



Natural Area  
CONSULTING MANAGEMENT SERVICES

## **Bollig Design Group**

# **Detailed Fauna Report – Keirnan Park Recreation Precinct**

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## Contents

1.0	Introduction.....	5
1.1	Site Location .....	5
1.2	Scope .....	5
2.0	Site Characteristics .....	7
2.1	Regional Context .....	7
2.2	Climate.....	7
2.3	Topography and Soils .....	7
2.4	Vegetation Complex .....	8
2.5	Hydrology .....	10
2.6	Black Cockatoo Habitat.....	10
3.0	Methodology .....	11
3.1	Desktop and Literature Review .....	11
3.2	Detailed Fauna Survey .....	11
3.2.1	Trapping.....	11
3.2.2	Weather Conditions.....	12
3.3	Limitations.....	13
4.0	Results .....	15
4.1	Fauna Desktop Survey .....	15
4.1.1	Fauna Species .....	15
4.1.2	Conservation Significant Species.....	15
4.2	Detailed Fauna Survey Results .....	18
4.3	Fauna Habitat .....	20
5.0	Implications of Results.....	23
5.1	Introduced Fauna .....	23
5.2	Conservation Significant Fauna .....	23
5.3	Clearing Recommendations.....	24
6.0	References.....	25
	Appendix 1: Fauna License .....	27
	Appendix 2: Conservation Codes.....	32
	Appendix 3: Protected Matters Report.....	34
	Appendix 4: Trapping Locations .....	46

## Executive Summary

Natural Area Consulting Management Services (Natural Area) was contracted by Bollig Design Group in August 2021 to undertake a detailed fauna survey within the proposed Keirnan Park Recreation Precinct. The purpose of the survey was to gather data on existing fauna species and assemblages present including confirming the presence of any conservation significant species.

The detailed fauna survey included the following activities:

- desktop searches of online databases including Protected Matters Search Tool and Atlas of Living Australia
- trapping over five days (four nights) with trap-lines, Elliot trap and trail cameras set out for a total of:
  - 64 Elliot trap nights (16 Elliot traps)
  - 28 pitfall trap nights (7 pitfall buckets)
  - 64 funnel trap nights (16 funnels)
  - 12 trail camera trap nights (3 trail cameras)
- recording opportunistic sightings when traversing the site and opportunistic captures of fauna when undertaking activities including but not limited to raking leaf litter and checking under rocks/logs

The fauna survey confirmed the presence of:

- five mammal species including one Priority 4 species, the Quenda (*Isoodon fusciventer*) and two declared pest species, the Red Fox (*Vulpes vulpes*) and the European Rabbit (*Oryctolagus cuniculus*)
- nine birds, including the Baudin's Cockatoo (*Calyptorhynchus baudinii*) which is listed as Vulnerable under the *Environment Protection Biodiversity Conservation Act 1999* and listed as threatened under the *Biodiversity Conservation Act 2016* (WA)
- one reptile, Western Three Lined Skink (*Acritoscincus trilineatus*)
- three amphibians.

Fauna habitat recorded by Natural Area included the presence of two vegetation types; Marri and *Xanthorrhoea* Woodland and Marri, Jarrah and *Xanthorrhoea* Woodland. Both provide potential Black Cockatoo fauna habitat.



## 1.0 Introduction

Natural Area Consulting Management Services (Natural Area) was contracted by Bollig Design Group to undertake a detailed fauna survey and reporting ahead of proposed clearing for the Keirnan Park Recreation Precinct. This detailed fauna survey was undertaken to provide information of fauna species assemblage and determination of any conservation significant fauna presence or the presence of their habitat. Survey outcomes will inform the environmental approval processes.

