

Basic Fauna and Targeted Western Ringtail Possum Assessment

Lot 783 Mitchell Drive, Lots 501, 502 and 504

Reef Drive and Lot 503 Seagrass Place, Gnarabup

Project No: EP20-008(07)

**Prepared for 5 Star Margaret River Pty Ltd
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Executive Summary

5 Star Margaret River Pty Ltd engaged Emerge Associates (Emerge) to conduct a 'basic' fauna and a 'targeted' *Pseudocheirus occidentalis* (western ringtail possum) assessment to provide information on the fauna values within Lot 783 Mitchell Drive, Lots 501, 502 and 504 Reef Drive, Lot 503 Seagrass Place and adjacent public land in Gnarabup (referred to herein as the 'site').

As part of the assessment a desktop review of relevant background information was completed and field surveys were undertaken on 16 and 17 September and 27 and 28 October 2020 and 2, 4 and 5 March 2021. During the field surveys opportunistic sightings of fauna were recorded and an assessment was made on the fauna habitat within the site and its suitability to provide habitat for conservation significant fauna. A targeted survey for threatened western ringtail possum was also undertaken.

Outcomes of the basic fauna survey include the following:

- The majority of the site (90.14%) supports relatively intact native vegetation which would support high fauna habitat values, particularly where it is in good or better condition. Extensive areas of similar habitat of the same or higher quality are located adjacent to the site and the wider area, including vegetation associated with Leeuwin-Naturaliste National Park.
- A total of 25 native and two introduced fauna species were directly or indirectly recorded in the site, including two species of conservation significance: Carnaby's cockatoo and western ringtail possum.
- The site does not support suitable breeding or roosting habitat for threatened species of black cockatoo. The site contains scattered peppermint trees and shrubs which are foraging plants for Carnaby's cockatoo but would only provide a small foraging resource.
- Four additional fauna of conservation significance were considered to have potential to occur within the site: osprey (migratory), Pacific swift (migratory), Peregrine falcon (migratory) and quenda (P4). The bird species (avifauna) would likely only fly above/over the site, while for the quenda similar or higher quality habitat is located adjacent to and in the wider area of the site.

Outcomes of the targeted western ringtail possum survey include the following:

- The **heathland** habitat provides potential habitat for western ringtail possum but is considered to be of marginal quality due to the limited extent of foraging resources and the low vegetation height in the site.
- No western ringtail possum were encountered in the site during the spotlighting surveys.
- Secondary evidence of western ringtail possum was recorded in the site in the form of old scats.
- Western ringtail possums may occasionally use the **heathland** habitat for refuge, foraging and/or dispersal but the abundance of WRTPs in the site is likely to be low.

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Abbreviation Tables

Table A1: Abbreviations – Organisations

Organisations	
EPA	Environmental Protection Authority
DBCA	Department of Biodiversity, Conservation and Attractions
DAWE	Department of Agriculture, Water and the Environment
WA Museum	Western Australian Museum

Table A2: Abbreviations – General terms

General terms	
EN	Endangered
EX	Extinct
VU	Vulnerable
MI	Migratory
P1	Priority 1
P2	Priority 2
P3	Priority 3
P4	Priority 4
P5	Priority 5
BAM Act	<i>Biosecurity and Agriculture Management Act 2007</i>
EBPC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
BC Act	<i>Biodiversity Conservation Act 2016</i>

Table A4: Abbreviations – units of measurement

Units of measurement	
cm	Centimetre
ha	Hectare
km	Kilometre
m	Metre
m AHD	m in relation to the Australian height datum

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1 Introduction

Emerge Associates (Emerge) were engaged by 5 Star Margaret River Pty Ltd to characterise the fauna values within Lots 502, 783 and 8001 Mitchell Drive, 501, 502, 503, 504, 5484 and 5487 Reef Drive, 702 and 606 Seagrass Place (5 Star Margaret River Pty Ltd landholdings) and a portion of the adjacent public land in Gnarabup (referred to herein as the 'site'). The site is located approximately eight kilometres (km) south west of Margaret River town in the south west of Western Australia within the Shire of Augusta Margaret River.

The site is approximately 13.73 hectares (ha) in size and is generally bounded by Wallcliffe Road to the east, Ocean View Road, Reef Road and Seagrass Place to the west and Breeze Cove to the south. The location and extent of the site is shown in **Figure 1**.

1.1 Purpose and scope of work

The scope of work was specifically to undertake a terrestrial vertebrate fauna assessment to the standard required of a 'basic' fauna survey and a 'targeted' survey for *Pseudocheirus occidentalis* (western ringtail possum) with reference to the *Environmental Protection Authority's* (EPA's) technical guidance (EPA 2020) and the *Environment Protection and Biodiversity Conservation Act Survey Guidelines for Australia's Threatened mammals* (DSEWPac 2011).

As part of this scope of work, the following tasks were undertaken:

- Desktop assessment of relevant background information pertaining to the site and surrounds, including database and literature searches for fauna species.
- Field survey to identify fauna species and fauna habitats within the site.
- Diurnal and nocturnal field surveys to determine evidence of use of the site by western ringtail possum.
- Compilation of a list of fauna species with potential to occur within the site as identified from the desktop assessment and opportunistically recorded as part of the field survey.
- Identification of potential habitat for conservation significant fauna species and an assessment of likelihood of occurrence.
- Mapping of fauna habitat.
- Documentation of the desktop assessment, survey methodology and results into a report.

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2 Environmental Context

2.1 Climate

Climate has a strong influence on the fauna habitat and species present in a region and a site. The south west of Western Australia experiences a Mediterranean climate of hot dry summers and cool wet winters.

2.1.1 Basic fauna

A total of 38.1 millimetre (mm) of rainfall was recorded during the month of the basic fauna survey (October 2021) from the Margaret River weather station (no. 009574) which is the closest weather station located approximately 7.4 km east of the site (BoM 2021). This is lower than the average rainfall of 71.2 mm for the same period and weather station (BoM 2021).

Temperatures recorded in October 2021 ranged from a mean maximum of 20.1 °C to a mean minimum of 9.2 °C, as recorded by the Witchcliffe weather station (no. 009746) which is the closest temperature recording weather station located approximately 10 km south-east of the site (BoM 2021). This is similar to the average maximum temperature of 19.7°C and average minimum temperature of 9.4°C for the same period and weather station (BoM 2021).

The weather conditions during the basic fauna field survey were usual for the time of year and were considered adequate for identifying most fauna species in the site.

2.1.2 Targeted western ringtail possum

In the month prior to the targeted western ringtail possum survey (February 2021) a total of 83 mm of rainfall was recorded from the Margaret River weather station (BoM 2021). This is much higher than the average rainfall of 13 mm for the same period and weather station (BoM 2021).

Temperatures recorded in February 2021 ranged from a mean maximum of 25.2°C to a mean minimum of 14.1°C, as recorded by the Witchcliffe weather station (no. 009746) which is the closest temperature recording weather station located approximately 10 km south-east of the site (BoM 2021). This is similar to the average maximum temperature of 27.1°C and average minimum temperature of 14.4°C for the same period and weather station (BoM 2021).

The weather conditions during the nocturnal western ringtail possum field survey were considered adequate for identifying WRTP individuals. The weather conditions during the diurnal survey provided ideal visibility and detectability of secondary evidence of WRTPS presence.

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2.2 Geomorphology and soils

Landform and soils influence fauna habitat and species at regional and local scales. The majority of the site lies in the Warren bioregion, as defined by the *Interim Biogeographic Regionalisation of Australia* (IBRA) (Environment Australia 2000). The Warren bioregion follows the coastline from Yallingup in the north-west to Albany in the south-east.

The Department of Primary Industries and Regional Development (DPIRD) has compiled data from various surveys to produce a soil landscape mapping dataset for Western Australia, which places the site within the 'Kilcarnup exposed dunes (organic) Phase' (DPIRD 2019). This soil landscape system is described as being steep dunes (gradients usually in excess of 20%) exposed to prevailing winds which come directly off the ocean. It has deep pale calcareous sands with brown topsoil (DPIRD 2019).

2.3 Topography

The elevation of the site ranges from 6 m in relation to the Australian height datum (mAHD) in the north eastern portion of the site to 30 mAHD in the southern portion of the site (DPIRD 2020) (**Figure 2**).

2.4 Hydrology and wetlands

Wetlands include "areas of seasonally, intermittently or permanently waterlogged soils or inundated land, whether natural or otherwise, fresh and saline, e.g. waterlogged soils, ponds, billabongs, lakes, swamps, tidal flats, estuaries, rivers and their tributaries" (Wetlands Advisory Committee 1977). Many wetlands provide important fauna habitat and support high levels of fauna biodiversity and endemism.

Wetlands of national or international significance may be afforded special protection under Commonwealth or international agreements. The following lists of important wetlands were checked as part of this assessment:

- *Ramsar List of Wetlands of International Importance* (DBCA 2017d)
- *A Directory of Important Wetlands in Australia* (DBCA 2018a).

No Ramsar or listed 'important wetlands' are located within or near the site.

Examination of the Department of Water and Environmental Regulation (DWER) hydrography dataset (DWER 2020) shows that no wetland or water related features occur in the site. The site occurs approximately 150 m east of the Indian ocean coastline.

The Department of Biodiversity, Conservation and Attractions (DBCA) has developed the *Geomorphic Wetlands Leeuwin Naturaliste Ridge and Donnybrook to Nannup - Unreviewed* dataset (DBCA 2018b). This dataset maps geomorphic wetland features and classifies them based on their landform shape and water permanence.

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A review of the *Geomorphic Wetlands Leeuwin Naturaliste Ridge and Donnybrook to Nannup - Unreviewed* dataset indicated that no wetland features occur within the site. The closest mapped wetland feature is located approximately 300 m north east of the site.

2.5 Regional vegetation

Vegetation types and resulting fauna habitats strongly influence the diversity and composition of fauna taxa present within an area. Native vegetation is described and mapped at different scales in order to illustrate patterns in its distribution. At a continental scale the *Interim Biogeographic Regionalisation of Australia* (IBRA) divides Australia into floristic subregions (Environment Australia 2000).

The site is contained within the Warren IBRA region and 'WAR01' subregion. The Warren subregion is characterised as comprising tall *Eucalyptus diversicolor* (karri) on deep loams or forest or *Eucalyptus marginata* (jarrah) to *Corymbia calophylla* (marri) on leached sands and extensive *Melaleuca* (paperbark) and sedge swamps in valleys (Beard 1990).

DBCA (2019b) mapping shows the site as comprising 'Kilcarnup, KE' vegetation complex which is described as a 'tall shrubland to closed heath of *Agonis flexuosa* and *Spyridium globulosum* on exposed slopes of calcareous dunes'.

2.6 Historic land use

Review of historical images available from 2000 onwards shows that parts of the southern and central portion of the site were cleared prior to 2007 (WALIA 2021). Historical imagery from 2012 also shows that the site was subject to an intense fire referred to as 'Blackwood Fire 8' (Noetic Solutions 2012), with all native vegetation appearing to have been burnt. Since the fire the vegetation in the site has regrown and minor clearing (in addition to what was cleared prior to the bushfire) for access tracks appears to have occurred.

2.7 Significant fauna

2.7.1 Threatened fauna species

Certain fauna taxa that are considered to be rare or under threat warrant special protection under Commonwealth and/or State legislation. At a Commonwealth level, fauna taxa may be listed as 'threatened' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Any action likely to have a significant impact on a taxon listed under the EPBC Act requires Ministerial approval.

In Western Australia fauna species may also be classed as 'threatened' under the *Biodiversity Conservation Act 2016* (BC Act). It is an offence to 'take' or 'disturb' threatened fauna without Ministerial approval.

Threatened fauna species listed under the EPBC Act and/or BC Act are assigned a conservation status according to attributes such as population size and geographic distribution. Further information on threatened species and their categories is provided in **Appendix A**.

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2.7.2 Priority fauna species

Fauna species that do not currently meet the criteria for listing as threatened but are potentially rare or threatened may be added to the Department of Biodiversity, Conservation and Attractions (DBCA) *Priority Fauna List*. These species are classified into 'priority' levels based on threat. Whilst priority species are not under direct statutory protection, they are considered during State approval processes. Further information on priority species and their categories is provided in **Appendix A**.

2.7.3 Migratory fauna species

Migratory fauna species that migrate to Australia and its external territories or pass through or over Australian waters during their annual migrations are protected under Commonwealth and State legislation. At a Commonwealth level, migratory fauna taxa may be listed as 'migratory' under *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Any action likely to have a significant impact on a taxon listed under the EPBC Act requires Ministerial approval. Further information on migratory species is provided in **Appendix A**.

2.7.4 Specially protected fauna species

In Western Australia, fauna species that are of special conservation interest, including migratory species, cetaceans, species subject to international agreement or species otherwise in need of special protection may be listed as 'specially protected' under the BC Act. Further information on specially protected species and their categories is provided in **Appendix A**.

2.7.5 Pest fauna species

The term 'pest fauna' can refer to any animal that requires some form of action to reduce its effect on the economy, the environment, human health and amenity. Pest fauna species are generally not native but some Australian or West Australian fauna may also be considered pests.

A particularly invasive or detrimental pest species may be listed as a 'declared pest' pursuant to Western Australia's *Biosecurity and Agriculture Management Act 2007* (BAM Act), indicating that it warrants special management to limit its spread. Further information on categories of declared pests is provided in **Appendix A**.

2.8 Environmentally sensitive areas

'Environmentally sensitive areas' (ESAs) are prescribed under the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 and have been identified to protect native vegetation values of areas surrounding values such as significant wetlands, threatened flora, threatened communities and Bush Forever sites. Within an ESA none of the exemptions under the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 apply. However, exemptions under Schedule 6 of the EP Act still apply, which includes (but is not limited to) any clearing in accordance with a subdivision approval under the *Planning and Development Act 2005* (a recognised exemption under the Schedule 6 of the EP Act).

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One ESA is located within the north-western portion of the site and extends to the west, south and north. The location of this ESA in relation to the site is shown in **Figure 3**, however is not located within 5 Star Margaret River Pty Ltd landholdings.

2.9 DBCA managed or legislated land

DBCA has tenure of or interests in numerous areas of land across the state for a range of purposes. Tenure categories include national parks, nature reserves, conservation parks, marine parks, marine nature reserves, marine management areas, section 5(1)(g) reserves, state forest and timber reserves. These areas are mapped within the *Legislated Lands and Waters (DBCA 2017a)* and *Lands of Interest (DBCA 2017c)* datasets. The *Legislated Lands and Waters (DBCA 2017a)* dataset includes lands subject to the following legislation; the *Conservation and Land Management Act 1984 (CALM Act 1984)*, *Swan and Canning Rivers Management Act 2006 (SCRM Act)* and lands identified under the *Land Administration Act 1997 (LA Act)*. The *Lands of Interest (DBCA 2017c)* dataset includes all other lands of which DBCA is recognised as the manager but is not vested under any act. These lands comprise of crown land and freehold land which DBCA has been acknowledged by the Department of Lands as the responsible agency.

No DBCA managed or legislated lands and waters are located within or adjacent to the site. The closest DBCA legislated lands to the site are Ngari Capes Marine park located approximately 200 m west of the site and Leeuwin-Naturaliste National Park located approximately 350 m to the east of the site. The locations of these lands in relation to the site are shown in **Figure 3**.

