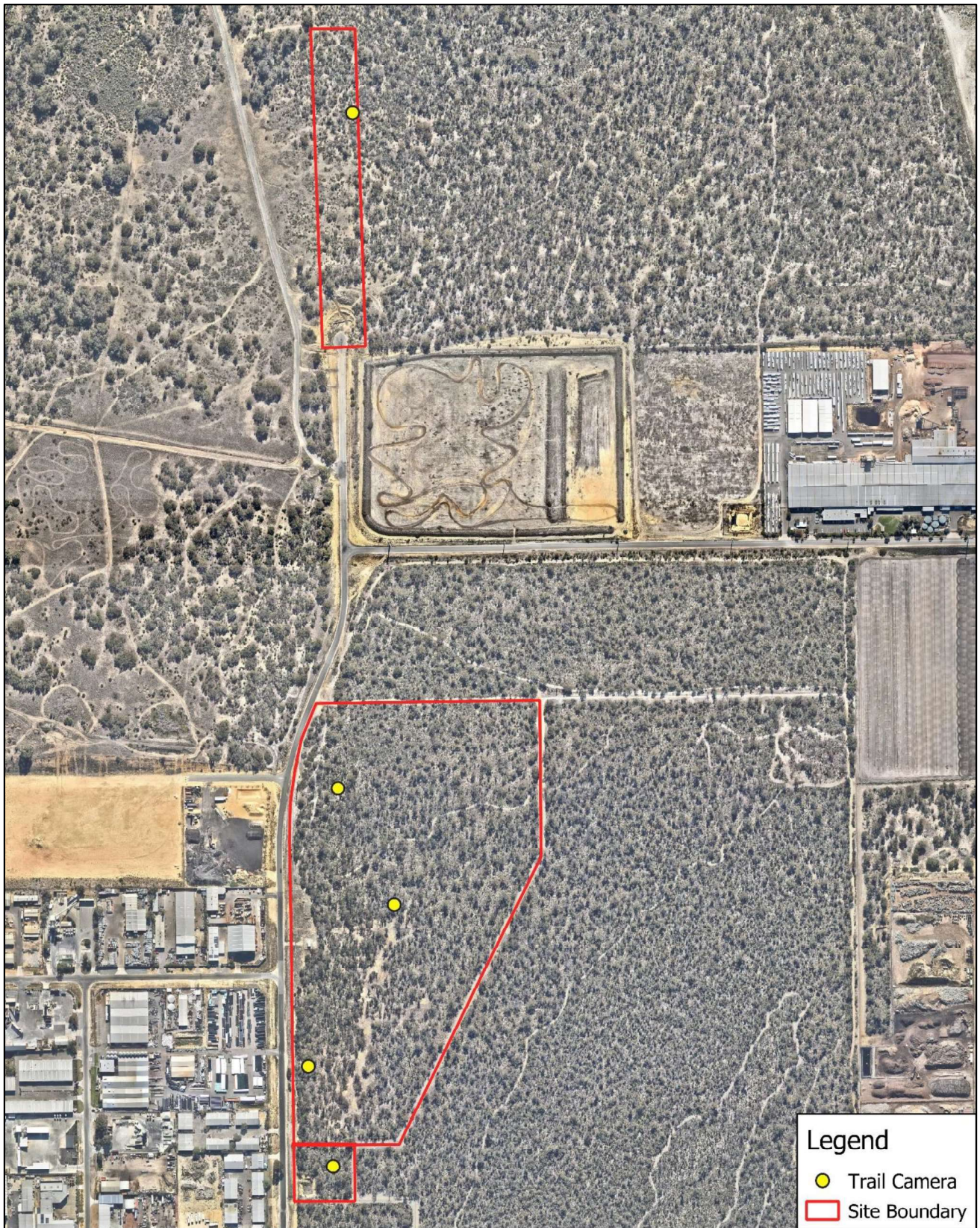
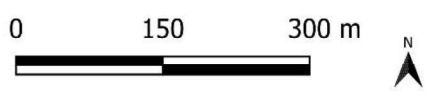


Figure 3:
Trail Cameras
Mather Drive Reserves
Neerabup, WA



Legend
● Trail Camera
□ Site Boundary

Client: City of Wanneroo
Date: 23/11/2020
Created by: K. Sadgrove
Image Source: Nearmap 2020
Datum: GDA 94

4.0 Results

4.1.1 Desktop Survey

A desktop survey of online databases indicated the potential for a total of 15 conservation significant fauna species (taxa) to occur within 3 km radius of the survey site (Table 2). There were six conservation significant fauna species listed under the *Biodiversity Conservation Act 2016* (WA) identified as potentially occurring within a 3 km radius of the survey site by NatureMap (DBCA, 2020b) (Appendix 1). A review of the Protected Matters Search tool (PMST) (Department of Agriculture, Water and the Environment 2020b) indicated the potential for 10 fauna species, listed as protected under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Cwlth) to occur within a 3 km radius of the site (Appendix 2).

A review of the DBCA threatened and priority flora database indicated five threatened or priority species, have been previously recorded within a 2 km radius of the survey site; highlighted in green in Table 2 (Department of Biodiversity, Conservation and Attractions, 2020d) (Table 2). Conservation codes are outlined in Appendix 3.