### 1.1 Site Location

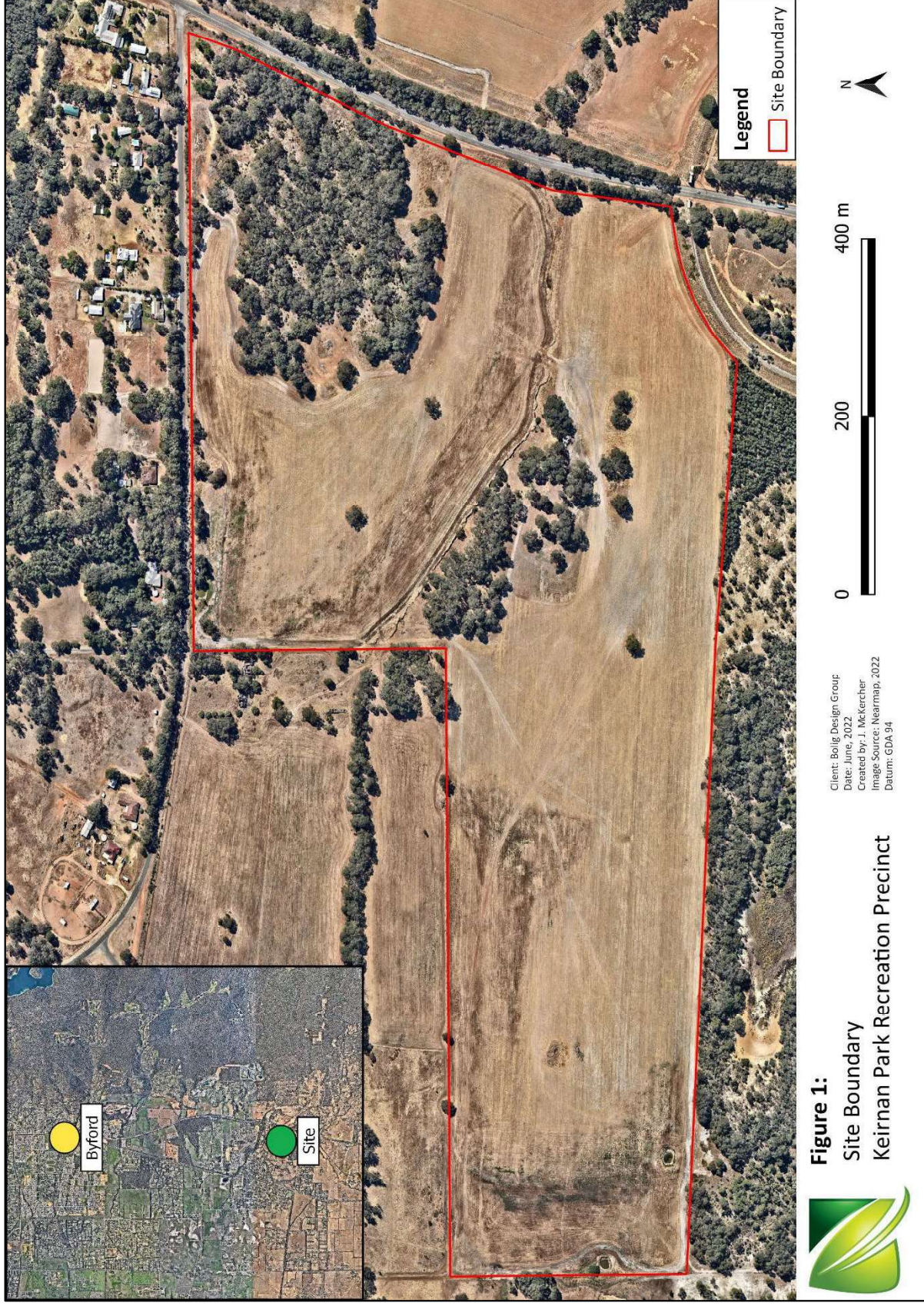
The site is located approximately 42 km south-east of Perth's Central Business District, in the suburb of Mundijong within the Shire of Serpentine-Jarrahdale. The site is bounded by Keirnan Street to the north and South Western Highway to the east. The southern boundary of the site is bounded by Watkins Road Nature Reserve which is known as Bush Forever Site 360 (DPLH, 2022). The site covers an area of approximately 63.1 ha, of which 8.4 ha was classified as heavily wooded Marri woodland with *Xanthorrhoea* understory (Figure 1).

### 1.2 Scope

Preliminary project activities undertaken by Natural Area included:

- searching fauna databases to gather contextual site information and an indication of species that are likely to be present in the area
- setting out a range of funnel, pitfall, Elliot traps and motion activated trail cameras
- recording opportunistic sightings and evidence of the presence of fauna while setting up checking traps daily
- recording calls, for frog and bird species within the survey site
- applying to the Department of Biodiversity Conservation and Attractions (DBCA) for a Regulation 28 Fauna Taking (Relocation) Licence for the duration of the project (Appendix 1)
- preparing a project specific JSA
- undertaking organisational project specific induction.







## 2.0 Site Characteristics

The characteristics of a site have a strong bearing on the flora, vegetation, fauna, and ecological communities present. Key characteristics of the proposed Keirnan Park Recreation Precinct are outlined in this section.

### 2.1 Regional Context

According to Interim Biogeographical Regionalisation of Australia (IBRA) descriptions, the site is located in the Perth Swan Coastal Plain 2 (SWA2- Swan Coastal Plain subregion). This region is characterised by low-lying coastal plain with sands of colluvial and aeolian origin. The region is dominated by Banksia and/or Jarrah Woodland over sandy soils associated with the dune systems, with Jarrah Woodland to the east where the Swan Coastal Plain rises (Mitchell, Williams & Desmond, 2002)

### 2.2 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, 2022):

- average rainfall is 760.9 mm pa, with the majority falling between June and July
- 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 8.1°C in winter to 17.6°C in summer, with the lowest recorded minimum being -1.3°C
- predominant wind directions include morning easterlies and south-westerly sea breezes during summer months, with an average wind speed of 16.5 km/h and gusts of more than 120 km/h.

### 2.3 Topography and Soils

The topography across the site ranges from 48 m Australian Height Datum (AHD) in the west to 76 m AHD in the south-east (Department of Primary Industries and Regional Development (DPIRD), 2022). Nine soil types are present with the site, Table 1 lists the soil types found within the site and their corresponding descriptions (Figure 2).