2.10 Ecological linkages

Ecological linkages are linear landscape elements that allow the movement of fauna, flora and genetic material between areas of remnant habitat. The movement of fauna and the exchange of genetic material between vegetation remnants improve the viability of those remnants by allowing greater access to breeding partners and food sources, refuge from disturbances such as fire and maintenance of genetic diversity of plant communities and populations. Ecological linkages are ideally continuous or near-continuous as the more fractured a linkage is, the less ease flora and fauna have in moving within the corridor (Alan Tingay and Associates 1998).

The Perth Biodiversity Project, supported by the Western Australia Local Government Association (WALGA), have identified and mapped regional ecological linkages within the Perth Metropolitan Region (WALGA and PBP 2004). This study was extended beyond the Perth Metropolitan Region through the South West Biodiversity Project, resulting in the identification and mapping of the South West regional ecological linkages (Molloy *et al.* 2009).

No mapped ecological linkage occur within the site. One ecological linkage occurs approximately 915 m to the east of the site. This linkage is associated with Lewin-Naturaliste National Park and extends beyond the site to the north and south, connecting to other linkages. The location of this linkage is shown in **Figure 3**.

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2.11 Previous surveys

Ecosystem Solutions (2015) previously undertook a flora, vegetation and fauna assessment over 'Lot 783 Wallcliffe Road and surrounds' which included the northern portion of the site. The survey included one day time visit, two pre-dawn black cockatoo roost surveys and two nocturnal surveys. No fauna species of conservation significance were recorded in the survey. No habitat for or evidence of threatened species of black cockatoo were recorded in the survey area.

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3 Methods

3.1 Desktop assessment

3.1.1 Basic fauna

A search was conducted for fauna species that have been recorded within a 10 km radius of the site using the *Protected Matters Search Tool* (DAWE 2020a), *NatureMap* (DBCA 2021), DBCA's conservation significant fauna database (reference no. FAUNA6649), previous surveys and literature references.

3.2 Field survey

3.2.1 Basic fauna

One zoologist from Emerge visited the site on 28 October 2020 during the day to conduct the basic fauna field survey. The survey was conducted from approximately 09:00 AM until 4:00 PM.

The weather conditions prior to and during the survey were warm and dry with temperatures ranging from a minimum of 7.5°C to maximum of 20.9°C (BoM 2021).

Transects were traversed across the site, during the day, and the characteristics of fauna habitat and presence of fauna species was recorded. Microhabitats such as logs, rocks and leaf litter were investigated and secondary evidence of species presence such as tracks, scats, skeletal remains, foraging evidence or calls was also noted.

An opportunistic fauna species list was compiled and fauna habitat values were described, with particular reference to conservation significant fauna species with potential to occur within the site.

3.2.2 Targeted western ringtail possum

Subconsultant zoologist Greg Harewood from Zootopia and a zoologist from Emerge visited the site on 2, 4 and 5 March 2021 to undertake the targeted western ringtail possum (WRTP) field survey. The WRTP field survey was comprised of two diurnal surveys and two nocturnal surveys as detailed in **Table 1**.

The weather conditions on all survey days were warm and mostly dry with temperatures ranging from a daily minimum of 16.3 °C to a daily maximum of 29 °C (BoM 2021). Minor rainfall was noted during the diurnal and nocturnal surveys on 4 March.

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Table 1: Summary of the types of WRTP surveys undertaken in the site

Date	Duration	Type of survey	Personnel
2 March 2021	7:30 PM to 9:30 PM	Nocturnal	Greg Harewood
4 March 2021	10:00 AM to 4:30 PM	Diurnal	Greg Harewood and a zoologist from Emerge
4 March 2021	7:30 PM to 9:30 PM	Nocturnal	Greg Harewood and a zoologist from Emerge
5 March 2021	9:00 AM to 1:00 PM	Diurnal	Zoologist from Emerge

3.2.2.1 Diurnal survey

During the diurnal survey the site was traversed on foot and scat sampling and active searches for other secondary evidence of WRTP presence such as dreys, tracks or skeletal remains was undertaken.

Scat sampling was undertaken using non-permanent quadrats. The quadrats comprised an area of approximately 1 m x 1 m and were located approximately 15 metres (m) apart. Within each sample the total number of WRTP scats were recorded. The location of each sample was recorded with a hand-held GPS unit. The sampling design was established based on similar methods used by Wayne *et al.* (2005) and DBCA (2019a). The samples were primarily placed along existing tracks and roads as the dense vegetation in the site did not allow traversing of the entire site.

Active searches for secondary evidence of WRTPs was also undertaken in the site with particular focus on areas supporting vegetation that was deemed most likely to provide habitat for WRPs. The locations of secondary evidence of WRTPs presence was recorded using a handheld GPS unit.

3.2.2.2 Nocturnal survey

The nocturnal survey comprised spotlighting for WRTP individuals. During the survey the site was traversed on foot and the vegetation was searched using high-powered torches. The torches were used to detect the presence of WRTPs through eye-shine. When eye-shine was observed, the individual was confirmed to be a WRTP using binoculars and the number of WRTP individuals present was noted. The location of each WRTP was recorded with a hand-held GPS unit.

The nocturnal survey was primarily undertaken along existing tracks and roads as the dense vegetation in the site did not allow traversing of the entire site.

3.3 Data analysis

3.3.1 Desktop assessment

A total number of species within the desktop assessment search area was calculated by adding the total count of non-conservation significant species provided by *NatureMap* to the combined number of conservation significant species with potential to occur provided by *NatureMap* and *Protected Matters Search Tool*.

Habitat requirements of conservation significant vertebrate fauna was specifically reviewed in relation to habitat within the site to determine a total number of conservation significant fauna

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species with potential to occur. Fauna species with no potential to occur within the site were excluded from this count (e.g. marine mammals and marine fish).

3.3.2 Fauna habitat

Fauna habitats were described according to the dominant flora species and vegetation type present, as determined from observations made during the field survey and information provided in the *Detailed Flora and Vegetation Assessment* (Emerge Associates 2021) for the site. The identified fauna habitats were mapped on aerial photography with the boundaries interpreted from aerial photography, previously identified plant communities (Emerge Associates 2021) and notes taken in the field.

3.3.3 Likelihood of occurrence

Information on habitat preferences and distribution of conservation significant fauna species with potential to occur within the site or wider area was reviewed and assessed against the general site conditions and fauna habitat types recorded during the field survey.

Based on the results of the desktop assessment and information recorded during the field survey, an assessment of the likelihood of occurrence of conservation significant fauna within the site was undertaken using the categories outlined in **Table 2**.

Table 2: Likelihood of occurrence assessment categories and definitions

Likelihood	Definition
Recorded	The species was recorded during the current field survey or during previous field surveys.
Likely	The site contains suitable habitat for the species and it is likely the species may occur based on presence of a recent historical record within or close to the site.
Possible	The site contains habitat of at least marginal quality and/or extent for the species and the site is located within the known distribution range of the species which is supported by recent literature records from near the site.
Unlikely	The site contains no or marginal habitat for the species and/or no recent literature records occur near the site.

3.3.4 Western ringtail possum abundance

Due to the limited number of WRTP scats recorded in the site no statistical analysis was undertaken for the site. Instead, general conclusions about the relative abundance and habitat use of WRTPs in the site were made.

3.4 Nomenclature and sources of information

Taxonomy and nomenclature of scientific and common names for fauna species follow the Western Australian Museum (WAM) *Checklist of the Terrestrial Vertebrate Fauna of Western Australia* (WAM 2020). Where common names were not provided by *Western Australian Museum* (WAM 2020), these have been derived from other sources as noted.

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Literature listed in **Appendix A** represent the main publications used to identify fauna species and habitats within the site.

3.5 Survey limitations

It is important to note the specific constraints imposed on surveys and the degree to which these may have limited survey outcomes. An evaluation of the survey methodology against standard constraints outlined in the EPA's document *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020) is provided in **Table 3**.

Table 3: Evaluation of survey methodology against standard constraints outlined in the EPA's Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020)

Constraint	Degree of limitation	Details
Level of survey	No limitation	A basic survey (desktop study and field survey) and a targeted survey for WRTP were undertaken. The level of survey and the survey effort are considered adequate to assess the fauna and habitat values within the site.
Scope	No limitation	The survey focused on vertebrate fauna and habitat values, with particular focus on WRTP and other conservation significant taxa with potential to occur within the site.
Proportion of fauna identified, recorded and/or collected.	No limitation	All observed vertebrate fauna were identified.
Sources of information e.g. previously available information (whether historic or recent) as distinct from new data.	No limitation	Adequate information was available from database searches and previous surveys.
The proportion of the task achieved and further work which might be needed.	No limitation	The task was achieved in its entirety.
Experience level of personnel	No limitation	The basic fauna assessment and this report was undertaken by a qualified zoologist with three years' experience in undertaking fauna surveys in Western Australia. The targeted WRTP survey was undertaken by a senior zoologist (Greg Harewood) with over 30 years' experience in undertaking fauna surveys in Western Australia and a zoologist from Emerge. Technical review was undertaken by a senior environmental consultant with 10 years' experience in ecological surveys in Western Australia.
Suitability of timing, weather and season	No limitation	Survey timing is not considered to be of great importance for basic fauna assessments. The weather conditions during the survey were usual for the time of year and timing is therefore not considered a limitation to this fauna assessment. The weather conditions during the WRTP spotlighting survey were mostly dry with low wind conditions. This was considered adequate for detecting WRTPs.
Completeness	No limitation	The desktop assessment and field survey components were completed comprehensively.

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Table 3: Evaluation of survey methodology against standard constraints outlined in the EPA's Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020) (continued)

Constraint	Degree of limitation	Details
Spatial coverage and access	No limitation	Site coverage during the basic fauna survey was mostly limited to existing tracks and roads due to the high density of the vegetation in the site. However, fauna habitat and fauna presence could still be assessed adequately.
	Minor limitation	The WRTP diurnal and nocturnal surveys were predominantly conducted on and near existing tracks and roads. The accessibility of the site through tracks and roads is extensive and the low vegetation height provided good visibility. The probability of detecting eye shine is considered to be similar for distances of up to 50 m and so transects spaced 100 m apart are considered ideal for spotlighting surveys (DoEE 2011). Most of the transects during the current survey were spaced less than 100 m apart to maximise detectability. For a small area in the northern portion of the site the distance between transects was 190 m at the widest point. However, given that the majority of the site was surveyed extensively this is only considered a minor limitation. While it is possible that additional scats would have been found during the diurnal survey if the entire site was traversed, the abundance is still considered likely to be low. In particular, given that the nocturnal survey was the primary survey method and scat sampling was undertaken to provide supplementary information, this is only considered a minor limitation.
Survey intensity	No limitation	The intensity of the survey was adequate given the size of the site and the habitat values present.
Influence of disturbance	No limitation	The site is modified due to historical disturbance. However, no recent disturbance was noted that may have affected outcomes of the survey.
Adequacy of resources	No limitation	All resources required to perform the survey were available.
Compliance with EPA (2020) guidance	Minor limitation	The EPA (2020) guidance requires that a full list of all fauna species with potential to occur within the site is compiled. As part of this assessment a comprehensive list of fauna species of conservation significance was compiled. Non-conservation taxa with potential to occur within the site were not compiled into a list but are provided as raw data in Appendix B . Given that all species with potential to occur within the site are still identified within the relevant appendices this is not considered to affect the outcomes of this assessment.
	Very minor limitation	The EPA (2020) guidance recommends that the <i>Australian Faunal Directory</i> (DAWE 2020b) nomenclature is used for bird species. This assessment uses the <i>WAM Checklist of the Terrestrial Vertebrate Fauna of Western Australia</i> (WAM 2020) nomenclature for birds and therefore does not strictly comply.

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4 Results

4.1 General site conditions

The site is undulating with rises in the northern, central and southern portions. Soils are brown to grey with some outcropping limestone.

The majority of the site supports dense native coastal shrubland (heathland) vegetation. Where the landform is elevated and more exposed, such as in the northern and central western portions, the shrub layer is lower. In more protected areas the shrubs are taller. Evidence of disturbance from the previous fire was recorded, such as dead wood on the ground and dead branches above existing vegetation.

Multiple unsealed tracks and one sealed path/boardwalk occur in the site. Vegetation regrowth and subsequent clearing appears to occur periodically within some of the unsealed paths.

4.2 Fauna habitat

Two fauna habitats were identified within the site: '**heathland**' and '**predominantly cleared area**'.

The heathland habitat occurs over the majority of the site. The **predominantly cleared area** occurs as tracks and disturbed areas amongst the **heathland** habitat and along the outer site boundary adjacent to roads.

A description and the area of each habitat is provided in **Table 4** and representative photographs of each are provided in **Plate 1** and **Plate 2**. The location of each habitat is shown on **Figure 4**.

Table 4: Fauna habitats identified within the site

Fauna habitat classification	Description	Area (ha)
Heathland	Closed heathland to tall closed heathland <i>Melaleuca huegelii</i> , <i>Scaevola crassifolia</i> , <i>Spyridium globulosum</i> and <i>Acacia littorea</i> with occasional <i>Agonis flexuosa</i> , <i>Thomasia triphylla</i> , <i>Melaleuca systema</i> and <i>Diplolaena dampieri</i> over isolated sedges <i>Lepidosperma squamatum</i> on sand with outcropping limestone (Plate 1).	12.38
Predominantly cleared area	Heavily disturbed areas dominated by weed plant species, bare ground or sealed surfaces (Plate 2).	1.35

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Plate 1: Heathland habitat



Plate 2: Predominantly cleared area habitat

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4.3 Fauna

4.3.1 Desktop assessment

A total 439 fauna species were identified from database searches as occurring or potentially occurring within 10 km of the site¹ as listed in **Appendix B**.

Of these species, 70 are conservation significant, including 47 threatened, 10 priority, 11 migratory, one conservation dependent and one other specially protected species as listed in **Appendix C**.

4.3.2 Species inventory

A total of 25 native and two introduced fauna species were directly recorded during the field survey, including two species of conservation significance. A complete species list is provided in **Appendix D**.

4.3.3 Conservation significant fauna

Two fauna species of conservation significance were directly or indirectly recorded within or near the site: *Calyptorhynchus latirostris* (Carnaby's cockatoo) and western ringtail possum.

Carnaby's cockatoo was seen flying over the site and western ring-tail possum was identified as occurring in the site from scats (refer to **Section 4.3.4**).

In addition, one priority, two migratory and one other specially protected fauna species were considered to possibly occur within the site as listed in **Table 5**.

The remainder of the conservation significant fauna species identified in the desktop assessment (64 species) are considered 'unlikely' to occur in the site due to lack of suitable habitat or because the site lies outside of the species known distribution. Fauna species classed as unlikely to occur are listed in **Appendix D**.

Table 5: Summary of conservation significant fauna species recorded or deemed possible or likely to occur within the site

Species	Common name	Level of significance		Habitat	Likelihood of occurrence within the site
		BC Act	EPBC Act		
Birds					
<i>Apus pacificus</i>	Pacific swift	MI	MI	Aerial, migratory species that is most often seen over inland plains and sometimes above open areas, foothills or in coastal areas. Sometimes occurs over settled areas, including towns, urban areas and cities (Johnstone and Storr 1998).	Possible: May opportunistically occur in or fly over the site on commute or while searching for prey.