Table 2: Threatened and priority fauna species potentially occurring in the survey area

Species Name	Common Name	Cons. Code	Nature Map	PMST	DBCA
Birds					
<i>Calidris canutus</i>	Red Knot, Knot	EN		X	
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR		X	
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo	V		X	
<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	EN, T	X	X	X
<i>Calyptorhynchus sp.</i>	White-tailed Black Cockatoo	T	X		
<i>Leipoa ocellata</i>	Malleefowl	V		X	
<i>Numenius madagascariensis</i>	Eastern Curlew	CR		X	
<i>Rostratula australis</i>	Australian Painted Snipe	E		X	
<i>Sternula neresis neresis</i>	Australian Fairy Turn	V		X	
Invertebrates					
<i>Hesperocolletes douglasi</i>	Douglas' Broad-headed Bee, Rottnest Bee	CR		X	
<i>Hylaeus globuliferus</i>	Wooly Bush Bee	P3	X		X
<i>Synemon gratiosa</i>	Graceful Sunmoth	P4	X		X
Mammals					
<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	V		X	
<i>Isodon fusciventer</i>	Quenda, Southwestern brown bandicoot	P4	X		X
<i>Notamacropus irma</i>	Western Brush Wallaby	P4	X		X

4.1.2 Literature Review

A literature review of previous environmental surveys conducted within the Mather Drive bushland was undertaken during the preparation of this report, with the conservation significant information recorded as follows:

- *Ground Truthing of Environmental Values lot 4 Flynn Drive, Neerabup* (Eco Logical 2012); this survey identified:
 - 28 additional trees from the original 15 trees identified by ATA Environmental (2007). Due to survey limitations, Eco Logical recommended a thorough and systemic search of the entire site for all potential habitat trees to be identified.
 - No threatened or priority species.
 - The threatened ecological community (TEC) FCT SCP 20a – *Banksia attenuata* woodlands over species rich dense shrublands was recorded in Lot 9000 approximately 110 m south-east of Lot 9100 survey site.
 - Site includes Lots 9100, 9003 and Mather Reserve (previously zoned as Lot 4).
 - Foraging and habitat trees were identified based on unpublished reports from ATA Environmental (2007) and RPS (2006) as well as in accordance with *Environment Protection and Biodiversity Conservation Act 1999 draft referral guidelines for three threatened black cockatoo species: Carnaby’s cockatoo (endangered) Calyptorhynchus latirostris, Baudin’s cockatoo (vulnerable) Calyptorhynchus baudinii, Forest red-tailed black cockatoo (vulnerable) Calyptorhynchus banksii naso* (Department of Sustainability, Environment, Water, Population and Communities, 2011)

- *Black Cockatoo Habitat Survey (Neerabup Industrial Area) Offset Sites* (Ecoscape 2020a) the survey identified:
 - A total of 65 habitat trees within lot 9100.
 - Six habitat trees within Lot 41.
 - Foraging and habitat trees were identified based on Commonwealth guidance *EPBC Act referral guidelines for three threatened black cockatoo species: Carnaby’s cockatoo (endangered) Calyptorhynchus latirostris Baudin’s cockatoo (vulnerable) Calyptorhynchus baudinii Forest red-tailed black cockatoo (vulnerable) Calyptorhynchus banksii naso* (Department of Sustainability, Environment, Water, Population and Communities, 2012), *Revised draft referral guideline for three threatened black cockatoo species: Carnaby’s Cockatoo (Endangered) Calyptorhynchus latirostris Baudin’s Cockatoo (Vulnerable) Calyptorhynchus baudinii Forest Red-tailed Black Cockatoo (Vulnerable) Calyptorhynchus banksii naso* (Department of the Environment and Energy, 2017) with breeding trees classified based on habitat value grading system developed by Bamford 2016.

4.2 Field Survey Results

A total of 29 vertebrate species and 11 invertebrate species were recorded, with 23 occurring in Mather Drive Road Reserve, 16 in Lot 9100 and 16 in Lot 41. Of the vertebrate species, 20 birds, four reptiles and four mammal species were recorded (Table 3). Three conservation significant fauna species were recorded during the survey, Quenda (*Isoodon fusciventer*) (Priority 4) at Lot 41 and Mather Drive Road Reserve and Carnaby’s Cockatoo (*Calyptorhynchus latirostris*–T/EN) and Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) at Lot 9100 and Mather Drive Road Reserve (highlighted green in Table 3).

Five introduced species were recorded (Table 3), including the Red Fox which is a category C3 declared pest under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) (WA). The Short-beaked Echidna was recorded at both Mather Drive Road Reserve and Lot 9100 this species is regionally significant as it is not common on the Swan Coastal Plain or near urban areas.

In addition to visual observation of Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) individuals at all three reserves, evidence of foraging was also noted in the form of chewed Jarrah (*Eucalyptus marginata*) nuts. Cockatoo habitat is present at all three reserves which is classified as ‘poor’ condition at the Mather Drive Road Reserve site and ‘good’ condition at Lot 41 and Lot 9100. Examples of fauna species observed are shown in Figure 4.

Table 3: Fauna species identified at the three survey sites (*denoted introduced species).