**Table 1:** Soil types within Keirnan Park Recreation Precinct

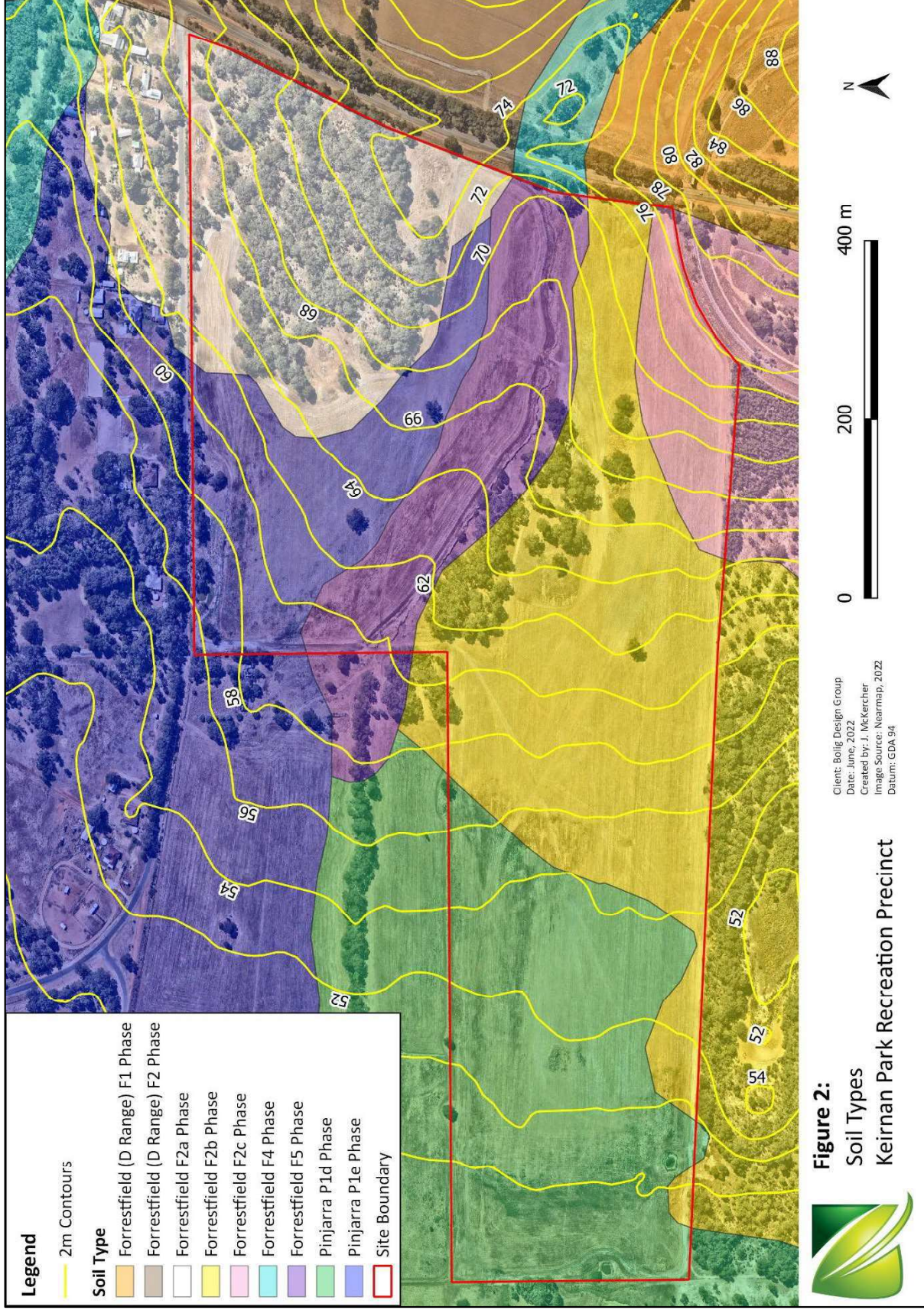
Name	Symbol	Description
Forrestfield (D Range) F1 Phase	213Fo__Ff1	Foot and low slopes < 10% with deep rapidly drained siliceous yellow brown sands, and pale or bleached sands with yellow-brown subsoil. Shrubland of unidentified species.
Forrestfield (D Range) F2 Phase	213Fo__Ff2	Foot and low slopes < 10%. Well drained gravelly yellow or brown duplex soils with sandy topsoil. Woodland of <i>E. marginata</i> , <i>E. calophylla</i> and some <i>B. grandis</i> .
Forrestfield F2a Phase	213Fo__F2a	Low slopes and foot slopes up to 5-10% with well drained shallow to moderately deep, very gravelly acidic yellow duplex soils and common laterite.
Forrestfield F2b Phase	213Fo__F2b	Low slopes and foot slopes up to 5-10% with well drained moderately deep to deep, gravelly acidic yellow duplex soils and rare laterite.

Name	Symbol	Description
Forrestfield F2c Phase	213Fo__F2c	Low slopes and foot slopes up to 5-10% slopes with well drained deep uniform yellowish brown sands which are generally free of laterite or gravel.
Forrestfield F4 Phase	213Fo__F4	Incised stream channels within gentle slopes with deep acidic yellow duplex soils and sandy alluvial gradational brown earths.
Forrestfield F5 Phase	213Fo__F5	Poorly defined stream channels on lowest slopes with deep acidic yellow duplex soils and sandy alluvial gradational brown earths.
Pinjarra P1d Phase	213Pj__P1d	Flat to very gently undulating plain with deep acidic mottled yellow duplex (or effective duplex) soils. Shallow pale sand to sandy loam over clay; imperfect to poorly drained and moderately susceptible to salinity.
Pinjarra P1e Phase	213Pj__P1e	Flat to very gently undulating plain with deep acidic mottled yellow duplex (or effective duplex) soils. Shallow pale sand to sandy loam over very gravelly clay; moderately well drained.