¹ Includes native and non-native species

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Table 5: Summary of conservation significant fauna species recorded or deemed possible or likely to occur within the site (continued)

Species	Common name	Level of significance		Habitat	Likelihood of occurrence within the site
		BC Act	EPBC Act		
Birds					
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	EN	EN	Mainly proteaceous scrubs and heaths and adjacent eucalypt woodlands and forests; also plantations of <i>Pinus</i> spp. Attracted to seeding <i>Banksia</i> spp., <i>Dryandra</i> spp., <i>Hakea</i> spp., <i>Eucalyptus</i> spp., <i>Corymbia calophylla</i> , <i>Grevillea</i> spp., and <i>Allocasuarina</i> spp. (Johnstone and Storr 1998).	Recorded (fly-over only): Potential foraging habitat present.
<i>Falco peregrinus</i>	Peregrine falcon	OS	-	Mainly found around cliffs along coasts, rivers, ranges and around wooded watercourses and lakes (Johnstone and Storr 1998).	Possible: May opportunistically occur in or fly over the site on commute or while searching for prey.
<i>Pandion cristatus</i>	Osprey	MI	MI	Coasts, estuaries, bays, inlets, islands, and surrounding waters; coral atolls, reefs, lagoons, rock cliffs, stacks (Pizzey & Knight 2012).	Possible: May opportunistically occur in or fly over the site on commute or while searching for prey.
Mammals					
<i>Isoodon fusciventer</i>	Quenda	P4	-	Dense scrubby, often swampy, vegetation with dense cover up to one metre high (DEC 2012)	Possible: Potentially suitable habitat present.
<i>Pseudocheirus occidentalis</i>	Western ringtail possum	CR	CR	Dense stands of <i>Agonis flexuosa</i> , as well as <i>Eucalyptus gomphocephala</i> , <i>Corymbia calophylla</i> and <i>Eucalyptus marginata</i> forests (DBCA 2017).	Recorded: Marginal habitat present.

CR=critically endangered, EN=endangered, VU=vulnerable, P4=priority 4, MI=migratory, OS=other specially protected

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4.3.4 Targeted western ringtail possum

4.3.4.1 Diurnal survey

A total of 313 locations within the site were sampled for WRTPS scats. Four WRTP scats were recorded in one of these samples in the central portion of the site within the **heathland** habitat. The scats seen were estimated to be approximately one month old.

A potential historic drey was also found in the **heathland** habitat in the south-western portion of the site. The structure was decayed to a degree that it was difficult to determine whether it was a drey. If it is a drey it likely has not been used for multiple months.

The locations of the scat samples, potential drey and transects walked during the diurnal survey are shown in **Figure 5**.

The diet of WRTPs comprises almost exclusively dominant and co-dominant upper and mid-storey myrtaceous plants such as peppermint, *Corymbia calophylla* (marri) and *Eucalyptus marginata* (jarrah) (DBCA 2017b). Peppermint occurs in the site as scattered low trees and shrubs.

Additionally, WRTPs may also feed on a range of other plants species including non-native garden species (DPaW 2017). Nature Conservation Margaret River Region (2018) have identified a list of plant species that were reported to be consumed by WRTPs. Of the listed plant species the following were recorded in the site: *Clematis pubescens* (common clematis), *Hardenbergia comptoniana* (native wisteria), *Lepidosperma gladiatum* (coastal sword sedge), *Melaleuca huegelii* (chenille honeymyrtle) and *Spyridium globulosum* (basket bush). These plants occur within the majority of the **heathland** habitat.

4.3.4.2 Nocturnal survey

No individuals of WRTP were recorded in the site during the nocturnal surveys.

Five WRTP individuals were observed approximately one km north of the site after the nocturnal survey on 4 March.

Over the course of the two nocturnal surveys a total length of 16.76 km was traversed within the site.

The locations of the transects walked during the spotlighting survey are shown in **Figure 6**.

4.3.5 Declared pests

One species listed as a declared pest (C3) pursuant to the BAM Act, *Oryctolagus cuniculus* (rabbit), was identified from scats within the site.

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5 Discussion

5.1 Fauna and fauna habitat values

The majority of the site contains native vegetation associated with the **heathland** habitat (90.14%). In particular where vegetation remains in good² or better condition it provides a dense cover of native shrubs and contains microhabitats such as rocky outcrops, logs and leaf litter that would provide high fauna habitat values to native fauna. Extensive areas of similar habitat of the same or higher quality is located adjacent to the site and the wider area, including vegetation associated with Leeuwin-Naturaliste National Park.

The remainder of the site contains **predominantly cleared area** (9.86%). This habitat provides limited habitat value to native fauna and is likely to be primarily utilised by common and widespread native and non-native fauna with non-specific habitat requirements.

The 26 native fauna species opportunistically recorded within the site are all generally common across the Warren region. Three of the fauna species recorded in or near the site are of conservation significance (further discussed in **Section 5.2.**).

5.2 Conservation significant fauna

Two species of conservation significance were recorded within or near the site during the field survey: Carnaby's cockatoo and WRTP. A record of these species was anticipated, as they are known to occur in the local area and suitable habitat for both species occurs within or near the site.

The extent of suitable habitat for Carnaby's cockatoo in the site is limited. The site does not contain any trees that are suitable for breeding or roosting by black cockatoos. The flora and vegetation survey that was undertaken concurrently with the fauna survey identified only one plant species that is known to be consumed by Carnaby's cockatoo (peppermint) (Emerge Associates 2021). The peppermint trees in the site occur as low shrubs scattered within the **heathland** habitat and have a relatively low cover. As such, the site provides a small potential foraging resource for Carnaby's cockatoo.

In addition to the aforementioned species recorded during the field survey, five species of conservation significance are considered to have potential to occur in the site: *Apus pacificus* (Pacific swift), *Falco peregrinus* (Peregrine falcon), *Isodon fusciventer* (quenda) and *Pandion cristatus* (osprey).

Quenda require dense ground cover vegetation to persist in an area and as such the majority of the **heathland** habitat provides suitable habitat for this species. Extensive areas of similar or higher quality habitat is located adjacent to and in the wider area of the site. A targeted survey would need to be undertaken to confirm if this species occurs in the site.

Pacific swift, Peregrine falcon and osprey are highly mobile species and may occasionally occur within or fly over the entire site as part of a much larger home range. Both peregrine falcon and osprey

² Keighery (1994)

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require large trees or cliff faces for breeding, which the site does not support. The Pacific swift does not breed in Australia. As such, opportunistic occurrences of all three species would likely be limited to the air space above the site.

5.3 Western ringtail possum

The **heathland** habitat in the site contains WRTP foraging plant species but their extent is limited. The majority of the **heathland** in the site comprises vegetation less than 2 m in height and in some parts even lower, which is sub-optimal for WRTPs as it would expose them to predation by cats and foxes. Therefore, the habitat within the site is considered to be of marginal quality for WRTPs. Extensive areas of more suitable habitat (associated with stands of peppermints) occur outside of the site in the local area, predominantly to the east.

DPaW (2017) define habitat critical to the survival of WRTP within the Swan Coastal Plain management zone (in which the site lies) as 'long unburnt mature remnant peppermint woodlands with high canopy continuity and high nutrient foliage with minimal periods of summer moisture stress, and habitat connecting patches of remnants'. The vegetation in the site does not meet this criteria, given it was burnt within the past ten years, lacks peppermint woodland and comprises heathland which would provide limited protection from summer moisture stress.

The targeted survey indicated that WRTP abundance in the site is low and use of the site infrequent, given that no individuals were sighted and low secondary evidence such as scats were recorded. WRTPs were recorded within suitable habitat outside of the site during the nocturnal survey indicating they are present in the local area. It is likely that WRTPs inhabit vegetation outside of the site within the local area (particularly where peppermints are present in higher abundance) and only use the **heathland** habitat in the site opportunistically for refuge, foraging and/or dispersal.

While not all of the **heathland** habitat could be traversed due to the impenetrable vegetation structure, the survey effort is appropriate to provide a good indication of WRTP presence within the site.

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6 Conclusions

6.1 Fauna and fauna habitat

The majority of the site (90.14%) contains relatively intact native vegetation which supports high fauna habitat values, particularly where it is in good or better condition. Extensive areas of similar habitat of the same or higher quality is located adjacent to the site and the wider area, including vegetation associated with Leeuwin-Naturaliste National Park.

A total of 25 native and two introduced fauna species were recorded in the site, including two species of conservation significance: Carnaby's cockatoo and western ringtail possum.

The site does not support suitable breeding or roosting habitat for threatened species of black cockatoo. The site contains low peppermint trees and shrubs which are a known foraging plant for Carnaby's cockatoo but the extent of peppermint in the site is limited and foraging potential is considered to be low.

Four additional fauna of conservation significance were considered to have potential to occur within the site: Osprey (migratory), Pacific swift (migratory), Peregrine falcon (migratory) and quenda (P4). The avifauna are only likely to utilise the air space over the site.

6.2 Western ringtail possum

Evidence of WRTP was recorded in the site in the form of old scats and a potential historic drey. No WRTP were encountered in the site during the nocturnal surveys.

The **heathland** habitat in the site provides potential habitat for WRTPs but is considered to be of marginal quality due to the limited extent of foraging resources and the low vegetation height.

Western ringtail possums may occasionally use the **heathland** habitat for refuge, foraging and/or dispersal but the abundance of WRTPs in the site is likely to be low.

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Figures



Figure 1: Site Location

Figure 2: Soils and Topography

Figure 3: Environmental Features

Figure 4: Fauna Habitat

Figure 5: Diurnal Western Ringtail Possum Survey Results and Effort

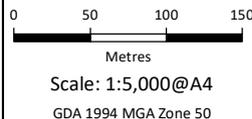
Figure 6: Western Ringtail Possum Nocturnal Survey Effort



Figure 1: Site Location

Project: Basic Fauna and Targeted Western Ringtail Possum Assessment - Lot 783 Mitchell Dr, Lots 501, 502 and 504 Reef Dr and Lot 503 Seagrass Pl, Gnarabup
Client: 5 Star Margaret River Pty Ltd

Plan Number: EP20-008(07)--F31
Drawn: GAR
Date: 24/02/2020
Checked: MS
Approved: RAW
Date: 01/04/2021



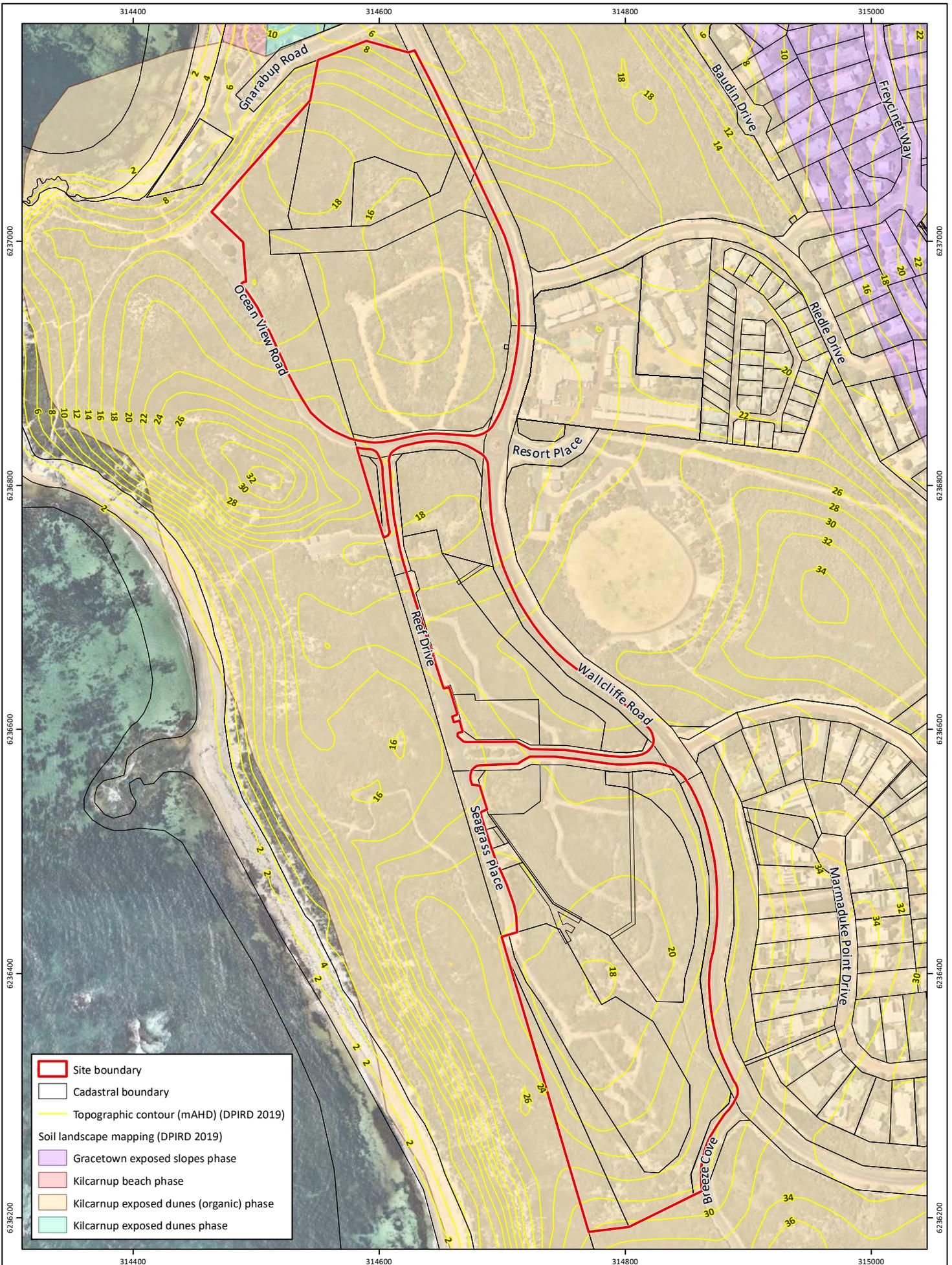


Figure 2: Soils and Topography

Project: Basic Fauna and Targeted Western Ringtail Possum Assessment - Lot 783 Mitchell Dr, Lots 501, 502 and 504 Reef Dr and Lot 503 Seagrass Pl, Gnarabup
Client: 5 Star Margaret River Pty Ltd

Plan Number: EP20-008(07)--F32
Drawn: GAR
Date: 24/02/2020
Checked: MS
Approved: RAW
Date: 01/04/2021