Group	Mather Dr Rd Res	Lot 9100	Lot 41	Family	Species	Common Name
Birds						
	x			Alcedinidae	<i>*Dacelo novaeguineae</i>	Laughing Kookaburra
			x	Columbidae	<i>*Spilopelia senegalensis</i>	Laughing Turtle Dove
	x			Acanthizidae	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped thornbill
	x			Cacatuidae	<i>Cacatua sanguinea</i>	Little Corella
			x	Cacatuidae	<i>Cacatuidae roseicapilla</i>	Galah, Pink and Grey
	x	x	x	Cacatuidae	<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo (observed/signs of feeding)
	x	x		Cacatuidae	<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo (heard calls/seen flying over)
			x	Corvidae	<i>Corvus coronoides</i>	Australian Raven
	x		x	Cracticidae	<i>Cracticus tibicen</i>	Australian Magpie
			x	Accipitridae	<i>Elanus caeruleus</i>	Black Shouldered Kite
			x	Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow
	x		x	Meliphagidae	<i>Lichmera indistincta</i>	Brown Honeyeater
	x			Maluridae	<i>Malurus splendens</i>	Splendid Fairywren
		x	x	Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater
			x	Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous whistler
	x			Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing
		x		Meliphagidae	<i>Phylidonyris niger</i>	White-Cheeked Honeyeater
		x		Psittacidae	<i>Platycercus spurius</i>	Red-capped Parrot
		x	x	Psittacidae	<i>Platycercus zonarius</i>	Australian Ringneck
	x			Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail
	x			Turnicidae	<i>Turnix varius varius</i>	Painted Buttonquail

Group	Mather Dr Rd Res	Lot 9100	Lot 41	Family	Species	Common Name
Invertebrate						
	x	x		Apidae	<i>*Apis mellifera</i>	European Honey Bee
	x	x		Julidae	<i>*Ommatoiulus moreletii</i>	Portuguese Millipede
		x		Ixodoidae	<i>Amblyomma triguttatum</i>	Kangaroo tick
	x	x		Apidae	<i>Amegilla sp.</i>	Blue Banded Bee
		x		Sparassidae	<i>Delena sp.</i>	Huntsman Spider
	x			Formicidae	<i>Iridomyrmex purpureus</i>	Meat ant
		x		Formicidae	<i>Myrmecia pilosula</i>	Jack jumper ant
	x			Pieridae	<i>Pieris rapae</i>	Cabbage Butterfly
			x	Acrididae		Cricket
			x	Syrphidae		Hoverfly
			x	Tabanidae		March fly
Mammals						
	x		x	Peramelidae	<i>Isoodon fusciventer</i>	Quenda, Bandicoot
	x	x	x	Macropodidae	<i>Macropus fuliginosus</i>	Western Grey Kangaroo (tracks, scats, bones)
	x	x		Tachyglossidae	<i>Tachyglossus aculeatus acanthion</i>	Short-beaked Echidna
	x			Canidae	<i>*Vulpes vulpes</i>	Red Fox
Reptiles						
			x	Scincidae	<i>Cryptoblepharus buchananii</i>	Snake Eyed Skink
	x			Agamidae	<i>Ctenophorus adalaidensis</i>	Western Heath Dragon
	x	x		Scincidae	<i>Tiliqua rugosa rugosa</i>	Bobtail
	x			Varanidae	<i>Varanus sp.</i>	Goanna



Platycercus zonarius (Australian Ringneck) – Lot 41



Turnix varius (Painted Button-quail) – Mather DRR



Calyptorhynchus latirostris (Carnaby's Cockatoo) –
Mather DRR



Cacatuidae roseicapilla (Galah) – Lot 41



Macropus fuliginosus (Western Grey Kangaroo) – Lot
9100



Isoodon fusciventer (Quenda) – Mather DRR



Tachyglossus aculeatus acanthion
(SHORT-BEAKED ECHIDNA) – Lot 9100



**Vulpes vulpes* (Red Fox) – Mather DRR

Figure 4: Fauna species recorded through observation and trail cameras

4.2.1 Fauna Habitat

The fauna habitat for Lot 9100 and Lot 41 is in good condition with vegetation and fauna habitat relatively intact with no major signs of disturbance throughout these sites. These two lots contain good quality understorey for small mammals, reptiles and invertebrates and good quality foraging and nesting canopy for native bird species. Lots 9100 and 41 also contained good microhabitats for invertebrates including the conservation significant species listed in Table 2, with their preferred habitat species, and the presence of logs and leaf litter for reptiles and invertebrates. The fauna habitat for Mather Drive Road reserve is in a more degraded state, mainly attributed to previous clearing and a lack of overstorey species for nesting birds. The habitat present does however provide a good foraging area for fauna inhabiting the higher quality bushland surrounding the site, with many species captured feeding in this area on trail cameras, including conservation significant species.

The food source for threatened black cockatoos is present within all three sites, with habitat trees previously recorded in Lot 9100 and Lot 41 by Ecoscape in 2020. Foraging habitat for the Priority 4 Quenda is also present in all three sites, with Lot 41 and Lot 9100 having denser understorey vegetation suitable for runnels (vegetative burrows). The Rainbow Bee-eater was observed in both Lot 9100 and 41; this species was previously listed as a threatened migratory species but has recently been de-listed. Rainbow Bee-eaters nest in burrows on the ground in open areas of sand; this habitat is present across all three sites.

5.0 Discussion

A total of 40 fauna species were recorded during the site survey, including both native and introduced species.

5.1 Fauna Habitat

Good foraging habitat for fauna is present in all three Mather Road sites, including for conservation significant species such as threatened black cockatoos and the Priority 4 Quenda. Habitat for mammals, reptiles, invertebrates and birds is of good quality in Lot 41 and Lot 9100, but in poor condition in Mather Drive Road reserve due to previous clearing and the lack of native flora and suitable habitat trees. Fauna trapping prior to clearing of these areas should be considered due to the high diversity of fauna species recorded on site.