Source: DPIRD, 2022

## 2.4 Vegetation Complex

One vegetation complex exists within the site boundary, namely The Forrestfield Complex. It is described as ranging between open forests of *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri) and *Eucalyptus wandoo* (Wandoo) to open Jarrah, Marri, *Allocasuarina fraseriana* (Sheoak) and *Banksia* sp. (Government of Western Australia, 2019). Within the Swan Coastal Plain, there is 12.29% of the Forrestfield Complex remaining and 9.1% remaining within the Shire of Serpentine-Jarrahdale (Government of Western Australia, 2019).



## 2.5 Hydrology

Due to topographical conditions, surface water predominantly flows in an east to west direction. Emerge (2021) identified three hydrological features within the site:

- a minor, non-perennial watercourse in the western portion of the site which is associated with the palusplain
- one un-named watercourse running across the central portion of the site. This feature is associated with the palusplain
- three earth dams.

## 2.6 Black Cockatoo Habitat

There is potential for the three threatened black cockatoo species and their habitat to occur on site, including the Carnaby's Cockatoo (*Calyptorhynchus latirostris*) listed as endangered under the *EPBC Act 1999* (Cwth), the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) and the Baudin's Black Cockatoo (*Calyptorhynchus baudinii*) listed as vulnerable; all are listed as threatened under *the Biodiversity Conservation Act 2016* (WA). According to NationalMap the survey site occurs within an area classified as:

- Carnaby's Cockatoo Areas requiring investigation as feeding habitat in the Swan Coastal Plain (SCP) IBRA Region (DBCA-057, 2022a)
- Carnaby's Cockatoo Unconfirmed Breeding Areas within the Swan Coastal Plain and Jarrah Forest IBRA regions (DBCA-055, 2022b)
- Black Cockatoo Roosting Sites (DBCA-064, 2022c).



## 3.0 Methodology

### 3.1 Desktop and Literature Review

The desktop survey included reviewing online databases to gather contextual knowledge and determine preliminary site characteristics including:

- likely native and non-native fauna species present within the survey site
- likely presence of threatened or priority fauna species
- whether Black Cockatoo species and their habitat is present within the site.

The following databases were accessed to obtain relevant information:

- Atlas of Living Australia (Atlas of Living Australia, 2022)
- BirdLife Australia (DBCA, 2022a-c)
- Protected Matters Search Tool (DAWE, 2022) (Appendix 2)
- Threatened and priority fauna database searches (DBCA, 2022d).

### 3.2 Detailed Fauna Survey

#### 3.2.1 Trapping

The trapping program was undertaken in accordance with *EPA technical guidance- Technical Guidance Terrestrial vertebrate fauna surveys for environmental impact assessment* (Environmental Protection Authority, 2020). The survey activities were undertaken by Natural Area ecologists Karri Grant and Michael Beeton for a period of five days (four trapping nights), commencing on the 13<sup>th</sup> to the 17<sup>th</sup> of June 2022. Trap locations are shown in Figure 4.

Survey activities included:

- trapping over five consecutive days (four nights) with trap-line, Elliott traps and trail cameras (Table 2, Figure 3)
- setting up 7 trap-lines which included pitfalls and funnel traps along a drift fence with vegetation used to cover funnel traps and placed in pitfall buckets to provide protection from the elements
- setting up Elliott traps with universal bait (oats and peanut butter), newspaper being placed inside for bedding and then traps were covered with a hessian bag or foliage to provide protection from the elements (Figure 3)
- all trap and trap line coordinates were recorded using a hand-help GPS (Appendix 4) and marked with flagging tape
- checking traps daily within three hours of sunrise as per Department of Biodiversity, Conservation and Attractions (DBCA) licence conditions, along with recording and releasing captured species back into the site
- recording frog call using the application, Frog ID
- active searching included searching under logs, rocks and hand raking through leaf litter
- static bird census was undertaken during trapping events with five-minute census undertaken at each trap line location recording visual observations of birds and calls heard
- setting out three motion activated trail cameras in high-activity areas to capture images of evasive/trap-shy animals

- walking the site to record opportunistic sightings or signs of birds and larger mammals, including calls, tracks, diggings, and scats
- recording the outcomes of the trapping and observation activities.

**Table 2:** Total trap nights

Number of Traps	Number of Nights	Number of Trap nights
7 Traplines		28
16 Elliots		64
16 Funnels	4	64
3 trail cameras		12
		<b>Total: 168</b>



**Figure 3:** Example of traps set up (from left to right), Elliot and trapline

### 3.2.2 Weather Conditions

Local weather conditions can affect fauna activity, with low temperatures and rain likely to reduce mammals and reptile activity, which was the case in this survey. The trapping period experienced cool and cloudy mornings, temperatures during the trapping period ranged between 10.1°C and 23.0°C. Rainfall during the trapping period was recorded at 10.2 mm according to the Perth Airport Weather Station ID:009022 (Bureau of Meteorology, 2022).



### 3.3 Limitations

Several limitations associated with both desktop and on-site fauna surveys remain, including:

- database searches only provide an indication of what fauna species may be present, with on ground surveys required to confirm those present
- different databases are reliant on information submitted via various reporting mechanisms, therefore 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 transiently as part of their range; as a result, they may not be present on site at the time of the survey
- certain fauna species are trap shy or difficult to trap, and may not be captured/observed even though they are present on site
- weather condition during the trapping period may impact outcomes, with few animals generally caught in cooler weather condition.



## 4.0 Results

### 4.1 Fauna Desktop Survey

#### 4.1.1 Fauna Species

A review of the DBCA Database searches (2022d) using a 20 km buffer around the site indicated a potential for:

- ten birds
- 11 mammals
- four reptiles
- one bivalve.