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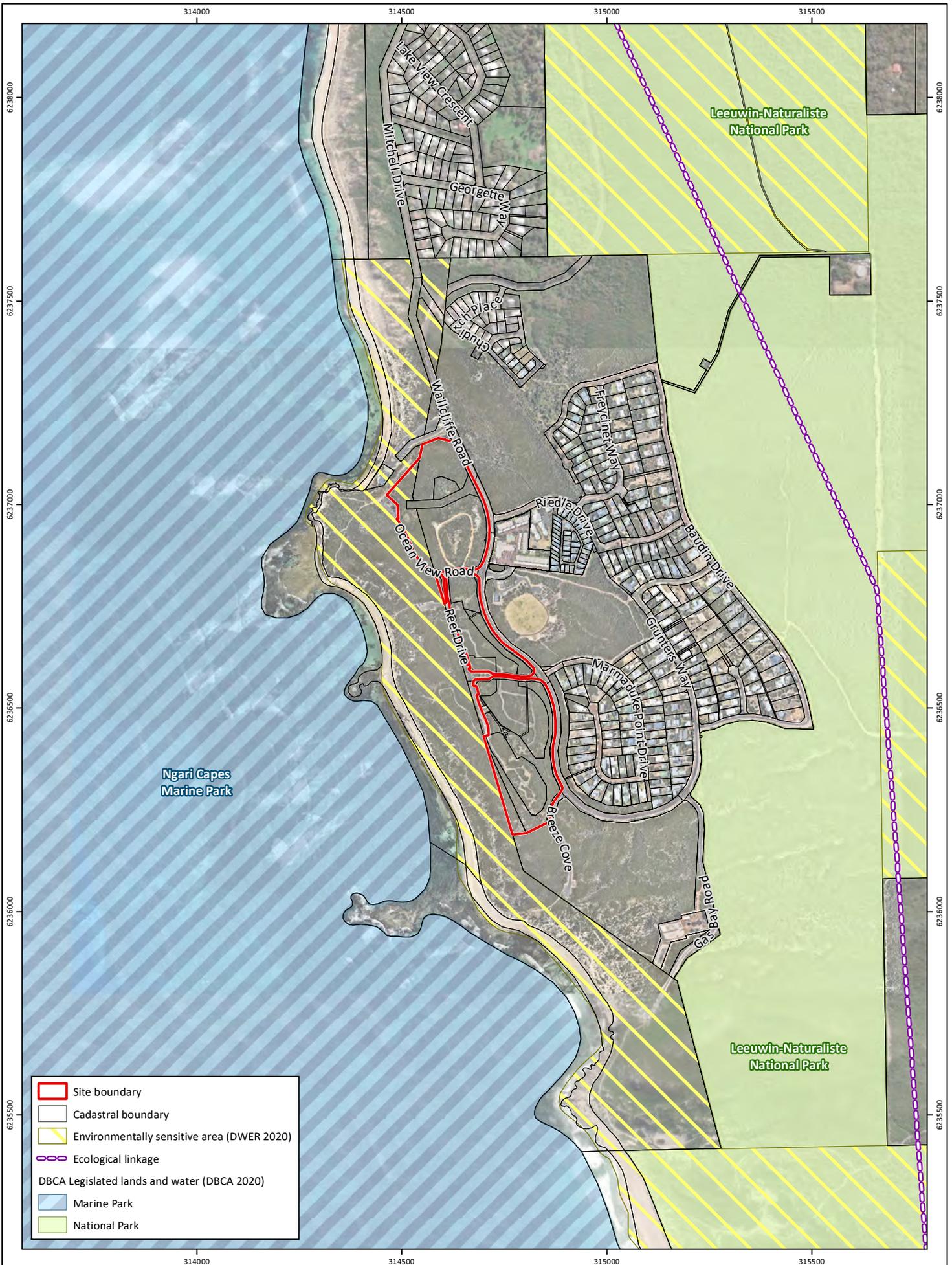


Figure 3: Environmental Features

Project: Basic Fauna and Targeted Western Ringtail Possum Assessment - Lot 783 Mitchell Dr, Lots 501, 502 and 504 Reef Dr and Lot 503 Seagrass Pl, Gnarabup
Client: 5 Star Margaret River Pty Ltd

Plan Number: EP20-008(07)--F33
Drawn: GAR
Date: 24/02/2020
Checked: MS
Approved: RAW
Date: 01/04/2021



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 GDA 1994 MGA Zone 50



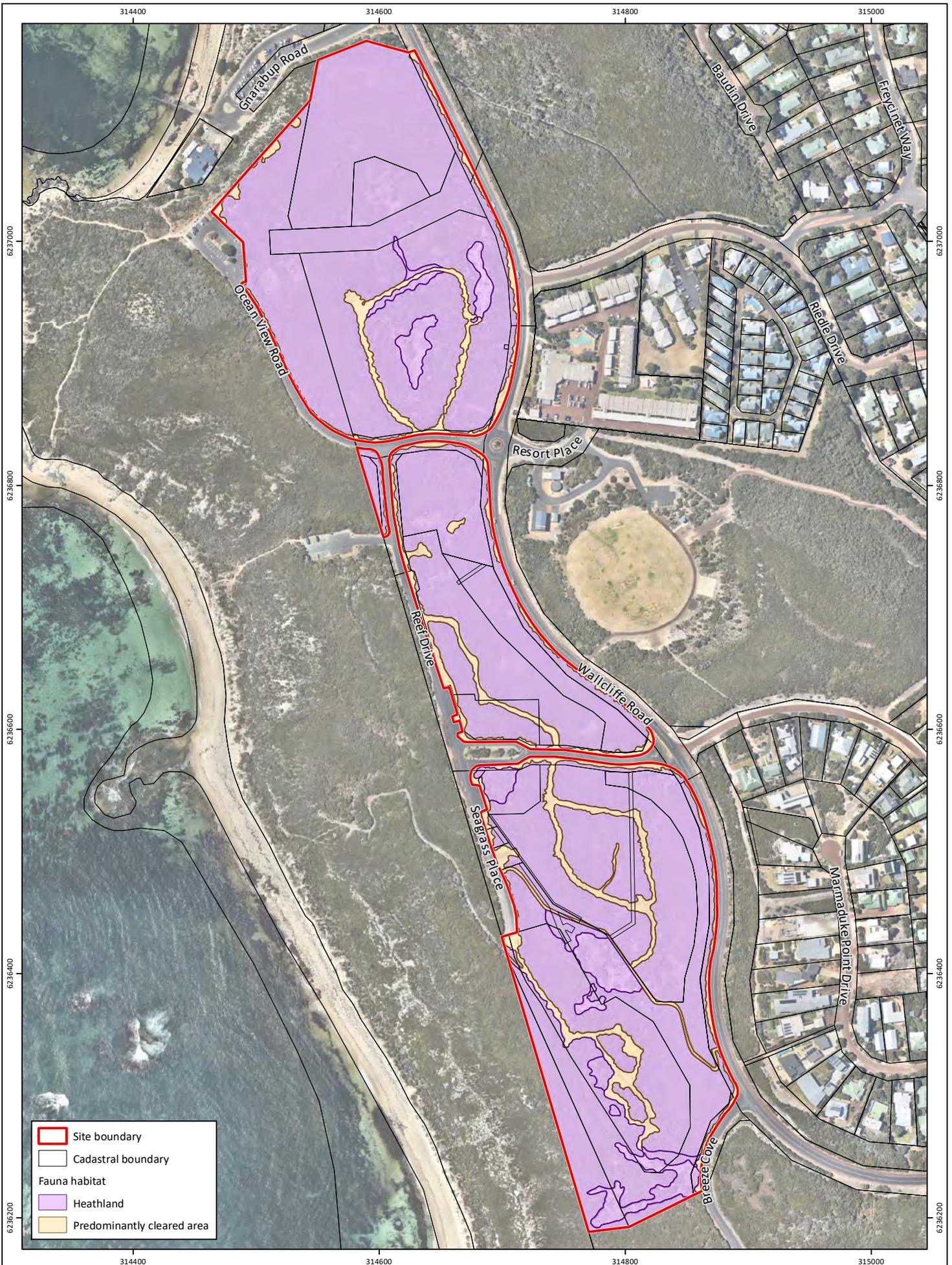


Figure 4: Fauna Habitat

Project: Basic Fauna and Targeted Western Ringtail Possum Assessment - Lot 783 Mitchell Dr, Lots 501, 502 and 504 Reef Dr and Lot 503 Seagrass Pl, Gnarabup
Client: 5 Star Margaret River Pty Ltd

Plan Number: EP20-008(07)--F34
Drawn: GAR
Date: 24/02/2020
Checked: MS
Approved: RAW
Date: 01/04/2021



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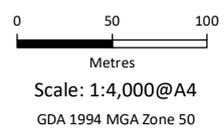




Figure 5: Diurnal Western Ringtail Possum Survey Results and Effort

Project: Basic Fauna and Targeted Western Ringtail Possum Assessment - Lot 783 Mitchell Dr, Lots 501, 502 and 504 Reef Dr and Lot 503 Seagrass Pl, Gnarabup
Client: 5 Star Margaret River Pty Ltd

Plan Number: EP20-008(07)--F48
Drawn: GAR
Date: 25/03/2020
Checked: MS
Approved: RAW
Date: 01/04/2021



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used.
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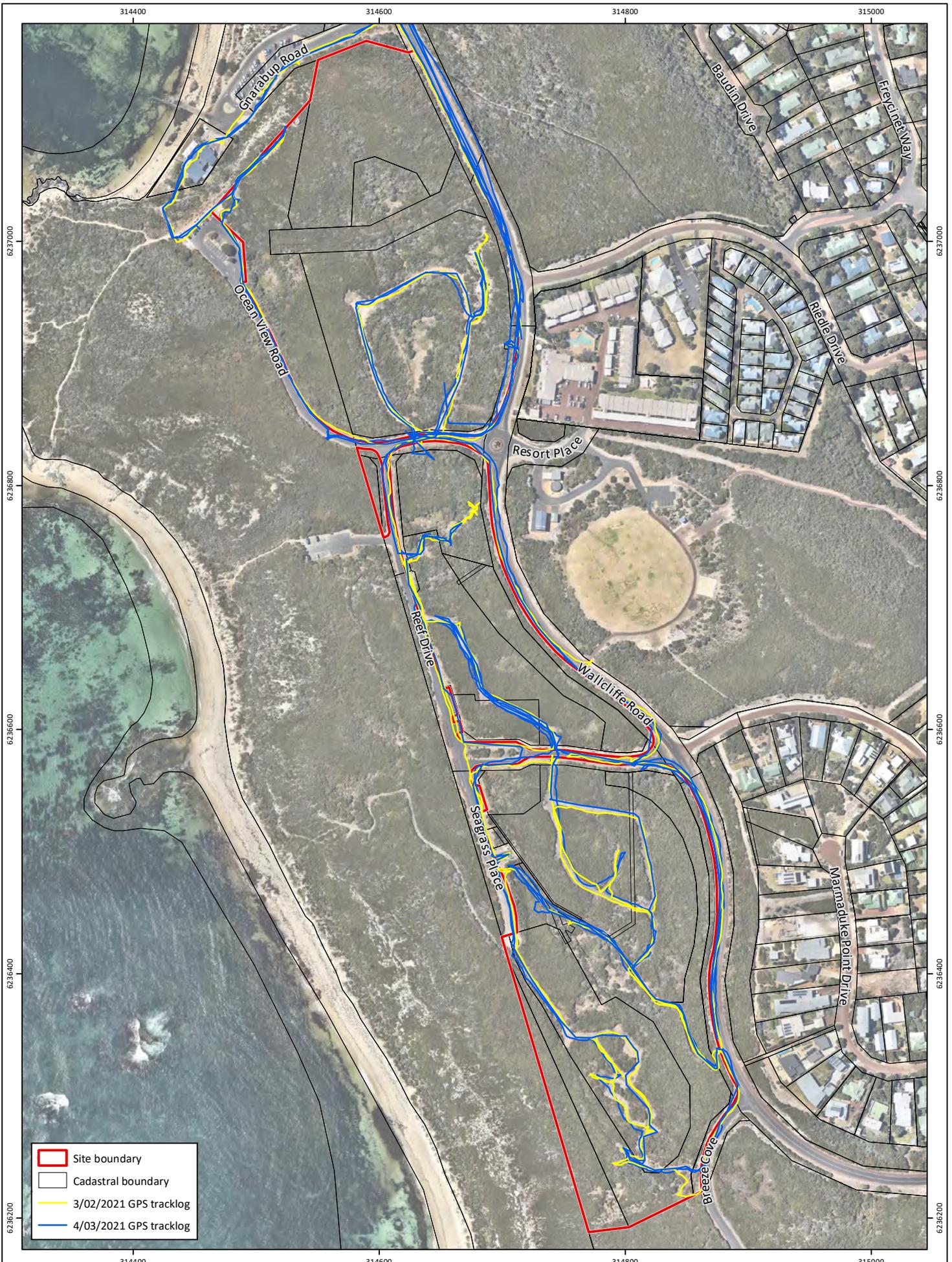


Figure 6: Western Ringtail Possum Nocturnal Survey Effort

Project: Basic Fauna and Targeted Western Ringtail Possum Assessment - Lot 783 Mitchell Dr, Lots 501, 502 and 504 Reef Dr and Lot 503 Seagrass Pl, Gnarabup
Client: 5 Star Margaret River Pty Ltd

Plan Number: EP20-008(07)--F49
Drawn: GAR
Date: 25/03/2020
Checked: MS
Approved: RAW
Date: 01/04/2021



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 GDA 1994 MGA Zone 50



Appendix A

Additional Information



Conservation Significant Fauna

Threatened and priority fauna

Fauna species considered rare or under threat warrant special protection under Commonwealth and/or State legislation. At the Commonwealth level, fauna species can be listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as ‘threatened’, ‘migratory’ or ‘marine’ as described in **Table 1**.

Migratory species comprise birds recognised under international treaties including:

- *Japan Australia Migratory Bird Agreement 1981* (JAMBA)
- *China Australia Migratory Bird Agreement 1998* (CAMBA)
- *Republic of Korea-Australia Migratory Bird Agreement 2007* (ROKAMBA)
- *Bonn Convention 1979* (The Convention on the Conservation of Migratory Species of Wild Animals).

Fauna species listed as threatened and migratory are protected in Australia as ‘matters of national environmental significance’ (MNES) under the EPBC Act.

Table 1: Definitions of conservation significant fauna species pursuant to the EPBC Act

Conservation Code	Category
X	Threatened Fauna – Extinct There is no reasonable doubt that the last member of the species has died.
EW [#]	Threatened Fauna – Extinct in the Wild Taxa which are known only to survive in cultivation, captivity or as a naturalised population outside its past range, or taxa which have not been recorded in its known and/or expected habitat despite appropriate exhaustive surveys.
CR [#]	Threatened Fauna – Critically Endangered Taxa which are considered to be facing an extremely high risk of extinction in the wild.
EN [#]	Threatened Fauna – Endangered Taxa which are considered to be facing a very high risk of extinction in the wild.
VU [#]	Threatened Fauna – Vulnerable Taxa which are considered to be facing a high risk of extinction in the wild.
Migratory [#]	Migratory Fauna All migratory species that are: (i) native species; and (ii) from time to time included in the appendices to the Bonn Convention; and (b) all migratory species from time to time included in annexes established under JAMBA, CAMBA and ROKAMBA; and All native species from time to time identified in a list established under, or an instrument made under, an international agreement approved by the Minister.
Ma	Marine Fauna Species in the list established under s248 of the EPBC Act

[#]matters of national environmental significance (MNES) under the EPBC Act

Additional Background Information



In Western Australia, fauna taxa may be classed as ‘threatened’, ‘extinct’, or ‘specially protected’ under the *Biodiversity Conservation Act 2016* (BC Act), which is enforced by Department of Biodiversity Conservation and Attractions (DBCA) (DBCA 2019). The definitions of these categories are provided in **Table 2**.

Table 2: Definitions of specially protected fauna schedules under the BC Act (DBCA 2019)

Category	Conservation Code	Definition
Threatened	CR	Critically endangered Threatened species considered to be facing an extremely high risk of extinction in the wild in the immediate future.
	EN	Endangered Threatened species considered to be facing a very high risk of extinction in the wild in the near future.
	VU	Vulnerable Threatened species considered to be facing a high risk of extinction in the wild in the medium-term future.
Extinct	EX	Extinct Species where there is no reasonable doubt that the last member of the species has died.
	EW	Extinct in the wild Species that is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form. Note that no species are currently listed as EW.
Specially protected	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 Includes birds that subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds.
	CD	Species of special conservation interest (conservation dependent fauna) Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
	OS	Other specially protected species Fauna otherwise in need of special protection to ensure their conservation.

Additional Background Information



Fauna species that may be threatened or near threatened but lack sufficient information to be legislatively listed may be added to the DBCA's *Priority Fauna List* (DBCA 2018b). Species listed under priorities 1-3 comprise possible threatened species that do not meet survey criteria or are otherwise data deficient. Species listed under priority 4 are those 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 (DBCA 2019).

Priority fauna species are considered during State approval processes. Priority fauna categories and definitions are listed in **Table 3** (DBCA 2019).