The Rainbow Bee-eater was observed in both Lot 9100 and 41, this species was previously listed as a threatened migratory species but has recently been de-listed. Rainbow Bee-eaters nest in burrows on the ground in open areas of sand (present across all three sites) and should be considered when planning sand extraction activities. The threatened black cockatoo habitat should be considered in terms of offsets and revegetation using appropriate foraging and nesting species or nesting boxes.

5.2 Fauna Species

A total of 29 vertebrates and five invertebrate species were recorded, with the majority (23) in Mather Drive Road Reserve, 16 in Lot 9100 and 16 in Lot 41. The high number observed at Mather Drive Road Reserve (considering it had the lowest habitat value of the sites) is likely due to it being further from development and industrial areas than the other two lots and the fact that it has increased connectivity to vegetated areas to the north in Neerabup. Three conservation significant fauna species were recorded during the survey; these included Carnaby's Cockatoo (*Calyptorhynchus latirostris*), Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) and Quenda (*Isoodon fusciventer*). Cockatoo habitat is present within the three Mather Drive sites in both good and poor condition. Evidence of foraging by cockatoos was identified in the form of chewed nuts and activity captured by the trail cameras of Carnaby's foraging on grasses.

The presence of these conservation significant species within each of the three survey sites will need to be considered in future clearing permit applications, further environmental approvals, and any associated impacts on the foraging flora species within the offsets. As Lot 9100 contains more than 1 ha of good quality foraging habitat for black cockatoos this triggers the referral guidelines in *EPBC Act Referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo, Baudin's cockatoo and Forest red-tailed black cockatoo* (EPA, 2012).

Of the conservation significant species listed by DBCA as recorded previously within 2 km of the three sites the P4 Graceful Sunmoth has the potential to occur due the presence of its preferred habitat species *Lomandra hermaphrodita*. However, this species is only present between February and April each year so would not have been present during the spring 2020 survey. The P3 Woolly Bush Bee also has a moderate possibility of occurring within Lot 9100 due to the occurrence of its habitat species including *Adenanthos cygnorum* and *Banksia attenuata* present, however *Adenanthos cygnorum* is not present in the other two sites.

The P4 Western Brush Wallaby is unlikely to occur within the sites as they usually prefer lower elevated areas near wetlands and were not recorded on the trail cameras, whilst the Western Grey Kangaroo were quite prevalent throughout the site and may be the reason for their absence due to increased competition for resources in the area.

5.3 Introduced Fauna Species

A total of five introduced fauna species were recorded during the site survey, of which one was a mammal, two were invertebrates and two were birds. These introduced species are all common around the Perth Metropolitan Region. The Red Fox (*Vulpes vulpes*) is listed as a category C3 declared pest under the *Biosecurity and Agriculture Management Act 2007 (WA)* and requires control by landowners and/or managers to reduce the harmful impacts of the organism, reduce its number and contain the spread of the species.

5.4 Conclusion

This survey was undertaken in accordance with the EPA *Technical Guidance – Vertebrate Fauna Surveys (2020)* for basic fauna surveys. Overall, the survey recorded a high number of species within the three survey sites with the majority being bird species. The species numbers for birds and invertebrates are likely to be higher, but since these species can be seasonal visitors and highly mobile using the site transiently it would take additional surveys during different times of the year to gain a full list of species frequenting the three survey sites.

Vegetation clearing during construction and development of the three Mather Drive sites may lead to injury and loss of terrestrial fauna. Due to the relatively high number of species, it is recommended that a fauna relocation/salvage program be implemented as a mitigating measure to reduce fauna mortalities during the clearing process. A pre-clearing trapping and relocation program using a range of traps (dry pitfalls, funnel traps, Elliotts) can be employed to target and trap mammals, reptiles and amphibians. Opportunistic hand capture and removal of nesting birds, small terrestrial and arboreal fauna can be undertaken, with larger mammals such as kangaroos encouraged to move out of the clearing area into adjacent remnant bushland. Clearing should commence immediately upon removal of traps to limit the chances of fauna recolonising the trapped area. Fauna relocators/spotters can be deployed on site during clearing activities to ensure any stranded or injured wildlife gets attended to immediately. Relocation sites would require assessment to ensure that habitat and ecology is suitable and sustainable for the relocated species. Any fauna relocation works would need to be undertaken by suitably qualified individuals, with a fauna relocation licence obtained prior to any works being undertaken from the Department of Biodiversity, Conservation and Attractions.

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Appendix 1: NatureMap Report

NatureMap Species Report

Created By Guest user on 31/08/2020

Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115° 47' 26" E, 31° 40' 42" S
Buffer 3km
Group By Species Group

Species Group	Species	Records
Amphibian	3	11
Bird	74	480
Dicotyledon	64	79
Fungus	1	3
Invertebrate	18	30
Mammal	6	9
Monocotyledon	29	37
Reptile	18	49
TOTAL	213	698

Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area
Amphibian				
1.	25410 <i>Heleioporus eyrei</i> (Moaning Frog)			
2.	25415 <i>Limnodynastes dorsalis</i> (Western Banjo Frog)			
3.	25420 <i>Myobatrachus gouldii</i> (Turtle Frog)			
Bird				
4.	24559 <i>Acanthagenys rufogularis</i> (Spiny-cheeked Honeyeater)			
5.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
6.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
7.	24262 <i>Acanthiza inornata</i> (Western Thornbill)			
8.	24560 <i>Acanthorhynchus superciliosus</i> (Western Spinebill)			
9.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
10.	24282 <i>Accipiter fasciatus</i> subsp. <i>fasciatus</i> (Brown Goshawk)			
11.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
12.	24562 <i>Anthochaera lunulata</i> (Western Little Wattlebird)			
13.	25554 <i>Apus pacificus</i> (Fork-tailed Swift, Pacific Swift)		IA	
14.	41324 <i>Ardea modesta</i> (great egret, white egret)			
15.	<i>Barnardius zonarius</i>			
16.	25715 <i>Cacatua roseicapilla</i> (Galah)			
17.	25716 <i>Cacatua sanguinea</i> (Little Corella)			
18.	24727 <i>Cacatua sanguinea</i> subsp. <i>westralensis</i> (Little Corella)			
19.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
20.	25717 <i>Calyptorhynchus banksii</i> (Red-tailed Black-Cockatoo)			
21.	24734 <i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)		T	
22.	48400 <i>Calyptorhynchus</i> sp. (white-tailed black cockatoo)		T	
23.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
24.	24613 <i>Colluricincla harmonica</i> subsp. <i>rufiventris</i> (Grey Shrike-thrush)			
25.	24399 <i>Columba livia</i> (Domestic Pigeon)	Y		
26.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
27.	25592 <i>Corvus coronoides</i> (Australian Raven)			
28.	24417 <i>Corvus coronoides</i> subsp. <i>perplexus</i> (Australian Raven)			
29.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
30.	24422 <i>Cracticus tibicen</i> subsp. <i>dorsalis</i> (White-backed Magpie)			
31.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
32.	24424 <i>Cracticus torquatus</i> subsp. <i>torquatus</i> (Grey Butcherbird)			
33.	30901 <i>Dacelo novaeguineae</i> (Laughing Kookaburra)	Y		
34.	25673 <i>Daphoenositta chrysoptera</i> (Varied Sittella)			
35.	<i>Eolophus roseicapillus</i>			
36.	24368 <i>Eurostopodus argus</i> (Spotted Nightjar)			
37.	25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
38.	25623 <i>Falco longipennis</i> (Australian Hobby)			
39.	25624 <i>Falco peregrinus</i> (Peregrine Falcon)		S	
40.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
41.	47962 <i>Glyciphila melanops</i> (Tawny-crowned Honeyeater)			
42.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
43.	24295 <i>Haliastur sphenurus</i> (Whistling Kite)			
44.	47965 <i>Hieraaetus morphnoides</i> (Little Eagle)			
45.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
46.	25659 <i>Lichenostomus leucotis</i> (White-eared Honeyeater)			
47.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
48.	25651 <i>Malurus lamberti</i> (Variegated Fairy-wren)			
49.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
50.	24552 <i>Malurus splendens</i> subsp. <i>splendens</i> (Splendid Fairy-wren)			
51.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
52.	25663 <i>Melithreptus brevirostris</i> (Brown-headed Honeyeater)			
53.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)			
54.	25693 <i>Microeca fascinans</i> (Jacky Winter)			
55.	24738 <i>Neophema elegans</i> (Elegant Parrot)			
56.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
57.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
58.	24624 <i>Pachycephala rufiventris</i> subsp. <i>rufiventris</i> (Rufous Whistler)			
59.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
60.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
61.	48066 <i>Petroica boodang</i> (Scarlet Robin)			
62.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
63.	48071 <i>Phylidonyris niger</i> (White-cheeked Honeyeater)			
64.	24596 <i>Phylidonyris novaehollandiae</i> (New Holland Honeyeater)			
65.	25720 <i>Platycercus icterotis</i> (Western Rosella)			
66.	24750 <i>Platycercus zonarius</i> subsp. <i>semitorquatus</i> (Twenty-eight Parrot)			
67.	<i>Purpurecephalus spurius</i>			
68.	48096 <i>Rhipidura albiscapa</i> (Grey Fantail)			
69.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
70.	30948 <i>Smicromis brevirostris</i> (Weebill)			
71.	25589 <i>Streptopelia chinensis</i> (Spotted Turtle-Dove)	Y		
72.	25590 <i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)	Y		
73.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
74.	24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)			
75.	25549 <i>Todiramphus sanctus</i> (Sacred Kingfisher)			
76.	25723 <i>Trichoglossus haematodus</i> (Rainbow Lorikeet)			
77.	25765 <i>Zosterops lateralis</i> (Grey-breasted White-eye, Silvereye)			