#### 4.1.2 Conservation Significant Species

As a result of the desktop assessment of the DBCA Database searches, ALA and PMST. A total of 26 conservation significance species has the potential to occur within the survey area (Table 3). These species are listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) and/or as threatened or priority species under the *Biodiversity Conservation Act 2016* (WA). A description of conservation codes is provided in Appendix 2. Of these species listed by the desktop searches as potentially occurring in the area, the habitat was considered suitable for seven of these species, with two known to be present in the site (highlighted green) (Table 3).

**Table 3:** Conservation significant species possible to occur or are present in Keirnan Park Recreation Precinct

Species Name	Common Name	Cons. Code	PMST	DBCA	ALA	Likelihood
<b>Mammals</b>						
<i>Bettongia penicillata ogilbyi</i>	Woylie	EN	X			Unlikely, outside of current distribution range
<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	VU	X	X		Unlikely habitat unsuitable
<i>Falsistrellus mackenziei</i>	Western False Pipistrelle	P4		X		Unlikely, outside of current distribution range
<i>Hydromys chrysogaster</i>	Water Rat	P4		X		Unlikely habitat unsuitable
<i>Isoodon fusciventer</i>	Quenda	P4		X	X	Present



Species Name	Common Name	Cons. Code	PMST	DBCA	ALA	Likelihood
<i>Myrmecobius fasciatus</i>	Numbat	EN		X		Unlikely, outside of current distribution range
<i>Notamacropus eugenii derbianus</i>	Tammar Wallaby	P4		X		Unlikely, outside of current distribution range
<i>Notamacropus irma</i>	Western Brush Wallaby	P4		X		Possibly, suitable habitat however highly unlikely due to the degraded nature of the site.
<i>Phascogale tapoatafa wambenger</i>	South-Western Brush-tailed Phascogale	VU		X		Possibly, suitable habitat however highly unlikely due to the degraded nature of the site.
<i>Pseudocheirus occidentalis</i>	Western Ringtail Possum	CR	X	X		Unlikely habitat unsuitable
<i>Setonix brachyurus</i>	Quokka	VU	X	X		Unlikely, outside of current distribution range
<b>Reptiles</b>						

Species Name	Common Name	Cons. Code	PMST	DBCA	ALA	Likelihood
<i>Acanthophis antarcticus</i>	Southern Death Adder	P3		X		Unlikely habitat unsuitable
<i>Ctenotus delli</i>	Dell's Skink	P4		X		Possibly, habitat suitable
<i>Lerista lineata</i>	Perth Slider	P3		X		Unlikely habitat unsuitable
<i>Neelaps calonotos</i>	Black Striped Snake	P3		X		Unlikely habitat unsuitable
<b>Birds</b>						
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	X	X	X	Unlikely habitat unsuitable
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR	X	X		Unlikely habitat unsuitable
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black-Cockatoo	T, VU	X	X	X	Possible, foraging habitat suitable
<i>Calyptorhynchus baudinii</i>	Baudin's Cockatoo	T, VU	X	X	X	Present, observed foraging on site
<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	T, EN	X	X	X	Possible, foraging habitat suitable
<i>Calyptorhynchus sp.</i> 'white-tailed black cockatoo'	White-tailed Black Cockatoo	T, EN		X		Possible, foraging habitat suitable
<i>Leipoa ocellata</i>	Malleefowl	VU	X	X		Unlikely habitat unsuitable
<i>Numenius madagascariensis</i>	Eastern Curlew	CR	X			Unlikely habitat unsuitable

Species Name	Common Name	Cons. Code	PMST	DBCA	ALA	Likelihood
<i>Oxyura australis</i>	Blue-billed Duck	P4		X		Unlikely habitat unsuitable
<i>Rostratula australis</i>	Australian Painted Snipe	EN	X			Unlikely habitat unsuitable
<b>Invertebrates</b>						
<i>Westralunio carteri</i>	Carter's Freshwater Mussel	VU		X		Unlikely habitat unsuitable

## 4.2 Detailed Fauna Survey Results

A total of 18 vertebrate species were recorded on site during the trapping period. A total of five mammals, three amphibians, one reptile and nine birds. Four of which are introduced species to the area, the fauna species list for Keirnan Park Recreation Precinct is listed in Table 4 with examples in Figure 5. All individuals captured in traps were in a healthy condition. All native species were recorded and released back on site while the captured introduced species (*\*Mus musculus*) were humanely euthanised on site.

Trapping efforts yielded two separate captures of the Quenda (*Isoodon fusciventer*) with additional individuals sighted on trail cameras throughout the site. Quenda captures included two female individuals, one of which was determined to be a mature female with two pouch young. The Quenda is listed as a Priority 4 species under the *Biodiversity Conservation Act 2016* (WA). The European Rabbit (*\*Oryctolagus cuniculus*) and European Red Fox (*\*Vulpes vulpes*) are listed as category C3 declared pests under the *Biosecurity and Agriculture Management Act 2007* (WA), which requires control by the land manager to reduce abundance and spread of these species.