Table 3: Definitions of priority fauna categories on DBCA's Priority Fauna List (DBCA 2019)

Conservation Code	Category
P1	<p>Priority 1 – Poorly known</p> <p>Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.</p>
P2	<p>Priority 2 – Poorly known</p> <p>Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.</p>
P3	<p>Priority 3 – Poorly known</p> <p>Species that are known from several locations and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.</p>
P4	<p>(a) Priority 4 – Rare species</p> <p>Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.</p> <p>(b) Priority 4 – Near Threatened</p> <p>Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.</p> <p>(c) Priority 4 – Other</p> <p>Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>

Pest fauna

A number of legislative and policy documents exist in relation to pest fauna management at state and national levels. The *Biosecurity and Agriculture Management Act 2007* (BAM Act) is the principle legislation guiding pest fauna management in Western Australia and lists declared pest species.

Declared Pests

Part 2.3.23 of the BAM Act requires a person must not; “a) keep, breed or cultivate the declared pest; b) keep, breed or cultivate an animal, plant or other thing that is infected or infested with the declared pest; c) release into the environment the declared pest, or an animal, plant or other thing that is infected or infested with the declared pest; or d) intentionally infect or infest, or expose to infection or infestation, a plant, animal or other thing with a declared pest”.

Under the BAM Act, all declared pests are assigned a legal status, as described in **Table 4**. Species assigned to the ‘declared pest, prohibited - s12’ category are placed in one of three control categories, as described in **Table 5**.

The *Biosecurity and Agriculture Management Regulations 2013* specify keeping categories for species assigned to the ‘declared pest - s22(2)’ category, which relate to the purposes of which species can be kept, as well as the entities that can keep them. The categories are described in **Table 6**.

The Western Australian Organism List (WAOL) provides the status of organisms which have been categorised under the BAM Act (DAFWA 2016).

Table 4: Legal status of declared pest species listed under the BAM Act (DAFWA 2016)

Category	Description
Declared Pest Prohibited - s12	May only be imported and kept subject to permits. Permit conditions applicable to some species may only be appropriate or available to research organisations or similarly secure institutions.
Declared Pest s22(2)	Must satisfy any applicable import requirements when imported, and may be subject to an import permit if they are potential carriers of high-risk organisms. They may also be subject to control and keeping requirements once within Western Australia

Table 5: Control categories of declared pest species listed under the BAM Act (DAFWA 2016)

Category	Description
C1	Exclusion Not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2	Eradication Present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3	Management Established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

Additional Background Information

*Table 6: Keeping categories of declared pest species listed under the BAM Act (DAFWA 2016)*

Category	Description
Prohibited	Can only be kept under a permit for public display and education purposes, and/or genuine scientific research, by entities approved by the state authority.
Exempt	No permit or conditions are required for keeping.
Restricted	Organisms which, relative to other species, have a low risk of becoming a problem for the environment, primary industry or public safety and can be kept under a permit by private individuals.

Wetland Habitat

Geomorphic wetland types

On the Swan Coastal Plain DBCA (2017) have used the geomorphic wetland classification system developed by Semeniuk (1987) and Semeniuk and Semeniuk (1995) to classify wetlands based on the landform shape and water permanence (hydro-period) as outlined in **Table 7**. DBCA maintains a dataset of the *Geomorphic Wetlands of the Swan Coastal Plain* (DBCA 2018a).

Table 7: Geomorphic Wetlands of the Swan Coastal Plain classification categories (DBCA 2017)

Level of inundation	Geomorphology			
	Basin	Flat	Channel	Slope
Permanently inundated	Lake	-	River	-
Seasonally inundated	Sumpland	Floodplain	Creek	-
Seasonally waterlogged	Dampland	Palusplain	-	Paluslope

Literature

The main literature used for identifying fauna and fauna habitats is listed in **Table 8** below.

Table 8: Standard literature used for identifying fauna species and habitats.

Conservation Code	Category
Birds	Johnstone and Storr (1998b), Johnstone and Storr (1998a), Pizzey and Knight (2012), Slater <i>et al.</i> (2003)
Mammals	Menkhorst and Knight (2011), Triggs (2003)
Amphibia	Tyler and Doughty (2009), Bush <i>et al.</i> (2002)
Reptiles	Bush <i>et al.</i> (2002)

References

General references

Bush, B., Maryan, B., Browne-Cooper, R. and Robinson, D. 2002, *Reptiles and Frogs of the Perth Region*, UWA Press, Crawley.

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Johnstone, R. E. and Storr, G. M. 1998a, *Handbook of Western Australian Birds. Volume 2 - Passerines (Blue-Winged Pitta to Goldfinch)*, Western Australian Museum, Perth.

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Menkhorst, P. and Knight, F. 2011, *Field guide to the mammals of Australia (Third edition)*, Oxford University Press Australia & New Zealand, Melbourne, VIC, Australia.

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Appendix B

Database Search Results



NatureMap Species Report

Created By Guest user on 02/12/2020

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 114° 59' 36" E, 33° 59' 38" S
Buffer 10km
Group By Conservation Status

Conservation Status	Species	Records
Non-conservation taxon	369	5875
Other specially protected fauna	3	26
Presumed extinct	2	4
Priority 1	1	1
Priority 3	4	8
Priority 4	5	120
Protected under international agreement	5	26
Rare or likely to become extinct	22	993
TOTAL	411	7053

Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area
Rare or likely to become extinct				
1.	24209 <i>Arctocephalus tropicalis</i> (Subantarctic fur-seal)		T	
2.	24358 <i>Atrichornis clamosus</i> (Noisy Scrub-bird, tjimiluk)		T	
3.	34110 <i>Austroassiminea lethra</i> (Cape Leeuwin Freshwater Snail)		T	
4.	24049 <i>Balaenoptera musculus</i> subsp. <i>intermedia</i> (Antarctic Blue Whale)		T	
5.	24162 <i>Bettongia penicillata</i> subsp. <i>ogilbyi</i> (Woylie, Brush-tailed Bettong)		T	
6.	24731 <i>Calyptorhynchus banksii</i> subsp. <i>naso</i> (Forest Red-tailed Black Cockatoo)		T	
7.	24733 <i>Calyptorhynchus baudinii</i> (Baudin's Cockatoo, White-tailed Long-billed Black Cockatoo)		T	
8.	24734 <i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)		T	
9.	48400 <i>Calyptorhynchus</i> sp. (white-tailed black cockatoo)		T	
10.	25335 <i>Caretta caretta</i> (Loggerhead Turtle)		T	
11.	33940 <i>Cherax tenuimanus</i> (Margaret River hairy marron, Margaret River Marron)		T	
12.	24092 <i>Dasyurus geoffroyi</i> (Chuditch, Western Quoll)		T	
13.	34026 <i>Galaxiella munda</i> (mud minnow, western dwarf galaxias)		T	
14.	24557 <i>Leipoa ocellata</i> (Malleefowl)		T	
15.	24146 <i>Myrmecobius fasciatus</i> (Numbat, Walpurti)		T	
16.	48401 <i>Petrogale</i> sp. (rock wallaby)		T	
17.	24163 <i>Potorous gilbertii</i> (Gilbert's Potoroo)		T	
18.	24166 <i>Pseudocheirus occidentalis</i> (Western Ringtail Possum, ngwayir)		T	
19.	25579 <i>Psophodes nigrogularis</i> (Western Whipbird)		T	
20.	24388 <i>Psophodes nigrogularis</i> subsp. <i>nigrogularis</i> (Western Whipbird (western heath))		T	
21.	24145 <i>Setonix brachyurus</i> (Quokka)		T	
22.	34113 <i>Westralunio carteri</i> (Carter's Freshwater Mussel)		T	
Presumed extinct				
23.	24439 <i>Dasyornis broadbenti</i> subsp. <i>litoralis</i> (Rufous Bristlebird, Rufous Bristlebird (SW WA))		X	
24.	24164 <i>Potorous platyops</i> (Broad-faced Potoroo)		X	
Protected under international agreement				
25.	41323 <i>Actitis hypoleucos</i> (Common Sandpiper)		IA	
26.	24780 <i>Calidris alba</i> (Sanderling)		IA	
27.	24788 <i>Calidris ruficollis</i> (Red-necked Stint)		IA	
28.	48591 <i>Pandion cristatus</i> (Osprey, Eastern Osprey)		IA	
29.	48597 <i>Thalasseus bergii</i> (Crested Tern)		IA	
Other specially protected fauna				
30.	25624 <i>Falco peregrinus</i> (Peregrine Falcon)		S	
31.	24475 <i>Falco peregrinus</i> subsp. <i>macropus</i> (Australian Peregrine Falcon)		S	
32.	48070 <i>Phascogale tapoatafa</i> subsp. <i>wambenger</i> (South-western Brush-tailed Phascogale,		S	