Dicotyledon

78.	3409 <i>Acacia lasiocarpa</i> (Panjang)			
79.	30032 <i>Acacia saligna</i> subsp. <i>saligna</i>			
80.	1728 <i>Allocasuarina fraseriana</i> (Sheoak, Kondil)			
81.	6311 <i>Andersonia heterophylla</i>			
82.	20283 <i>Astartea scoparia</i> (Common Astartea)			
83.	6331 <i>Astroloma microcalyx</i> (Native Cranberry)			
84.	7046 <i>Bellardia trixago</i> (Bellardia)	Y		
85.	3710 <i>Bossiaea eriocarpa</i> (Common Brown Pea)			
86.	5460 <i>Calytrix fraseri</i> (Pink Summer Calytrix)			
87.	2957 <i>Cassytha racemosa</i> (Dodder Laurel)			
88.	2889 <i>Cerastium glomeratum</i> (Mouse Ear Chickweed)	Y		
89.	4552 <i>Comesperma confertum</i>			
90.	15511 <i>Conospermum boreale</i>			
91.	1876 <i>Conospermum incurvum</i> (Plume Smokebush)			
92.	1885 <i>Conospermum triplinervium</i> (Tree Smokebush)			
93.	17104 <i>Corymbia calophylla</i> (Marr)			
94.	6218 <i>Daucus glochidiatus</i> (Australian Carrot)			
95.	4746 <i>Diplopeltis huegelii</i>			
96.	3095 <i>Drosera erythrorhiza</i> (Red Ink Sundew)			
97.	48710 <i>Drosera micrantha</i>			
98.	3118 <i>Drosera pallida</i> (Pale Rainbow)			
99.	31233 <i>Drosera patens</i>		P1	
100.	30712 <i>Drosera x sidjamesii</i>		P1	
101.	5615 <i>Eucalyptus decipiens</i> (Limestone Marlock, Moit)			
102.	13541 <i>Eucalyptus petrensis</i>			
103.	7323 <i>Galium murale</i> (Small Goosegrass)	Y		
104.	6143 <i>Glichrocaryon aureum</i> (Common Popflower)			
105.	2175 <i>Hakea lissocarpha</i> (Honey Bush)			
106.	2214 <i>Hakea trifurcata</i> (Two-leaf Hakea)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
107.	3961 <i>Hardenbergia comptoniana</i> (Native Wisteria)			
108.	3016 <i>Heliophila pusilla</i>	Y		
109.	5135 <i>Hibbertia hypericoides</i> (Yellow Buttercups)			
110.	45534 <i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>			
111.	5162 <i>Hibbertia racemosa</i> (Stalked Guinea Flower)			
112.	6222 <i>Homalosciadium homalocarpum</i>			
113.	12859 <i>Hovea trisperma</i> var. <i>trisperma</i>			
114.	6232 <i>Hydrocotyle hispidula</i>			
115.	8086 <i>Hypochaeris glabra</i> (Smooth Catsear)	Y		
116.	4027 <i>Jacksonia sericea</i> (Waldjumi)		P4	
117.	4044 <i>Kennedia prostrata</i> (Scarlet Runner)			
118.	5850 <i>Leptospermum laevigatum</i> (Coast Teatree)	Y		
119.	6427 <i>Leucopogon parviflorus</i> (Coast Beard-heath)			
120.	6456 <i>Lysinema ciliatum</i> (Curry Flower)			
121.	5920 <i>Melaleuca huegelii</i> (Chenille Honeymyrtle)			
122.	18598 <i>Melaleuca systema</i>			
123.	8106 <i>Millotia tenuifolia</i> (Soft Millotia)			
124.	2309 <i>Petrophile serruriae</i>			
125.	4675 <i>Phyllanthus calycinus</i> (False Boronia)			
126.	5243 <i>Pimelea ferruginea</i>			
127.	8177 <i>Podolepis lessonii</i>			
128.	42022 <i>Poranthera moorokatta</i>		P2	
129.	8231 <i>Sonchus oleraceus</i> (Common Sowthistle)	Y		
130.	4207 <i>Sphaerolobium medium</i>			
131.	4713 <i>Stachystemon axillaris</i> (Leafy Stachystemon)			
132.	4733 <i>Stackhousia monogyna</i>			
133.	2918 <i>Stellaria media</i> (Chickweed)	Y		
134.	25831 <i>Stylidium araeophyllum</i> (Stilt Walker)			
135.	7745 <i>Stylidium junceum</i> (Reed Triggerplant)			
136.	13127 <i>Stylidium maritimum</i>		P3	
137.	4256 <i>Templetonia retusa</i> (Cockies Tongues)			
138.	6280 <i>Trachymene pilosa</i> (Native Parsnip)			
139.	4292 <i>Trifolium campestre</i> (Hop Clover)	Y		
140.	8254 <i>Urospermum picroides</i> (False Hawkbit)	Y		
141.	8255 <i>Ursinia anthemoides</i> (Ursinia)	Y		

Fungus

142. *Phytophthora cinnamomi*

Invertebrate

143. *Aname mainae*
 144. *Araneus senicaudatus*
 145. *Austracantha minax*
 146. *Australomimetus ovidi*
 147. *Eriophora biapicata*
 148. 33977 *Hylaeus globuliferus* (woolybush bee)
 149. *Isopeda leishmani*
 150. *Lampona cylindrata*
 151. *Latrodectus hasseltii*
 152. *Maratus pavonis*
 153. *Nephila edulis*
 154. *Oecobius navus*
 155. *Ommatoiulus moreletii*
 156. *Oratemnus curtus*
 157. *Pholcus phalangoides*
 158. 33992 *Synemon gratioiosa* (Graceful Sunmoth)
 159. *Venator immansueta*
 160. *Venatrix pullastra*

Mammal

161. 24041 *Felis catus* (Cat)
 162. 48588 *Isodon fusciventer* (Quenda, southwestern brown bandicoot)
 163. 24132 *Macropus fuliginosus* (Western Grey Kangaroo)
 164. 24223 *Mus musculus* (House Mouse)
 165. 48022 *Notamacropus irma* (Western Brush Wallaby)
 166. 24085 *Oryctolagus cuniculus* (Rabbit)

Monocotyledon

167. 184 *Aira caryophylla* (Silvery Hairgrass)
 168. 231 *Avellinia michelii*
 169. 244 *Briza maxima* (Blowfly Grass)
 170. 11038 *Caladeria bicalliata*