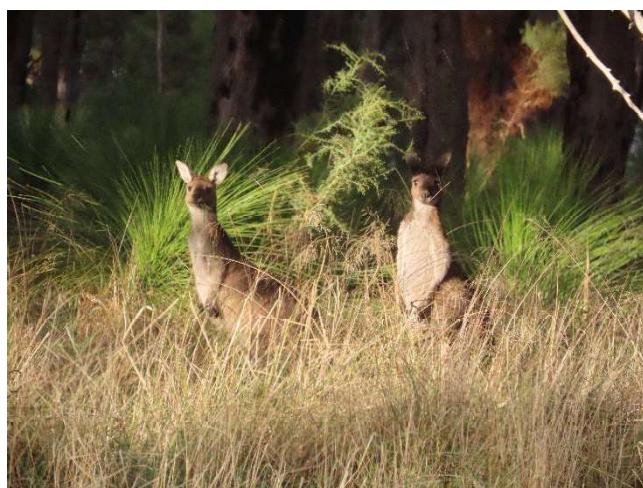
The Baudin's Cockatoo (*Calyptorhynchus baudinii*) was recorded foraging throughout the survey site on multiple days during the trapping period. The Baudin's Cockatoo are listed as Vulnerable under the *Environment Protection Biodiversity Conservation Act 1999* and listed as threatened under the *Biodiversity Conservation Act 2016* (WA).

**Table 4:** Vertebrate fauna recorded on site

Family	Type	Species Name	Common Name
Myobatrachidae	Amphibian	<i>Crinia insignifera</i>	Squelching Frog
Myobatrachidae	Amphibian	<i>Crinia pseudinsignifera</i>	Bleating Froglet
Limnodynastidae	Amphibian	<i>Heleioporus eyrei</i>	Moaning Frog
Peramelidae	Mammal	<i>Isoodon fusciventer</i> (P4)	Quenda (Priority 4)
Macropodidae	Mammal	<i>Macropus fuliginosus</i>	Western Grey Kangaroo

Canidae	Mammal	* <i>Vulpes vulpes</i>	Red Fox
Leporidae	Mammal	* <i>Oryctolagus cuniculus</i>	European Rabbit
Muridae	Mammal	* <i>Mus musculus</i>	House Mouse
Scincidae	Reptile	<i>Acritoscincus trilineatus</i>	Western Three Lined Skink
Alcedinidae	Bird	* <i>Dacelo novaeguineae</i>	Laughing Kookaburra
Anatidae	Bird	<i>Anas superciliosa</i>	Pacific Black Duck
Anatidae	Bird	<i>Chenonetta jubata</i>	Australian Wood Duck
Artamidae	Bird	<i>Gymnorhina tibicen</i>	Australian Magpie
Cacatuidae	Bird	<i>Calyptorhynchus baudinii</i> (T/VU)	Baudin's Cockatoo
Cacatuidae	Bird	<i>Eolophus roseicapilla</i>	Galah
Corvidae	Bird	<i>Corvus coronoides</i>	Australian Raven
Psittacidae	Bird	<i>Barnardius zonarius</i>	Australian Ringneck
Scolopacidae	Bird	<i>Calidris ruficollis</i>	Red-necked Stint

\*Denotes introduced species.



Western Grey Kangaroo (*Macropus fuliginosus melanops*)



Baudin's Cockatoo (*Calyptorhynchus baudinii*) (T/VU)





*Heleioporus eyrie* (Moaning Frog)



Western Three Lined Skink (*Acritoscincus trilineatus*)



Quenda (*Isodon fusciventer*) (P4)



European Rabbit (\**Oryctolagus cuniculus*)

\*Denotes introduced species.

**Figure 5:** Examples of the vertebrate species captured during the survey

### 4.3 Fauna Habitat

The fauna habitat recorded by Natural Area confirmed the presence of two vegetation types which provide potential Black Cockatoo fauna habitat, Marri and *Xanthorrhoea* Woodland and Marri, Jarrah and *Xanthorrhoea* Woodland (Figure 6). These vegetation types are shown in Figure 6 and represent high value foraging and potential roosting habitat for black cockatoos. Other vegetation types noted on site presented low fauna habitat values for Black Cockatoos due to the absence of preferred foraging plant species and lack of native vegetation, with some of the areas consisting mostly of introduced grassland and therefore have not been mapped.

Black Cockatoos preferred foraging species include Marri and Jarrah, Marri is the dominant species through each of these vegetation types and is classed as a primary foraging/ food source for all three threatened black cockatoo species (Department of Environment and Conservation, 2011). Jarrah is classified as a primary food source for the Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo, while a secondary source for Baudin's Cockatoo (DEC, 2011).



Emerge Associates (Emerge) undertook a Targeted Black Cockatoo Assessment in Spring 2021 in which they determined that 384 trees could be classified as potential habitat trees. One potentially having a suitable hollow for black cockatoo breeding. However, no evidence of breeding was observed by Emerge in Spring 2021 (Emerge Associates, 2021) or Natural Area in June 2022.



**Figure 6:**  
Fauna Habitat  
Keirnan Park Recreation Precinct



## 5.0 Implications of Results

### 5.1 Introduced Fauna

The presence of the European Rabbit (*Oryctolagus cuniculus*) was identified by scats, diggings and via trail cameras throughout the survey site. The European Rabbit poses a significant environmental risk to the site and surrounding areas. Rabbits can reproduce rapidly; they compete with native animals for limited resources and habitats and cause land degradation and erosion due to diggings/warrens. Under the *Biosecurity and Agriculture Management Act 2007*, landholders are required to control rabbits within their properties. There are several options to control European Rabbit population including:

- fencing areas to keep populations out of vegetation
- releasing the Rabbit Haemorrhagic Disease Virus (RHDV)
- cage trapping for isolate population
- installing revegetation along with tree guards to control grazing pressures.