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
	Wambenger)			
Priority 1				
33.	33980 <i>Kawaniphila pachomai</i> (Grey Vernal Katydid (southwest), cricket)		P1	
Priority 3				
34.	47873 <i>Bertmainius opimus</i> (western pygmy trapdoor spider)		P3	
35.	34030 <i>Geotria australis</i> (Pouched Lamprey)		P3	
36.	33995 <i>Trichosternus relictus</i> (a ground beetle (Margaret River), beetle)		P3	
37.	24855 <i>Tyto novaehollandiae</i> subsp. <i>novaehollandiae</i> (Masked Owl (southwest))		P3	
Priority 4				
38.	24215 <i>Hydromys chrysogaster</i> (Water-rat, Rakali)		P4	
39.	48588 <i>Isodon fusciventer</i> (Quenda, southwestern brown bandicoot)		P4	
40.	48024 <i>Notamacropus eugenii</i> subsp. <i>derbianus</i> (Tamar Wallaby, Tamar)		P4	
41.	48022 <i>Notamacropus irma</i> (Western Brush Wallaby)		P4	
42.	48135 <i>Thinornis rubricollis</i> (Hooded Plover, Hooded Dotterel)		P4	
Non-conservation taxon				
43.	<i>Acanthaluteres vittiger</i>			
44.	<i>Acanthistius pardalotus</i>			
45.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
46.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
47.	24262 <i>Acanthiza inornata</i> (Western Thornbill)			
48.	24560 <i>Acanthorhynchus superciliosus</i> (Western Spinebill)			
49.	<i>Acariformes</i> sp.			
50.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
51.	24281 <i>Accipiter cirrocephalus</i> subsp. <i>cirrocephalus</i> (Collared Sparrowhawk)			
52.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
53.	<i>Acritoptila globosa</i>			
54.	42368 <i>Acritoscincus trilineatus</i> (Western Three-lined Skink)			
55.	<i>Aeshnidae</i> sp.			
56.	<i>Afurcagobius suppositus</i>			
57.	<i>Akamptogonus novarae</i>			
58.	<i>Akamptogonus novarae?</i>			Y
59.	<i>Allothereua maculata</i>			
60.	<i>Alotanypus dalyupensis</i>			
61.	<i>Amphisopodidae</i> sp.			
62.	<i>Aname tepperi</i>			
63.	24312 <i>Anas gracilis</i> (Grey Teal)			
64.	24313 <i>Anas platyrhynchos</i> (Mallard)			
65.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
66.	<i>Ancylidae</i> sp.			
67.	47414 <i>Anhinga novaehollandiae</i> (Australasian Darter)			
68.	24088 <i>Antechinus flavipes</i> subsp. <i>leucogaster</i> (Yellow-footed Antechinus, Mardo)			
69.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
70.	24562 <i>Anthochaera lunulata</i> (Western Little Wattlebird)			
71.	24599 <i>Anthus australis</i> subsp. <i>australis</i> (Australian Pipit)			
72.	24990 <i>Aprasia pulchella</i> (Granite Worm-lizard)			
73.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
74.	<i>Aracana aurita</i>			
75.	<i>Arachnura higginsii</i>			
76.	<i>Araneus cyphoxis</i>			
77.	<i>Araneus eburneiventris</i>			
78.	<i>Araneus senicaudatus</i>			
79.	<i>Archaeosynthemis leachii</i>			
80.	<i>Archaeosynthemis occidentalis</i>			
81.	<i>Archaeosynthemis spiniger</i>			
82.	<i>Archichauliodes</i> sp.			
83.	<i>Argiope trifasciata</i>			
84.	<i>Arrenuridae</i> sp.			
85.	<i>Arripis georgiana</i>			
86.	<i>Arripis truttacea</i>			
87.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
88.	24353 <i>Artamus cyanopterus</i> (Dusky Woodswallow)			
89.	<i>Arteria cingulipes</i>			
90.	<i>Arteria flavimana</i>			
91.	<i>Arteria linnaei</i>			
92.	<i>Asadipus kunderang</i>			
93.	<i>Athericidae</i> sp.			
94.	<i>Atherinosoma wallacei</i>			
95.	<i>Aturidae</i> sp.			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
96.	<i>Austracantha minax</i>			
97.	<i>Australomimetes diabolicus</i>			
98.	<i>Australomimetes tasmaniensis</i>			
99.	<i>Austroaeschna anacantha</i>			
100.	<i>Austrochiltonia</i> sp.			
101.	<i>Baetidae</i> sp.			
102.	<i>Baiami tegenarioides</i>			
103.	<i>Baiami volucripes</i>			
104.	<i>Barnardius zonarius</i>			
105.	<i>Bibulmena kadjina</i>			
106.	<i>Bithyniidae</i> sp.			
107.	24319 <i>Biziura lobata</i> (Musk Duck)			
108.	<i>Botryocladus freemani</i>			
109.	25713 <i>Cacatua galerita</i> (Sulphur-crested Cockatoo)			
110.	24723 <i>Cacatua pastinator</i> subsp. <i>butleri</i> (Butler's Corella)			
111.	25598 <i>Cacomantis flabelliformis</i> (Fan-tailed Cuckoo)			
112.	24427 <i>Cacomantis flabelliformis</i> subsp. <i>flabelliformis</i> (Fan-tailed Cuckoo)			
113.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
114.	<i>Caenidae</i> sp.			
115.	25717 <i>Calyptorhynchus banksii</i> (Red-tailed Black-Cockatoo)			
116.	<i>Carassius auratus</i>			
117.	<i>Ceratopogonidae</i> sp.			
118.	24086 <i>Cercartetus concinnus</i> (Western Pygmy-possum, <i>Mundarda</i>)			
119.	<i>Cercophonius granulatus</i>			
120.	<i>Cercophonius sulcatus</i>			
121.	24187 <i>Chalinolobus morio</i> (Chocolate Wattled Bat)			
122.	<i>Chaussieria warregense</i>			
123.	43380 <i>Chelodina colliei</i> (South-western Snake-necked Turtle)			
124.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
125.	33939 <i>Cherax cainii</i> (Marron)			
126.	<i>Cherax quinquecarinatus</i>			
127.	<i>Chironominae</i> sp.			
128.	<i>Chironomus</i> aff. <i>alternans</i> (V24) (CB)			
129.	<i>Chironomus tepperi</i>			
130.	24980 <i>Christinus marmoratus</i> (Marbled Gecko)			
131.	<i>Chroicocephalus novaehollandiae</i>			
132.	24432 <i>Chrysococcyx lucidus</i> subsp. <i>plagosus</i> (Shining Bronze Cuckoo)			
133.	24288 <i>Circus approximans</i> (Swamp Harrier)			
134.	<i>Cladocera</i> (non-daphniidae)			
135.	<i>Cladocera</i> (unident.)			
136.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
137.	<i>Conicochernes crassus</i>			
138.	<i>Copepoda</i> sp.			
139.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
140.	<i>Corduliidae</i> sp.			
141.	<i>Coris auricularis</i>			
142.	<i>Corixidae</i> sp.			
143.	<i>Cormocephalus aurantipes</i>			
144.	<i>Cormocephalus hartmeyerii</i>			
145.	<i>Cormocephalus strigosus</i>			
146.	25592 <i>Corvus coronoides</i> (Australian Raven)			
147.	24417 <i>Corvus coronoides</i> subsp. <i>perplexus</i> (Australian Raven)			
148.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
149.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
150.	<i>Cricotopus 'parbicinctus'</i>			
151.	25398 <i>Crinia georgiana</i> (Quacking Frog)			
152.	25399 <i>Crinia glauerti</i> (Clicking Frog)			
153.	<i>Cristiceps australis</i>			
154.	30893 <i>Cryptoblepharus buchananii</i>			
155.	25047 <i>Ctenotus impar</i>			
156.	25049 <i>Ctenotus labillardieri</i>			
157.	<i>Culicidae</i> sp.			
158.	<i>Cyclosa trilobata</i>			
159.	30901 <i>Dacelo novaeguineae</i> (Laughing Kookaburra)	Y		
160.	<i>Dactylophora nigricans</i>			
161.	25673 <i>Daphoenositta chrysoptera</i> (Varied Sittella)			
162.	<i>Dicrotendipes</i> sp. A (V47) (SAP)			
163.	<i>Dytiscidae</i> sp.			
164.	25251 <i>Echiopsis curta</i> (Bardick)			
165.	<i>Edelia vittata</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
166.	25096 <i>Egernia kingii</i> (King's Skink)			
167.	25100 <i>Egernia napoleonis</i>			
168.	<i>Egretta novaehollandiae</i>			
169.	<i>Elanus axillaris</i>			
170.	25250 <i>Elapognathus coronatus</i> (Crowned Snake)			
171.	47937 <i>Elseymornis melanops</i> (Black-fronted Dotterel)			
172.	<i>Empididae</i> sp.			
173.	<i>Enchytraeidae</i> sp.			
174.	<i>Eolophus roseicapillus</i>			
175.	24651 <i>Eopsaltria australis</i> subsp. <i>griseogularis</i> (Western Yellow Robin)			
176.	24652 <i>Eopsaltria georgiana</i> (White-breasted Robin)			
177.	<i>Ephydriidae</i> sp.			
178.	24567 <i>Epthianura albifrons</i> (White-fronted Chat)			
179.	24258 <i>Equus caballus</i> (Horse)	Y		
180.	<i>Eriophora biapicata</i>			
181.	25621 <i>Falco berigora</i> (Brown Falcon)			
182.	25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
183.	25623 <i>Falco longipennis</i> (Australian Hobby)			
184.	24041 <i>Felis catus</i> (Cat)	Y		
185.	25727 <i>Fulica atra</i> (Eurasian Coot)			
186.	34028 <i>Galaxias occidentalis</i> (Western Minnow)			
187.	25404 <i>Geocrinia leai</i> (Ticking Frog)			
188.	<i>Geogarypus taylori</i>			
189.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
190.	<i>Glossiphoniidae</i> sp.			
191.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
192.	<i>Gripopterygidae</i> sp.			
193.	<i>Gyrinidae</i> sp.			
194.	25627 <i>Haematopus fuliginosus</i> (Sooty Oystercatcher)			
195.	24487 <i>Haematopus longirostris</i> (Pied Oystercatcher)			
196.	<i>Halichoeres brownfieldi</i>			
197.	24296 <i>Hamirostra isura</i> (Square-tailed Kite)			
198.	<i>Harrisius</i> sp. B (SFM)			
199.	25410 <i>Heleioporus eyrei</i> (Moaning Frog)			
200.	25411 <i>Heleioporus inornatus</i> (Whooping Frog)			
201.	<i>Hemicorduliidae</i> sp.			
202.	30919 <i>Hemiergis gracilipes</i> (skink)			
203.	25118 <i>Hemiergis peronii</i> subsp. <i>tridactyla</i>			
204.	<i>Henicops dentatus</i>			
205.	<i>Heterodontus portusjacksoni</i>			
206.	47965 <i>Hieraaetus morphnoides</i> (Little Eagle)			
207.	<i>Hippocampus</i> sp.			
208.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
209.	<i>Holasteron aspinosum</i>			
210.	<i>Hydraenidae</i> sp.			
211.	<i>Hydrobiosidae</i> sp.			
212.	<i>Hydrophilidae</i> sp.			
213.	43384 <i>Hydrophis platurus</i> (Yellow-bellied Seasnake)			
214.	<i>Hydropsychidae</i> sp.			
215.	<i>Hydroptilidae</i> sp.			
216.	<i>Isopeda leishmanni</i>			
217.	<i>Ixodes australiensis</i>			
218.	<i>Kiefferulus interinctus</i>			
219.	24511 <i>Larus novaehollandiae</i> subsp. <i>novaehollandiae</i> (Silver Gull)			
220.	25638 <i>Larus pacificus</i> (Pacific Gull)			
221.	<i>Lectrides parilis</i>			
222.	<i>Lepidoperca occidentalis</i>			
223.	<i>Lepidoptera</i> (non-pyralid)			
224.	<i>Leptoceridae</i> sp.			
225.	<i>Leptoperla australica</i>			
226.	<i>Leptophlebiid</i> genus S sp. AV1			
227.	<i>Leptophlebiidae</i> sp.			
228.	25131 <i>Lerista distinguenda</i>			
229.	25133 <i>Lerista elegans</i>			
230.	25155 <i>Lerista muelleri</i>			
231.	25005 <i>Lialis burtonis</i>			
232.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
233.	24582 <i>Lichmera indistincta</i> subsp. <i>indistincta</i> (Brown Honeyeater)			
234.	25415 <i>Limnodynastes dorsalis</i> (Western Banjo Frog)			
235.	25378 <i>Litoria adelaidensis</i> (Slender Tree Frog)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
236.	25388 <i>Litoria moorei</i> (Motorbike Frog)			
237.	<i>Lophoictinia isura</i>			
238.	<i>Lymnaeidae</i> sp.			
239.	24132 <i>Macropus fuliginosus</i> (Western Grey Kangaroo)			
240.	25650 <i>Malurus elegans</i> (Red-winged Fairy-wren)			
241.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
242.	<i>Maratus pavonis</i>			
243.	<i>Megaloptera</i> sp.			
244.	<i>Megapodagrionidae</i> sp.			
245.	25663 <i>Melithreptus brevirostris</i> (Brown-headed Honeyeater)			
246.	24587 <i>Melithreptus chloropsis</i> (Western White-naped Honeyeater)			
247.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)			
248.	24078 <i>Mesoplodon grayi</i> (Gray's Beaked Whale)			
249.	<i>Mesoveliidae</i> sp.			
250.	<i>Meuschenia flavolineata</i>			
251.	<i>Meuschenia galii</i>			
252.	<i>Meuschenia hippocrepis</i>			
253.	<i>Microcarbo melanoleucos</i>			
254.	<i>Microvelia</i> (<i>Austromicrovelia</i>) <i>australiensis</i>			
255.	<i>Microvelia</i> sp.			
256.	24213 <i>Mirounga leonina</i> (Southern Elephant Seal)			
257.	<i>Missulena granulosa</i>			
258.	<i>Mituliodon tarantulinus</i>			
259.	25240 <i>Morelia spilota</i> subsp. <i>imbricata</i> (Carpet Python)			
260.	25191 <i>Morethia lineocellata</i>			
261.	25192 <i>Morethia obscura</i>			
262.	48008 <i>Morus serrator</i> (Australasian Gannet)			
263.	25610 <i>Myiagra inquieta</i> (Restless Flycatcher)			
264.	<i>Naididae</i> sp.			
265.	<i>Nannoperca vittata</i>			
266.	<i>Naucrates ductor</i>			
267.	<i>Neboissophlebia occidentalis</i>			
268.	<i>Nematoda</i> sp.			
269.	<i>Neopataecus waterhousii</i>			
270.	24738 <i>Neophema elegans</i> (Elegant Parrot)			
271.	24739 <i>Neophema petrophila</i> (Rock Parrot)			
272.	<i>Newmanoperla exigua</i>			
273.	<i>Notalina</i> sp.			
274.	<i>Notalina</i> sp. AV15 (PSW)			
275.	<i>Notoperata tenax</i>			
276.	<i>Nousia</i> sp. AV16			
277.	<i>Nunciella aspera</i>			
278.	25564 <i>Nycticorax caledonicus</i> (Rufous Night Heron)			
279.	24194 <i>Nyctophilus geoffroyi</i> (Lesser Long-eared Bat)			
280.	<i>Nyungara bunny</i>			
281.	<i>Ochthebius</i> sp.			
282.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
283.	<i>Odax acroptilus</i>			
284.	<i>Oligochaeta</i> sp.			
285.	<i>Oniscidae</i> sp.			
286.	<i>Orthocladinae</i> 'woodminer' (SAP)			
287.	<i>Orthocladinae</i> sp.			
288.	<i>Ostracoda</i> (<i>unident.</i>)			
289.	<i>Oxidae</i> sp.			
290.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
291.	<i>Palaemonidae</i> sp.			
292.	<i>Paralimnophyes pullulus</i> (V42)			
293.	<i>Paramerina levidensis</i>			
294.	<i>Parastacidae</i> sp.			
295.	25253 <i>Parasuta gouldii</i>			
296.	25255 <i>Parasuta nigriceps</i>			
297.	25681 <i>Pardalotus punctatus</i> (Spotted Pardalote)			
298.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
299.	24630 <i>Pardalotus striatus</i> subsp. <i>westraliensis</i> (Striated Pardalote)			
300.	24674 <i>Pavo cristatus</i> (Common Peafowl, Indian Peafowl)	Y		
301.	<i>Pelsartia humeralis</i>			
302.	<i>Pentasteron intermedium</i>			
303.	<i>Perthiidae</i> sp.			
304.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
305.	48066 <i>Petroica boodang</i> (Scarlet Robin)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
306.	25697 <i>Phalacrocorax carbo</i> (Great Cormorant)			
307.	24667 <i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)			
308.	25699 <i>Phalacrocorax varius</i> (Pied Cormorant)			
309.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
310.	25587 <i>Phaps elegans</i> (Brush Bronzewing)			
311.	<i>Phreatoicidae</i> sp.			
312.	<i>Phreodrilidae</i> sp.			
313.	48071 <i>Phylidonyris niger</i> (White-cheeked Honeyeater)			
314.	24596 <i>Phylidonyris novaehollandiae</i> (New Holland Honeyeater)			
315.	<i>Pictilabrus laticlavus</i>			
316.	<i>Planorbidae</i> sp.			
317.	<i>Platycephalus</i> sp.			
318.	25720 <i>Platycercus icterotis</i> (Western Rosella)			
319.	24745 <i>Platycercus icterotis</i> subsp. <i>icterotis</i> (Western Rosella)			
320.	24747 <i>Platycercus spurius</i> (Red-capped Parrot)			
321.	24750 <i>Platycercus zonarius</i> subsp. <i>semitorquatus</i> (Twenty-eight Parrot)			
322.	25703 <i>Podargus strigoides</i> (Tawny Frogmouth)			
323.	24907 <i>Pogona minor</i> subsp. <i>minor</i> (Dwarf Bearded Dragon)			
324.	<i>Polypedilum</i> nr. <i>convexum</i> (SAP)			
325.	<i>Polypedilum watsoni</i>			
326.	25722 <i>Polytelis anthopeplus</i> (Regent Parrot)			
327.	25731 <i>Porphyrio porphyrio</i> (Purple Swamphen)			
328.	24771 <i>Porzana tabuensis</i> (Spotless Crane)			
329.	<i>Prionosternum nitidiceps</i>			
330.	<i>Protochelifer cavernarum</i>			
331.	<i>Pseudogobius olorum</i>			
332.	25259 <i>Pseudonaja affinis</i> subsp. <i>affinis</i> (Dugite)			
333.	<i>Pseudotyranochthonius giganteus</i>			
334.	<i>Pterygotrigla polyommata</i>			
335.	<i>Purpureicephalus spurius</i>			
336.	25008 <i>Pygopus lepidopodus</i> (Common Scaly Foot)			
337.	<i>Pyralidae</i> sp.			
338.	24243 <i>Rattus fuscipes</i> (Western Bush Rat)			
339.	24245 <i>Rattus rattus</i> (Black Rat)	Y		
340.	<i>Raveniella peckorum</i>			
341.	<i>Rheotanytarsus</i> sp. (SFM)			
342.	<i>Rheotanytarsus trivittatus</i>			
343.	<i>Rheotanytarsus underwoodi</i>			
344.	30818 <i>Rhinoplocephalus bicolor</i> (Square-nosed Snake)			
345.	48096 <i>Rhipidura albiscapa</i> (Grey Fantail)			
346.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
347.	<i>Richardsonianidae</i> sp.			
348.	<i>Riekoperla occidentalis</i>			
349.	<i>Riethia</i> v4			
350.	<i>Schuettea woodwardi</i>			
351.	<i>Scirtidae</i> sp.			
352.	<i>Scobinichthys granulatus</i>			
353.	<i>Scolopendra laeta</i>			
354.	25534 <i>Sericornis frontalis</i> (White-browed Scrubwren)			
355.	24279 <i>Sericornis frontalis</i> subsp. <i>maculatus</i> (White-browed Scrubwren)			
356.	<i>Simaetha tenuior</i>			
357.	<i>Simuliidae</i> sp.			
358.	<i>Siphonognathus beddomei</i>			
359.	<i>Siphonotus flavomarginatus</i>			
360.	<i>Skusella</i> "V12 ex-WA" (Cranston)			
361.	24109 <i>Sminthopsis dolichura</i> (Little long-tailed Dunnart)			
362.	24111 <i>Sminthopsis gilberti</i> (Gilbert's Dunnart)			
363.	<i>Spinicrus minimus</i>			
364.	<i>Spinicrus porongorupensis</i>			
365.	24645 <i>Stagonopleura oculata</i> (Red-eared Firetail)			
366.	<i>Staphylinidae</i> sp.			
367.	<i>Steatoda grossa</i>			
368.	24522 <i>Sterna bergii</i> (Crested Tern)			
369.	<i>Sternopriscus</i> sp.			
370.	25655 <i>Stipiturus malachurus</i> (Southern Emu-wren)			
371.	24554 <i>Stipiturus malachurus</i> subsp. <i>westernensis</i> (Southern Emu-wren)			
372.	<i>Storosa tetrica</i>			
373.	<i>Stratiomyidae</i> sp.			
374.	25597 <i>Strepera versicolor</i> (Grey Currawong)			
375.	<i>Supunna picta</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
376.	<i>Synthemistidae</i> sp.			
377.	<i>Tabanidae</i> sp.			
378.	25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
379.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
380.	<i>Talitridae</i> sp.			
381.	<i>Tamopsis perthensis</i>			
382.	<i>Tanypodinae</i> sp.			
383.	<i>Tanytarsus aff manleyensis</i>			
384.	<i>Tanytarsus nr K5</i>			
385.	<i>Tanytarsus palmatus</i>			
386.	<i>Taphiassa robertsi</i>			
387.	24167 <i>Tarsipes rostratus</i> (Honey Possum, Noolbenger)			
388.	<i>Tasmanicosa leuckartii</i>			
389.	<i>Tasmanocoenis tillyardi</i>			
390.	<i>Telephlebiidae</i> sp.			
391.	<i>Temnocephalidea</i> sp.			
392.	<i>Thaumaleidae</i> sp.			
393.	<i>Thienemanniella</i> sp. (V19) (SAP)			
394.	24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)			
395.	25519 <i>Tiliqua rugosa</i>			
396.	25207 <i>Tiliqua rugosa</i> subsp. <i>rugosa</i>			
397.	<i>Tipulidae</i> sp.			
398.	25549 <i>Todiramphus sanctus</i> (Sacred Kingfisher)			
399.	25521 <i>Trichosurus vulpecula</i> (Common Brushtail Possum)			
400.	24158 <i>Trichosurus vulpecula</i> subsp. <i>vulpecula</i> (Common Brushtail Possum)			
401.	<i>Triplectides</i> sp. AV1 (SFM)			
402.	<i>Triplectides</i> sp. AV21 (SFM)			
403.	48147 <i>Turnix varius</i> (Painted Button-quail)			
404.	25764 <i>Tyto novaehollandiae</i> (Masked Owl)			
405.	<i>Urodacus novaehollandiae</i>			
406.	25225 <i>Varanus rosenbergi</i> (Heath Monitor)			
407.	<i>Velliidae</i> sp.			
408.	<i>Venator immansueta</i>			
409.	24206 <i>Vespadelus regulus</i> (Southern Forest Bat)			
410.	24040 <i>Vulpes vulpes</i> (Red Fox)	Y		
411.	25765 <i>Zosterops lateralis</i> (Grey-breasted White-eye, Silvereye)			