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
171.	1595 <i>Caladenia hirta</i> (Sugar Candy Orchid)			
172.	1162 <i>Cartonema philydroides</i>			
173.	1134 <i>Centrolepis polygyna</i> (Wiry Centrolepis)			
174.	1418 <i>Conostylis aculeata</i> (Prickly Conostylis)			
175.	11826 <i>Conostylis aculeata</i> subsp. <i>aculeata</i>			
176.	10916 <i>Cyrtostylis huegelii</i>			
177.	1646 <i>Eriochilus dilatatus</i> (White Bunny Orchid)			
178.	1520 <i>Gladiolus caryophyllaceus</i> (Wild Gladiolus)	Y		
179.	467 <i>Lagurus ovatus</i> (Hare's Tail Grass)	Y		
180.	925 <i>Lepidosperma angustatum</i>			
181.	945 <i>Lepidosperma squamatum</i>			
182.	1228 <i>Lomandra hermaphrodita</i>			
183.	1231 <i>Lomandra maritima</i>			
184.	<i>Pterostylis</i> aff. <i>nana</i>			
185.	17267 <i>Pterostylis brevisepala</i>			
186.	12217 <i>Pterostylis sanguinea</i>			
187.	1556 <i>Romulea rosea</i> (Guildford Grass)	Y		
188.	982 <i>Schoenus clandestinus</i>			
189.	992 <i>Schoenus grandiflorus</i> (Large Flowered Bogrush)			
190.	1018 <i>Schoenus subfascicularis</i>			
191.	1036 <i>Tetaria octandra</i>			
192.	1338 <i>Thysanotus manglesianus</i> (Fringed Lily)			
193.	1361 <i>Tricoryne elatior</i> (Yellow Autumn Lily)			
194.	724 <i>Vulpia myuros</i> (Rat's Tail Fescue)	Y		
195.	1256 <i>Xanthorrhoea preissii</i> (Grass tree, Palga)			

Reptile

196.	24980 <i>Christinus marmoratus</i> (Marbled Gecko)			
197.	24918 <i>Crenadactylus ocellatus</i> subsp. <i>ocellatus</i> (Clawless Gecko)			
198.	30893 <i>Cryptoblepharus buchanani</i>			
199.	30899 <i>Ctenophorus adelaidensis</i> (Southern Heath Dragon, Western Heath Dragon)			
200.	25027 <i>Ctenotus australis</i>			
201.	25039 <i>Ctenotus fallens</i>			
202.	24999 <i>Delma grayii</i>			
203.	25296 <i>Demansia psammophis</i> subsp. <i>reticulata</i> (Yellow-faced Whipsnake)			
204.	25119 <i>Hemiergis quadrilineata</i>			
205.	25133 <i>Lerista elegans</i>			
206.	25165 <i>Lerista praepedita</i>			
207.	25005 <i>Lialis burtonis</i>			
208.	25184 <i>Menetia greyii</i>			
209.	25192 <i>Morethia obscura</i>			
210.	25511 <i>Pseudonaja affinis</i> (Dugite)			
211.	25008 <i>Pygopus lepidopodus</i> (Common Scaly Foot)			
212.	24943 <i>Strophurus spinigerus</i> subsp. <i>inornatus</i>			
213.	25207 <i>Tiliqua rugosa</i> subsp. <i>rugosa</i>			

Conservation Codes

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

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

Appendix 2: Protected Matter Search Tool Report



EPBC Act Protected Matters Report

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

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

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

Report created: 04/08/20 13:04:36

[Summary](#)

[Details](#)

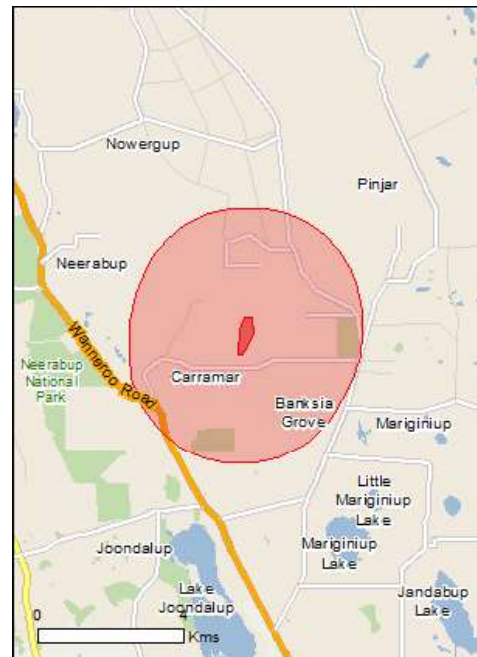
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

Buffer: 3.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	19
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	34
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[[Resource Information](#)]

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

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

Listed Threatened Species

[[Resource Information](#)]

Name	Status	Type of Presence
------	--------	------------------

Birds

[Calidris canutus](#)

Red Knot, Knot [855]

Endangered

Species or species habitat may occur within area

[Calidris ferruginea](#)

Curlew Sandpiper [856]

Critically Endangered

Species or species habitat likely to occur within area

[Calyptorhynchus banksii naso](#)

Forest Red-tailed Black-Cockatoo, Karrak [67034]

Vulnerable

Species or species habitat likely to occur within area

[Calyptorhynchus latirostris](#)

Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]

Endangered

Species or species habitat known to occur within area

[Leipoa ocellata](#)

Malleefowl [934]

Vulnerable

Species or species habitat likely to occur within area

[Numenius madagascariensis](#)

Eastern Curlew, Far Eastern Curlew [847]

Critically Endangered

Species or species habitat may occur within area

[Rostratula australis](#)

Australian Painted Snipe [77037]

Endangered

Species or species habitat likely to occur within area

[Sternula nereis nereis](#)

Australian Fairy Tern [82950]