The European Red Fox (*Vulpes vulpes*) was recorded in the form of scats throughout the survey site. This indicates that this species utilises the site as part of its home range and would likely utilise surrounding properties too. The presence of European Red Fox within a site causes pressure on small-medium native species within the area through predation. The Red Fox is also a declared pest in Western Australia and requires landowner to control their population under the *Biosecurity and Agriculture Management Act 2007*. Control methods commonly used include 1080 baiting or trapping exercises to control surrounding populations.

### 5.2 Conservation Significant Fauna

Quenda (*Isodon fusciventer*) is listed as a Priority 4 species under the *BC Act* and was only recorded in dense vegetation cover in the survey site (Marri and *Xanthorrhoea* vegetation type). The survey site provides suitable habitat and is likely to support a permanent breeding population. Retaining the two portions of dense bushland will unlikely directly impact the Quenda population. However, Natural Area recommends conservation fencing around the Marri and *Xanthorrhoea* Woodland to keep native fauna, particularly Quenda's, safe from pedestrian and vehicle traffic along with the potential increase of predation from domestic animals. The addition of signage throughout Keirnan Park Recreation Precinct after development is recommended by Natural Area to encourage reduce of speed and as a reminder of fauna presence throughout the site.

Baudin's Cockatoo (*Calyptorhynchus baudinii*) was the only Black Cockatoo recorded at the survey site, with no sightings of Carnaby's Cockatoo (*Calyptorhynchus latirostris*) and Forest Red-tailed Black Cockatoos (*Calyptorhynchus banksii naso*) being recorded during the trapping period by Natural Area. However, the Carnaby's Cockatoo (*Calyptorhynchus latirostris*) and Forest Red-tailed Black Cockatoos (*Calyptorhynchus banksii naso*) still have the potential to be present at site, due to Marri and Jarrah known as preferred foraging sources being available throughout the site. Retaining majority of the Marri and Jarrah vegetation is recommended.

### **5.3 Clearing Recommendations**

The clearing of the survey site should be undertaken in a one-directional manner starting from the paddocks/non-native vegetation and clearing towards the vegetated areas to direct any potential fauna into remaining vegetated areas and away from main roads.

It is recommended that fauna spotting is implemented during clearing works and/or having experienced ecologist on call to remove any injured fauna if clearing sparse to mid-dense vegetation. With spotters on site undertaking active searches (walkover) across the site prior to, during and post clearing. However, if dense vegetation is to be removed, Natural Areas recommends implementing a trapping and relocation program.

Clearing activities should occur outside of nesting season for black cockatoos (late winter to spring) to limit the potential for nesting birds to be occupying hollows. If clearing in nesting season, checking of hollow bearing trees should be implemented 48 hours before clearing occurs to ensure no nesting birds are occupying the hollows. If any conservation significant birds are nesting in hollows the tree should be left in situ with a 10 m buffer and monitored weekly until the eggs hatch and fledglings have left the nest.



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## **Appendix 1: Fauna License**

## Appendix 2: Conservation Codes

### Western Australia (*Biodiversity Conservation Act 2016*)

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



Conservation Code	Name	Description
		evaluation of 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, 2020)

#### **Commonwealth (*Environment Protection and Biodiversity Conservation Act 1999*)**

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)

## **Appendix 3: Protected Matters 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: 29/06/22 11:06:39

[Summary](#)

[Details](#)

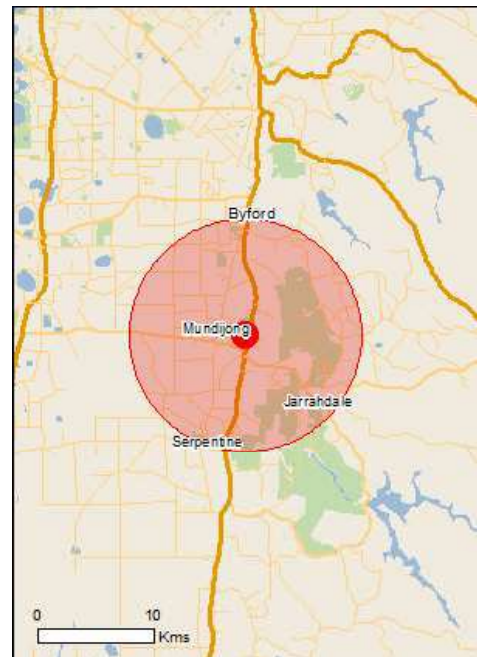
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



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[Coordinates](#)

Buffer: 10.0Km



# 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](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	2
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	5
<a href="#">Listed Threatened Species:</a>	31
<a href="#">Listed Migratory Species:</a>	9

## 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.

<a href="#">Commonwealth Land:</a>	1
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	14
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	11
<a href="#">Regional Forest Agreements:</a>	1
<a href="#">Invasive Species:</a>	38
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">Key Ecological Features (Marine)</a>	None

# Details

## Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[ Resource Information ]
Name	Proximity
<a href="#">Forrestdale and thomsons lakes</a>	Within 10km of Ramsar
<a href="#">Peel-yalgorup system</a>	20 - 30km upstream

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
<a href="#">Banksia Woodlands of the Swan Coastal Plain ecological community</a>	Endangered	Community likely to occur within area
<a href="#">Clay Pans of the Swan Coastal Plain</a>	Critically Endangered	Community likely to occur within area
<a href="#">Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain</a>	Endangered	Community known to occur within area
<a href="#">Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain</a>	Endangered	Community known to occur within area
<a href="#">Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community</a>	Critically Endangered	Community may occur within area