Conservation Codes

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

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



EPBC Act Protected Matters Report

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

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

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

Report created: 07/09/20 15:01:33

[Summary](#)

[Details](#)

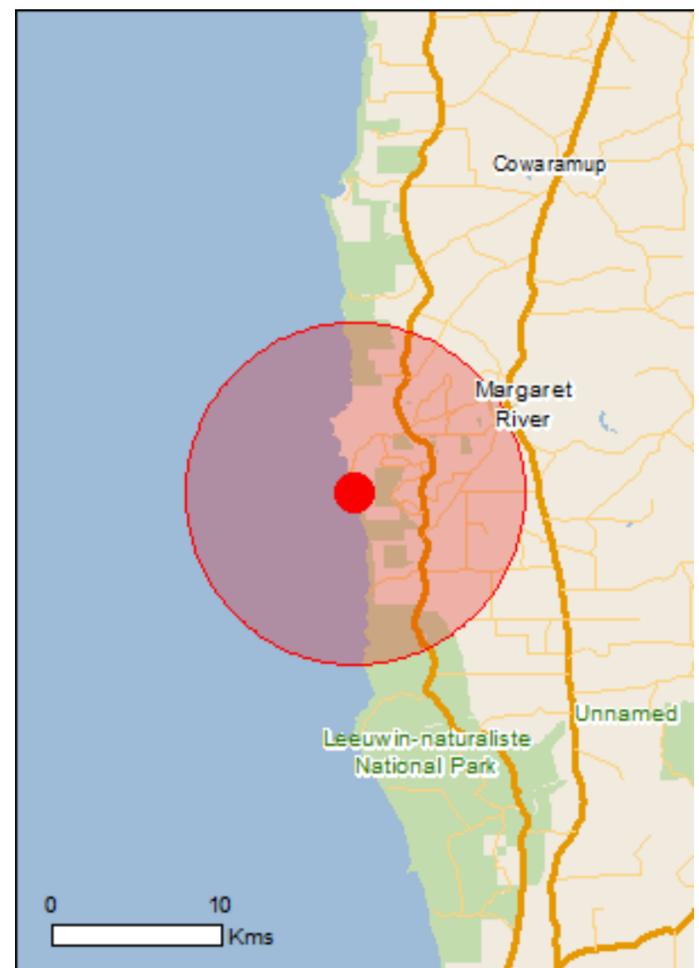
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

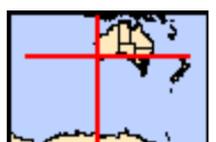
[Acknowledgements](#)



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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](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	56
Listed Migratory Species:	41

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	65
Whales and Other Cetaceans:	13
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	2

Extra Information

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

State and Territory Reserves:	5
Regional Forest Agreements:	1
Invasive Species:	24
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	1

Details

Matters of National Environmental Significance

Commonwealth Marine Area

[\[Resource Information \]](#)

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside the Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area. Generally the Commonwealth Marine Area stretches from three nautical miles to two hundred nautical miles from the coast.

Name

EEZ and Territorial Sea

Marine Regions

[\[Resource Information \]](#)

If you are planning to undertake action in an area in or close to the Commonwealth Marine Area, and a marine bioregional plan has been prepared for the Commonwealth Marine Area in that area, the marine bioregional plan may inform your decision as to whether to refer your proposed action under the EPBC Act.

Name

[South-west](#)

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
Aquatic Root Mat Community 4 in Caves of the Leeuwin Naturaliste Ridge	Endangered	Community known to occur within area

Listed Threatened Species

[\[Resource Information \]](#)

Name	Status	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Breeding known to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	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
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Crustaceans		
Cherax tenuimanus Hairy Marron, Margaret River Hairy Marron, Margaret River Marron [78931]	Critically Endangered	Species or species habitat may occur within area
Frogs		
Geocrinia alba White-bellied Frog, Creek Frog [26181]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat known to occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat may occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat known to occur within area
Setonix brachyurus Quokka [229]	Vulnerable	Species or species habitat known to occur within area
Other		
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area
Plants		
Banksia nivea subsp. uliginosa Swamp Honey-pot [82766]	Endangered	Species or species habitat may occur within area
Banksia squarrosa subsp. argillacea Whicher Range Dryandra [82769]	Vulnerable	Species or species habitat may occur within area
Caladenia excelsa Giant Spider-orchid [56717]	Endangered	Species or species habitat likely to occur within area
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat may occur within area
Caladenia lodgeana Lodge's Spider-orchid [68664]	Critically Endangered	Species or species habitat known to occur within area
Calectasia cyanea Blue Tinsel Lily [7669]	Critically Endangered	Species or species habitat may occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat may occur within area
Gastrolobium papilio Butterfly-leaved Gastrolobium [78415]	Endangered	Species or species habitat may occur within area
Lambertia echinata subsp. occidentalis Western Prickly Honeysuckle [64528]	Endangered	Species or species habitat may occur within area
Sphenotoma drummondii Mountain Paper-heath [21160]	Endangered	Species or species habitat may occur within area

Reptiles

Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Sharks

Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat known to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	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
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species

Name	Threatened	Type of Presence
Diomedea dabbenena Tristan Albatross [66471]	Endangered	habitat may occur within area Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Hydroprogne caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Onychoprion anaethetus Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Breeding known to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within

Name	Threatened	Type of Presence area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	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 may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area

Other Matters Protected by the EPBC Act

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

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may 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 may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		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
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Sterna anaethetus Bridled Tern [814]		Foraging, feeding or

Name	Threatened	Type of Presence
Sterna caspia Caspian Tern [59467]		related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat known to occur within area
Fish		
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus subelongatus West Australian Seahorse [66722]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species

Name	Threatened	Type of Presence
Mitotichthys meraculus Western Crested Pipefish [66259]		habitat may occur within area Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species

Name	Threatened	Type of Presence
habitat known to occur within area		
Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Australian Marine Parks		[Resource Information]
Name	Label	
South-west Corner	National Park Zone (IUCN II)	
South-west Corner	Special Purpose Zone (Mining)	

Extra Information

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

Name	State
Bramley	WA
Leeuwin-Naturaliste	WA
NTWA Bushland covenant (0003)	WA
NTWA Bushland covenant (0144)	WA
NTWA Bushland covenant (0147)	WA

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

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	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
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Birds

Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
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Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
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Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
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Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
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Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
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Mammals

Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
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Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
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Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
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Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
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Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
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Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
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Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur
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Name	Status	Type of Presence within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area

Plants

Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		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
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to 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
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

Key Ecological Features (Marine) [\[Resource Information \]](#)

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region
Western rock lobster	South-west