Vulnerable

Species or species habitat may occur within area

Insects

[Hesperocolletes douglasi](#)

Douglas' Broad-headed Bee, Rottnest Bee [66734]

Critically Endangered

Species or species habitat may occur within area

Mammals

Name	Status	Type of Presence
Dasyurus geoffroi Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Plants		
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
Anigozanthos viridis subsp. terraspectans Dwarf Green Kangaroo Paw [3435]	Vulnerable	Species or species habitat may occur within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat may occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat may occur within area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat may occur within area
Drakaea elastica Glossy-leaved Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat likely to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat may occur within area
Eucalyptus argutifolia Yanchep Mallee, Wabling Hill Mallee [24263]	Vulnerable	Species or species habitat known to occur within area
Melaleuca sp. Wanneroo (G.J. Keighery 16705) [89456]	Endangered	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

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

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area

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

Other Matters Protected by the EPBC Act

Commonwealth Land [\[Resource Information \]](#)

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.

Name
Commonwealth Land -

Listed Marine Species [\[Resource Information \]](#)

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur

Name	Threatened	Type of Presence
Merops ornatus Rainbow Bee-eater [670]		within area Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

Invasive Species [\[Resource Information \]](#)

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
<i>Acridotheres tristis</i> Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
<i>Anas platyrhynchos</i> Mallard [974]		Species or species habitat likely to occur within area
<i>Carduelis carduelis</i> European Goldfinch [403]		Species or species habitat likely to occur within area
<i>Columba livia</i> Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
<i>Passer domesticus</i> House Sparrow [405]		Species or species habitat likely to occur within area
<i>Passer montanus</i> Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
<i>Streptopelia chinensis</i> Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
<i>Streptopelia senegalensis</i> Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
<i>Sturnus vulgaris</i> Common Starling [389]		Species or species habitat likely to occur within area
Mammals		
<i>Bos taurus</i> Domestic Cattle [16]		Species or species habitat likely to occur within area
<i>Canis lupus familiaris</i> Domestic Dog [82654]		Species or species habitat likely to occur within area
<i>Felis catus</i> Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
<i>Funambulus pennantii</i> Northern Palm Squirrel, Five-striped Palm Squirrel [129]		Species or species habitat likely to occur within area
<i>Mus musculus</i> House Mouse [120]		Species or species habitat likely to occur within area
<i>Oryctolagus cuniculus</i> Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
<i>Rattus norvegicus</i> Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
<i>Rattus rattus</i> Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
<i>Vulpes vulpes</i> Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
<i>Asparagus aethiopicus</i> Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
<i>Asparagus asparagoides</i> Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
<i>Brachiaria mutica</i> Para Grass [5879]		Species or species habitat may occur within area
<i>Cenchrus ciliaris</i> Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
<i>Chrysanthemoides monilifera</i> Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i> Boneseed [16905]		Species or species habitat likely to occur within area
<i>Genista</i> sp. X <i>Genista monspessulana</i> Broom [67538]		Species or species habitat may occur within area
<i>Lantana camara</i> Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red		Species or species habitat likely to occur

Name	Status	Type of Presence
Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-31.684492 115.789122,-31.679379 115.789208,-31.676786 115.790496,-31.676823 115.792556,-31.680256 115.792641,-31.683908 115.790624,-31.683908 115.789981,-31.684638 115.789981,-31.684638 115.789122,-31.684492 115.789122

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](#)
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- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

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

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

Appendix 3: Conservation Codes

Western Australia

Conservation Code	Name	Description
T	Threatened	Flora or fauna that is rare or likely to become extinct, ranked according to their level of threat using IUCN Red List criteria (Schedules 1-3 of the Wildlife Conservation (Specially Protected Fauna) Notice or the Wildlife Conservation (Rare Flora) Notice)
CR	Critically endangered	Species considered to be facing an extremely high risk of extinction within the wild in the immediate future
EN	Endangered	Species considered to be facing a very high risk of extinction in the wild in the near future
VU	Vulnerable	Species considered to be facing a high risk of extinction in the wild in the medium-term future
EX	Extinct Species	Species where 'there is no reasonable doubt that the last member of the species has died (Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice or the Wildlife Conservation (Rare Flora) Notice)
EW	Extinct in the Wild	Species that are known to only survive in cultivation, in captivity, or as a naturalised population well outside its past range; and it has not been recorded in its known or expected habitat at appropriate seasons anywhere in its past range, despite surveys over a timeframe appropriate to its life cycle and form
MI	Migratory Species	Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth (Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice)
CD	Conservation Dependent	Species of special conservation interest (conservation dependent fauna), being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened (Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice)
OS	Specially Protected	Fauna otherwise in need of special protection to ensure their conservation (Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice)
P	Priority Species	Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of

Conservation Code	Name	Description
		conservation status so that consideration can be given to their declaration as threatened fauna or flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.
P1	Priority One	Poorly known species – Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either very small or on lands not managed for conservation, such as road verges, urban areas, farmland, active mineral lease and under threat of habitat destruction or degradation.
2	Priority Two	Poorly known species – Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, such as national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves and similar.
3	Priority Three	Poorly known species – Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat
4	Priority Four	Rare or near threatened and other species in need of monitoring.

(Source: Department of Biodiversity, Conservation and Attractions, 2020a)

Commonwealth

Category	Description
Critically Endangered	Species facing an extremely high risk of extinction in the wild in the immediate future
Endangered	Species facing a very high risk of extinction in the wild in the near future
Vulnerable	Species facing a high risk of extinction in the wild in the medium term

(Source: Department of Agriculture, Water and the Environment, 2020a)