Listed Threatened Species	[ Resource Information ]	
Name	Status	Type of Presence
<b>Birds</b>		
<a href="#">Botaurus poiciloptilus</a>		
Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
<a href="#">Calidris ferruginea</a>		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calyptorhynchus banksii naso</a>		
Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Calyptorhynchus baudinii</a>		
Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Roosting known to occur within area
<a href="#">Calyptorhynchus latirostris</a>		
Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
<a href="#">Leipoa ocellata</a>		
Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Numenius madagascariensis</a>		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Rostratula australis</a>		
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur

Name	Status	Type of Presence within area
<b>Mammals</b>		
<a href="#">Bettongia penicillata ogilbyi</a> Woylie [66844]	Endangered	Species or species habitat known to occur within area
<a href="#">Dasyurus geoffroi</a> Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Pseudocheirus occidentalis</a> Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Setonix brachyurus</a> Quokka [229]	Vulnerable	Species or species habitat known to occur within area
<b>Other</b>		
<a href="#">Westralunio carteri</a> Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area
<b>Plants</b>		
<a href="#">Andersonia gracilis</a> Slender Andersonia [14470]	Endangered	Species or species habitat likely to occur within area
<a href="#">Anthocercis gracilis</a> Slender Tailflower [11103]	Vulnerable	Species or species habitat may occur within area
<a href="#">Caladenia huegelii</a> King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat likely to occur within area
<a href="#">Diuris micrantha</a> Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Diuris purdiei</a> Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat known to occur within area
<a href="#">Drakaea elastica</a> Glossy-leaved Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area
<a href="#">Drakaea micrantha</a> Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Eleocharis keigheryi</a> Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area
<a href="#">Eucalyptus x balanites</a> Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat likely to occur within area
<a href="#">Grevillea curviloba subsp. incurva</a> Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat may occur within area
<a href="#">Lasiopetalum pterocarpum</a> Wing-fruited Lasiopetalum [64922]	Endangered	Species or species habitat known to occur within area
<a href="#">Lepidosperma rostratum</a> Beaked Lepidosperma [14152]	Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
<a href="#">Synaphea sp. Fairbridge Farm (D. Papenfus 696)</a> Selena's Synaphea [82881]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Synaphea sp. Pinjarra Plain (A.S. George 17182)</a> [86878]	Endangered	Species or species habitat known to occur within area
<a href="#">Synaphea sp. Serpentine (G.R. Brand 103)</a> [86879]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Tetraria australiensis</a> Southern Tetraria [10137]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Thelymitra stellata</a> Star Sun-orchid [7060]	Endangered	Species or species habitat likely to occur within area
<a href="#">Verticordia plumosa var. ananeotes</a> Tufted Plumed Featherflower [23871]	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
<b>Migratory Marine Birds</b>		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<b>Migratory Terrestrial Species</b>		
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
<b>Migratory Wetlands Species</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat likely to occur within area
<a href="#">Tringa nebularia</a> 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
<b>Birds</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat likely to occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
<a href="#">Thinornis rubricollis</a> Hooded Plover [59510]		Species or species habitat may occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area



## Extra Information

### State and Territory Reserves [\[ Resource Information \]](#)

Name	State
Cardup	WA
Gooralong	WA
Lambkin	WA
NTWA Bushland covenant (0011)	WA
NTWA Bushland covenant (0076)	WA
Serpentine	WA
Unnamed WA46587	WA
Unnamed WA46818	WA
Unnamed WA51784	WA
Unnamed WA51963	WA
Watkins Road	WA

### Regional Forest Agreements [\[ Resource Information \]](#)

Note that all areas with completed RFAs have been included.

Name	State
<a href="#">South West WA RFA</a>	Western Australia

### 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
<b>Birds</b>		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard, Northern Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Streptopelia chinensis Spotted Turtle-Dove, Spotted Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
<b>Mammals</b>		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Funambulus pennantii Northern Palm Squirrel, Five-striped Palm Squirrel [129]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
<b>Plants</b>		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within

Name	Status	Type of Presence area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding 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
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area
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
<b>Reptiles</b>		
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

-32.29524 116.00725

# Acknowledgements

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

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

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

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



## Appendix 4: Trapping Locations

Trap Number	Latitude	Longitude
<b>Elliot</b>		
E1	-32.293729	116.010388
E2	-32.293707	116.010552
E3	-32.294171	116.009100
E4	-32.294252	116.009022
E5	-32.293401	116.009422
E6	-32.29352	116.009213
E7	-32.292862	116.009035
E8	-32.292996	116.009063
E9	-32.292521	116.009901
E10	-32.292651	116.010134
E11	-32.292281	116.011194
E12	-32.292441	116.011081
E13	-32.295007	116.005050
E14	-32.294792	116.005060
E15	-32.292517	116.008403
E16	-32.292661	116.007998
<b>Trap Line</b>		
TL1	-32.293669	116.010448
TL2	-32.294295	116.009162
TL3	-32.293546	116.009366
TL4	-32.292903	116.009094
TL5	-32.292413	116.009818
TL6	-32.292451	116.011223
TL7	-32.294995	116.005180
<b>Trail Camera</b>		
Cam 1	-32.292285	116.011087
Cam 2	-32.293406	116.009303
Cam 3	-32.292342	116.010711