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-33.99385 114.99347

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 C

Conservation Significant Species and Likelihood of Occurrence Assessment



Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Geocrinia alba</i>	White-bellied frog	CR	CR	Swampy flows along drainage depressions in an area of subdued topography (relief < 80m) near the junction of the Leeuwin-Naturaliste Ridge and Blackwood Plateau. Breeding sites are typically associated with sandy soils, dense overstorey vegetation dominated by Homalospermum firmum, Agonis linearifolia, Astartea fascicularis, and a dense ground layer of rhizomatous vegetation, usually composed of Pseudoloxocarya sp., Loxocarya sp. and Tetrarrhena laevis (DPAW 2014).	Unlikely Site is located outside of the species known distribution range.
<i>Anous tenuirostris melanops</i>	Australian lesser noddy	EN	VU	Very common in blue-water seas around the Abrolhos (endemic to this area, accidental occurrences on lower west coast of Australia) (Johnstone and Storr 1998).	Unlikely No suitable habitat present.
<i>Apus pacificus</i>	Pacific swift	MI	MI	Aerial, migratory species that is most often seen over inland plains and sometimes above open areas, foothills or in coastal areas. Sometimes occurs over settled areas, including towns, urban areas and cities (Pizzey & Knight 2012).	Possible May opportunistically occur in or fly over the site on commute or while searching for prey.
<i>Ardenna carneipes</i>	Flesh-footed shearwater	VU	MI	Marine species that breeds on islands off south coast from near Cape Leeuwin (Johnstone and Storr 1998).	Unlikely No suitable habitat present.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Atrichornis clamosus</i>	Noisy scrub-bird	EN	EN	Dense heath, rushes, tall sedges, under stunted scrubby trees of gullies in coastal hills and dense thickets around coastal sandplain swamps. Species occurs on the south-coast of Western Australia, from Two Peoples Bay Nature Reserve to Cheynes Beach (DPAW 2014).	Unlikely Site is located outside of the species known distribution range.
<i>Botaurus poiciloptilus</i>	Australasian bittern	EN	EN	In or over water, in tall reedbeds, sedges, rushes, cumbungi, lignum. Also occurs in ricefields, drains in tussocky paddocks and occasionally in saltmarshes and brackish wetlands.	Unlikely No suitable habitat present.
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	MI	MI	Occurs in tidal mudflats, saltmarshes and mangroves, as well as, shallow fresh, brackish or saline inland wetlands. It is also known from floodwaters, irrigated pastures and crops, sewage ponds, saltfields.	Unlikely No suitable habitat present.
<i>Calidris alba</i>	Sanderling	MI	MI	Mainly steeply shelving sandy beaches exposed to ocean swell. Also sandy inlets, estuarine sandbanks and near-coastal saltlakes (including saltwork ponds) (Johnstone & Storr 1998).	Unlikely No suitable habitat present.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Calidris canutus</i>	Red knot	EN	EN (MI)	Mud and sand flats in estuaries and on sheltered coasts. Also near-coastal saltlakes, including saltwork ponds.	Unlikely No suitable habitat present.
<i>Calidris ferruginea</i>	Curlew sandpiper	CR	CR (MI)	Mainly shallows of estuaries and near-coastal saltlakes (including saltwork ponds) and drying near-coastal freshwater lakes and swamps. Also beaches and near-coastal sewage ponds.	Unlikely No suitable habitat present.
<i>Calidris melanotos</i>	Pectoral sandpiper	MI	MI	Mainly fresh waters (swamps, lagoons, river pools, irrigation channels and sewage ponds); also samphire flats around estuaries and saltlakes (Johnstone & Storr 1998).	Unlikely No suitable habitat present.
<i>Calidris ruficollis</i>	Red-necked stint	MI	MI	Tidal mudflats, saltmarshes, sandy or shelly beaches, saline and freshwater wetlands (coastal and inland), saltfields, sewage ponds (Pizzey and Knight 2012).	Unlikely No suitable habitat present.
<i>Calyptorhynchus banksii naso</i>	Forest red-tailed black cockatoo	VU	VU	Eucalypt and Corymbia forests, often in hilly interior. More recently also observed in more open agricultural and suburban areas including Perth metropolitan area. Attracted to seeding Corymbia calophylla, Eucalyptus marginata, introduced Melia azdarach and Eucalyptus spp. trees.	Unlikely No suitable habitat present. No plant species known to be consumed by this species were recorded in the site.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Calyptorhynchus baudinii</i>	Baudin's cockatoo	EN	EN	Mainly eucalypt forests. Attracted to seeding <i>Corymbia calophylla</i> , <i>Banksia</i> spp., <i>Hakea</i> spp., and to fruiting apples and pears (Johnstone and Storr 1998).	Unlikely No suitable habitat present. No plant species known to be consumed by this species were recorded in the site.
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	EN	EN	Mainly proteaceous scrubs and heaths and adjacent eucalypt woodlands and forests; also plantations of <i>Pinus</i> spp. Attracted to seeding <i>Banksia</i> spp., <i>Dryandra</i> spp., <i>Hakea</i> spp., <i>Eucalyptus</i> spp., <i>Corymbia calophylla</i> , <i>Grevillea</i> spp., and <i>Allocasuarina</i> spp. (Johnstone and Storr 1998).	Recorded (fly-over only) Potential foraging habitat (peppermint trees and shrubs) present.
<i>Diomedea amsterdamensis</i>	Amsterdam albatross	CR	EN (MI)	The Amsterdam albatross is a marine, pelagic seabird. It nests in open patchy vegetation (among tussocks, ferns or shrubs) near exposed ridges or hillocks (Weimerskirch et al. 1985). It sleeps and rests on ocean waters when not breeding (Marchant and Higgins 1990).	Unlikely No suitable habitat present.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Diomedea dabbenena</i>	Tristan albatross	CR	EN (MI)	The Tristan albatross is a marine, pelagic seabird. It forages in open water in the Atlantic Ocean near the Cape of Good Hope, South Africa. It sleeps and rests on ocean waters when not breeding (Marchant and Higgins 1990).	Unlikely No suitable habitat present.
<i>Diomedea epomophora</i>	Southern royal albatross	VU	VU (MI)	Rare visitor to Western Australian seas; it breeds on subantarctic islands south of New Zealand (Johnstone and Storr 1998).	Unlikely No suitable habitat present.
<i>Diomedea exulans</i>	Wandering albatross	VU	VU (MI)	Marine, pelagic and aerial species. It breeds on Macquarie Island and feeds in Australian portions of the Southern Ocean (DoE 2018).	Unlikely No suitable habitat present.
<i>Diomedea sanfordi</i>	Northern royal albatross	EN	EN	Species is marine, pelagic and aerial. Habitat includes subantarctic, subtropical, and occasionally Antarctic waters (Marchant & Higgins 1990). Rare visitors to south Western Australian waters.	Unlikely No suitable habitat present.
<i>Falco peregrinus</i>	Peregrine falcon	OS	-	Mainly found around cliffs along coasts, rivers, ranges and around wooded watercourses and lakes (Johnstone and Storr 1998).	Possible May opportunistically occur in or fly over the site on commute or while searching for prey.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Halobaena caerulea</i>	Blue petrel	MI	VU (MI)	Marine species that breeds on southern subantarctic and northern arctic islands. Only an accidental or uncommon visitor to Western Australian waters (Johnstone & Storr 1998).	Unlikely No suitable habitat present.
<i>Ixobrychus flavicollis australis</i>	Black bittern	P2	-	Freshwater pools, swamps and lagoons, well-screened with trees. Occasionally feeding by day but mainly sheltering in dense waterside vegetation (Melaleuca spp., Eucalyptus camaldulensis, Pandanus spp. and long grass) (Johnstone and Storr 1998).	Unlikely No suitable habitat present.
<i>Leipoa ocellata</i>	Mallefowl	VU	VU	Scrubs and thickets of Eucalyptus spp., Melaleuca lanceolata and Acacia linophylla; also other dense litter-forming shrublands. Attracted to fallen wheat in stubbles and along roads (Johnstone and Storr 1998).	Unlikely Species locally extinct.
<i>Limosa lapponica</i>	Bar-tailed godwit	CR at	MI	Estuarine sand and mudflats and sandy beaches with loads of seaweed; also reef flats and near-coastal saltlakes (including saltwork ponds) (Johnstone and Storr 1998).	Unlikely No suitable habitat present.
<i>Limosa lapponica baueri</i>	Bar-tailed godwit	VU	VU	Estuarine sand and mudflats and sandy beaches with loads of seaweed; also reef flats and near-coastal saltlakes (including saltwork ponds) (Johnstone and Storr 1998).	Unlikely No suitable habitat present.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Limosa lapponica menzbieri</i>	Bar-tailed godwit	CR	CR	Mainly coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. Has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (Higgins and Davies 1996).	Unlikely No suitable habitat present.
<i>Macronectes giganteus</i>	Southern giant-petrel	MI	EN (MI)	Breeds on southern subantarctic and antarctic islands. May visit Western Australian waters from February to December (mostly June to September) (Johnstone and Storr 1998).	Unlikely No suitable habitat present.
<i>Macronectes halli</i>	Northern giant petrel	MI	VU (MI)	Breeds on subantarctic islands. May visit Western Australian water from February to September (Johnstone and Storr 1998).	Unlikely No suitable habitat present.
<i>Numenius madagascariensis</i>	Eastern curlew	CR	CR (MI)	Mainly tidal mudflats; also reef flats, sandy beaches and rarely near-coastal lakes (including saltwork ponds) (Johnstone and Storr 1998).	Unlikely No suitable habitat present.
<i>Onychoprion anaethetus</i>	Bridled tern	MI	MI	Tropical and subtropical seas, offshore islands, rarely coasts (Pizzey & Knight).	Unlikely No suitable habitat present.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Pachyptila turtur subantarctica</i>	Fairy prion	-	VU	Breeds on subantarctic islands and is presumed to frequent subtropical waters during non-breeding period (TSSC 2015).	Unlikely No suitable habitat present.
<i>Pandion cristatus</i>	Osprey	MI	MI	Coasts, estuaries, bays, inlets, islands, and surrounding waters; coral atolls, reefs, lagoons, rock cliffs, stacks (Pizzey & Knight 2012).	Possible May opportunistically occur in or fly over the site on commute or while searching for prey.
<i>Phoebastria fusca</i>	Sooty albatross	EN	VU (MI)	Marine, pelagic species that tolerates a wide range of sea surface temperatures and salinities. breeds on subtropical and subantarctic islands in the Indian and Atlantic Oceans, on vegetated cliffs and steep slopes that are sheltered from prevailing winds, often amongst tussock grass.	Unlikely No suitable habitat present.
<i>Psophodes nigrogularis nigrogularis</i>	Western Whipbird	EN	EN	Dense scrub of heath, mallee and broombush (Macrombe & Stewart 2004). Species range is restricted to a small area east of Albany Western Australia.	Unlikely Species locally extinct.
<i>Pterodroma mollis</i>	Soft-plumaged petrel	MI	VU (MI)	Marine species that breeds on temperate and subantarctic islands in south Atlantic and south Indian Ocean. Visitor to West Australian waters from March to September. Rarely observed inshore (Johnstone & Storr 1998).	Unlikely No suitable habitat present.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Sterna caspia</i>	Caspian tern	MI	MI	Mainly sheltered areas, estuaries (when not laden with silt) and tidal creeks; occasionally near-coastal saltlakes (including saltwork ponds) and brackish pools in lower courses of rivers; rarely fresh waters.	Unlikely No suitable habitat present.
<i>Sternula nereis nereis</i>	Australian fairy tern	VU	VU	Sheltered blue-water seas close to land, estuaries (when free of silt) and near-coastal lakes (Johnstone and Storr 1998).	Unlikely No suitable habitat present.
<i>Thalassarche carteri</i>	Indian yellow-nosed albatross	EN	VU (MI)	Marine species that inhabits seas of south and west coast of Western Australia and breeds on islands in the south Indian Ocean and in the south Atlantic (Johnstone & Storr 1998).	Unlikely No suitable habitat present.
<i>Thalassarche cauta</i>	Shy albatross	VU	VU (MI)	Scarce visitor (late May to mid-October) to southwestern and western seas. Breeds on islands off Tasmania and south New Zealand (Johnstone and Storr 1998).	Unlikely No suitable habitat present.
<i>Thalassarche impavida</i>	Campbell albatross	VU	VU (MI)	Scarce visitor to south western and western seas. Breeds on Campbell island.	Unlikely No suitable habitat present.
<i>Thalassarche melanophris</i>	Black-browed albatross	EN	VU (MI)	Seas of south and west coasts. Visitor to Western Australian mainland from January to early November (mostly May to September). Breeds on southern subantarctic and antarctic islands (Johnstone and Storr 1998).	Unlikely No suitable habitat present.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Thalassarche steadi</i>	White-capped albatross	VU	VU (MI)	Marine species that occurs in subantarctic and subtropical waters. It reaches tropical areas associated with the cool Humboldt Current off South America (Marchant & Higgins 1990). The species has been noted in shelf-waters around breeding islands and over adjacent rises. During the non-breeding season, birds have been observed over continental shelves around continents. The species occurs both inshore and offshore (Marchant 1977) and enters harbours and bays (Jehl 1973). Birds gather to scavenge at commercial fishing grounds.	Unlikely No suitable habitat present.
<i>Thalasseus bergii</i>	Crested tern	MI	MI	Mainly blue-water seas (especially within 3 km of land), including southern estuaries in summer and autumn (when free of silt); also tidal creeks in north, but not penetrating far into larger estuaries.	Unlikely No suitable habitat present.
<i>Thinornis rubricollis</i>	Hooded plover	P4	VU	Margins and shallows of saltlakes, sandy and seaweedy beaches and estuaries; also dams (Johnstone & Storr 1998).	Unlikely No suitable habitat present.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Tringa hypoleucos</i>	Common sandpiper	MI	MI	Edge of sheltered waters salt or fresh, e.g. estuaries, mangrove creeks, rocky coasts, near-coastal saltlakes (including saltwork ponds), river pools, lagoons, claypans, drying swamps, flood waters, dams and sewage ponds. Preferring situations where low perches are available (Johnstone & Storr 1998).	Unlikely No suitable habitat present.
<i>Tyto novaehollandiae novaehollandiae</i>	Australian masked owl	P3	-	Forests, open woodlands, farmlands with large trees. E.g. river red gums, adjacent cleared country, timbered watercourses, paperbark woodlands and caves (Pizzey & Knight 2012).	Unlikely No suitable habitat present.
<i>Cherax tenuimanus</i>	Margaret River hairy marron	CR	CR	Occurs primarily in the upper reaches of the Margaret River. Prefers sandy areas, particularly where detritus (organic matter) accumulates, and requires in-stream structural diversity for protection (DoE 2013)	Unlikely No suitable habitat present.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Galaxiella munda</i>	Mud minnow	VU	-	Prefers swift-flowing streams in Karri forests, near submerged vegetation. The water in these streams is usually acidic (pH 3.0-6.0) and darkly tannin-stained, and the water temperature fluctuates widely with the seasons. It also occasionally occurs in ponds, swamps and roadside drains (Gomon et al. 2020).	Unlikely No suitable habitat present.
<i>Geotria australis</i>	Pouched lamprey	P3	-	Marine, estuarine and coastal rivers and streams. Adults live in Southern Ocean and migrate upstream to spawn. Larvae live in muddy burrows in the upper reaches of streams (Bray and Gomon 2018).	Unlikely No suitable habitat present.
<i>Austroassiminea lethia</i>	Cape Leeuwin freshwater snail	VU	-	Natural freshwater seepages and springs emerging from limestone or lime sands in coastal areas (Ponder et al. 2016)	Unlikely No suitable habitat present.
<i>Bertmainius opimus</i>	western pygmy trapdoor spider	P3	-	Mesic habitats including karri and tingle forests in the south west of WA (Main 1991). The species makes shallow burrows in the bark of karri and tingle trees an in the mossy banks of creeks (FPC 2017).	Unlikely No suitable habitat present.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Bertmainius tingle</i>	Tingle pygmy trapdoor spider	EN	EN	Species constructs shallow burrows in the tree bark of tingle trees (<i>Eucalyptus guilfoylei</i> , <i>E. jacksonii</i> and <i>E. brevistylis</i>) or in soil on the banks of creek lines and gullies in a small area of the high rainfall, closed-forest ecosystem of the Warren bioregion on the far south coast of Western Australia. Species is only known from 2 locations, all within a small area of the Walpole-Nornalup National Park.	Unlikely Site is located outside of the species known distribution range.
<i>Kawaniphila pachomai</i>	Grey vernal katydid	P1	-	Inhabits trees and shrubs and can be found mostly in heath or mixed woodland (Rentz 1993). The species occurs in coastal SW Western Australia with records near Vasse and within the southern Perth metropolitan region	Unlikely Site is located outside of the species known distribution range.
<i>Trichosternus relictus</i>	a ground beetle	P3	-	Recorded under logs in Eucalyptus woodlands (Darlington 1953).	Unlikely No suitable habitat present and no recent records occur near the site.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Westralunio carteri</i>	Carter's freshwater mussel	VU	VU	Occurs in greatest abundance in slower flowing streams with stable sediments that are soft enough for burrowing amongst woody debris and exposed tree roots. Also occupies lentic systems including large water supply dams and even on-stream farm dams. Salinity tolerance quite low (Morgan et al. 2011).	Unlikely No suitable habitat present.
<i>Bettongia penicillata ogilbyi</i>	Woylie	CR	EN	Woodlands and adjacent heaths with a dense understorey of shrubs, particularly <i>Gastrolobium</i> spp. (TSSC 2018).	Unlikely Species locally extinct.
<i>Dasyornis broadbenti litoralis</i>	Rufous Bristlebird	OS	-	Mainly found around cliffs along coasts, rivers, ranges and around wooded watercourses and lakes (Johnstone and Storr 1998).	Unlikely Species locally extinct.
<i>Dasyurus geoffroii</i>	Chuditch	VU	VU	Wide range of habitats from woodlands, dry sclerophyll forests, riparian vegetation, beaches and deserts. Appears to utilise native vegetation along road sides in the wheatbelt (DEC 2012b).	Unlikely Potentially suitable habitat presents but no recent records occur near the site.
<i>Hydromys chrysogaster</i>	Rakali	P4	-	Areas with permanent water, fresh, brackish or marine. Likely to occur in all major rivers and most of the larger streams as well as bodies of permanent water in the lower south west (Christensen et al. 1985).	Unlikely No suitable habitat present.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Isoodon fusciventer</i>	Quenda	P4	-	Dense scrubby, often swampy, vegetation with dense cover up to one metre high (DEC 2012)	Possible Potentially suitable habitat present.
<i>Myrmecobius fasciatus</i>	Numbat	EN	EN	Generally dominated by Eucalyptus spp. that provide hollow logs and branches for shelter and termites for food (van Dyck & Strahan 2008).	Unlikely Species locally extinct.
<i>Notamacropus eugenii derbianus</i>	Tammar wallaby	P4	-	Dry sclerophyll forest, Banksia spp. woodlands and shrublands, typically favouring dense low vegetation that provides dense cover (Christensen and Strahan 1983).	Unlikely Species locally extinct.
<i>Notamacropus irma</i>	Western brush wallaby	P4	-	Dry sclerophyll forest, Banksia spp. woodlands and shrublands, typically favouring dense low vegetation that provides dense cover (Christensen and Strahan 1983).	Unlikely Marginal habitat present but no recent records occur near the site.
<i>Petrogale sp.</i>	Rock wallaby	T	Unknwn	Specific habitat requirements differ between the different species and subspecies occurring in Western Australia. Species generally occur in rocky habitats.	Unlikely No species of rock wallaby are known to occur in the general area.
<i>Phascogale tapoatafa wambenger</i>	South-western brush-tailed phascogale	CD	-	Dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover (Triggs 2003).	Unlikely No suitable habitat present.
<i>Potorous gilbertii</i>	Gilbert's potoroo	CR	CR	Dense Melaleuca heath with dense groundcover of sedges (Menkhorst & Knight 2011).	Unlikely Species locally extinct.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
<i>Potorous platyops</i>	Broad-faced potoroo	EX	EX	-	Unlikely Species extinct.
<i>Pseudocheirus occidentalis</i>	Western ringtail possum	CR	CR	On the Swan Coastal Plain in Agonis flexuosa woodlands and Agonis flexuosa/ Eucalyptus gomphocephala forests. Also Eucalyptus marginata forests (DBCA 2017).	Recorded Marginal habitat present.
<i>Setonix brachyurus</i>	Quokka	VU	VU	On the mainland mostly dense streamside vegetation or shrubland and heath areas, particularly around swamps (Cronin 2007).	Unlikely Species locally extinct.

Note: CE=critically endangered, EN=endangered, VU=vulnerable, CD=conservation dependent, MI=migratory, OS=other specially protected, P1=Priority 1,

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Appendix D

Species List



Lot 783 Mitchell Drive, Lots 501, 502 and 504 Reef Drive and Lot 503 Seagrass Place, Gnarabup

Category	Status	Species name	Common name	Record type
Birds				
		<i>Artamus cyanopterus</i>	Dusky woodswallow	Sight
	*	<i>Cacatua roseicapilla</i>	Galah	Sight
	EN	<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	Sight
		<i>Corvus coronoides</i>	Australian raven	Sight
		<i>Egretta novaehollandiae</i>	White-faced heron	Sight
		<i>Eopsaltria georgiana</i>	White-breasted robin	Sight
		<i>Falco cenchroides</i>	Australian kestrel	Sight
		<i>Hirundo neoxena</i>	Welcome swallow	Sight
		<i>Larus novaehollandiae</i>	Silver gull	Sight
		<i>Larus pacificus</i>	Pacific gull	Sight
		<i>Malurus splendens</i>	Splendid fairywren	Sight
		<i>Pachycephala rufiventris</i>	Rufous whistler	Call
		<i>Phylidonyris novaehollandiae</i>	New Holland honeyeater	Sight
		<i>Sericornis frontalis maculatus</i>	Spotted scrubwren	Sight
		<i>Stagonopleura oculata</i>	Red-eared firetail	Sight
		<i>Stipiturus malachurus westernensis</i>	Southern emu-wren	Sight
		<i>Zosterops lateralis</i>	Grey-breasted white-eye	Sight
Mammals				
		<i>Macropus fuliginosus melanops</i>	Western grey kangaroo	Scats
	*DP	<i>Oryctolagus cuniculus</i>	Rabbit	Scats, digging, tracks
	CR	<i>Pseudocheirus occidentalis</i>	Western ringtail possum	Scats
Reptiles				
		<i>Menetia greyii</i>	Common dwarf skink	Sight
		<i>Morelia spilota imbricata</i>	Carpet python	Sight
		<i>Morethia lineoocellata</i>	Western pale-flecked morethia	Sight
		<i>Pogona minor minor</i>	Western bearded dragon	Sight
		<i>Pseudonaja affinis affinis</i>	Dugite	Sight
		<i>Tiliqua rugosa rugosa</i>	Bobtail	Sight

Note: *denotes introduced fauna species, DP=declared pest under the BAM Act, CR= Critically endangered under the EPBC Act, EN=Endangered under the EPBC Act, VU=Vulnerable under the EPBC Act.

