Walpole Foreshore Reserve, Walpole WA

Reconnaissance flora and vegetation and basic fauna survey report

Bio Diverse Solutions

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Table of Contents

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1. Introduction, scope and background information

The Shire of Manjimup ("the client") commissioned Bio Diverse Solutions as Environmental Consultants to undertake a reconnaissance flora and vegetation survey and a basic (previously reconnaissance) fauna assessment of the Walpole Foreshore Reserve, Walpole. The scope of works included:

- Desktop assessment of the subject area, including all publicly available database searches for threatened flora, vegetation communities and threatened fauna data;
- An out-of-season reconnaissance flora and vegetation survey across survey area to identify vegetation types, condition, possible ecological communities and conservation significant flora habitat;
- Identification of flora species, including herbarium identification if required;
- Basic fauna survey to map fauna habitat in the area, identify areas likely to provide habitat for conservation significant species and opportunistic sampling of fauna species (including conservation significant);
- GPS and map any populations of threatened species (if applicable);
- GIS mapping of vegetation types present and their condition;
- GIS mapping of fauna habitat;
- Prepare a report on survey outcomes; and
- Provide the client with the IBSA Data package (as required to be submitted by the client).

1.1. Site location and Development Proposal

The 'survey area' is defined as the 2.3ha area of native vegetation located to the west of Reserve (Type 3 R) 36421 located at the Walpole Foreshore on Walpole Street, Walpole in the Shire of Manjimup. The client is proposing to clear 2.3ha of native vegetation and as such requires an initial out-of-season reconnaissance flora and vegetation survey (with a follow-up targeted spring survey) and a basic fauna survey. A map of the survey area locality is provided in Figure 1.

1.2. Existing Land use

The survey area is part of Reserve (Type 3 R) 36421 managed by the Shire of Manjimup for recreational and conservation purposes. It comprises 2.3ha of native vegetation, which is currently proposed to be cleared.

Figure 1: Survey Area Locality

2. Desktop Assessment

2.1. Geology and soils

Database searches shows the survey area lies within the Broke System (254Br). The Broke System is described as *"Poorly drained plain with low granitic rises, along the coast of the Warren-Denmark Southland. Non-saline wet soil and pale deep sand. Sedges, ti-tree heath and paperbark-banksia woodlands"* (Department of Primary Industries and Regional Development [DPIRD], 2017a).

The Warren-Denmark Southland Zone is described as "*Rises in a series of broad benches from the Southern Ocean north to the Blackwood Valley. Deeply weathered granite and gneiss overlain by Tertiary and Quaternary sediments in the south. Swampy in places" (*DPIRD, 2017b). The soil type within the application area is mapped as the Walpole Subsystem (254BrWA). The Walpole Subsystem is described as *"Flat to gently sloping benches; some shallow dissections. Podzols and deep sands; teatree scrub, sheoak woodland and kangaroo grass sedgeland"* (DPIRD, 2017c).

2.2. Climate

The closest coastal Bureau of Meteorology (BoM) site is Windy Harbour (009871). The average annual temperature in Windy Harbour ranges from 11.4 – 20.3°C. The average summer temperature ranges between 13 - 23.7°C, whilst average winter temperatures range between 8.6 - 17.8°C. The annual mean rainfall for Windy Harbour is 1070.3mm (BoM, 2021). Climate data for Windy Harbour has been used as there is no climate data available for Walpole / North Walpole and it is the closest open coastal site.

2.3. Habitat Connectivity

Habitat connectivity assessments rely on a bioregional and landscape-scale approach to evaluate habitat for fauna movement and ecological linkage across a region. Habitat connectivity is largely reliant on remnant vegetation, recognising it plays a very important role in developing corridors between protected areas to assist in achieving long-term biodiversity management outcomes (Wilkins *et al*. 2006; Department of Biodiversity, Conservation and Attractions [DBCA], 2017). The greater Walpole area is largely vegetated with significant areas vested into the conservation estate or currently underdeveloped. The area has higher levels of remnant bushland remaining. The survey area is located on the Walpole Foreshore and clearing of native vegetation will effectively remove a small linkage or element of connectivity of intact vegetation surrounding the inlet periphery.

2.4. Water

The survey area does not lie within any Public Drinking Water Source areas (Department of Water and Environmental Regulation [DWER], 2018). The Nornalup Inlet, which is part of the Walpole and Nornalup Inlets Marine Park, is located directly adjacent to the survey area and is open to the ocean. The survey area functions as an important barrier between the upslope residential areas and the Marine Park. The Bellanger Barrier Conservation Class wetland, which is registered as a South Coast Significant Wetland is located within the eastern portion of the survey area. The Collier Creek Conservation Class wetland is located approximately 175m to the east of the survey area (DPIRD, 2017d). Refer to Map 2 in Appendix A.

2.5. Environmentally Sensitive Areas

The survey area contains an Environmentally Sensitive Area (DWER, 2021). Refer to Map 2 in Appendix A.

2.6. Remnant Vegetation

The survey area lies within the Warren Bioregion and Warren (WAR01) subregion. Hearn *et al* (2002) describes the Warren Bioregion as "d*issected undulating country of the Leeuwin Complex, Southern Perth Basin (Blackwood Plateau), South-West intrusions of the Yilgarn Craton and western parts of the Albany Orogen with loamy soils supporting Karri forest, laterites supporting Jarrah-Marri forest, leached sandy soils in depressions and plains supporting low Jarrah woodlands and paperbark/sedge swamps, and Holocene marine dunes with Agonis flexuosa and Banksia woodlands and heaths."*

The vegetation has been mapped on a broad scale by J.S. Beard (Shepherd *et al.* 2002) in the 1970's, where a system was devised for state-wide mapping and vegetation classification based on geographic, geological, soil, climate structure, life form and vegetation characteristics (Sandiford and Barrett, 2010). Vegetation units were regarded as associations and were grouped into Vegetation Systems representing a particular pattern of association distribution within a given area. A GIS search

of J.S. Beards (Beard *et al.* 2013) vegetation classification places the survey area within one System and Vegetation Association (DPIRD, 2017e) Refer to Map 1 in Appendix A:

- **System Association Name**: Nornalup.
- **Vegetation Association Number:** 27.
- **Structure Description:** Low woodland or open low woodland.
- **Floristic Description:** Other acacia, banksia, peppermint, cypress pine, casuarina, *York gum Acacia spp*., *Banksia spp*., *Agonis flexuosa*, *Callitris spp*., *Allocasuarina spp*., *Eucalyptus loxophleba*.
- **Remnant Vegetation by Beard Association Rarity in LGA:** 90.07% remaining (GoWA, 2019).
- **Remnant Vegetation by Beard Association Rarity in IBRA Region:** 74.44% remaining (GoWA, 2019).

Mattiske and Havel (1998) as part of the biodiversity assessment for the comprehensive regional assessment for the south west forest region mapped the area as containing one vegetation complex present (data retrieved from DBCA_047) Refer to Map 1 in Appendix A:

- **Vegetation Complex:** Walpole (Wp).
- **Vegetation Description:** Low woodland of *Allocasuarina fraseriana-Banksia attenuata-Banksia ilicifolia* with stunted *Eucalyptus marginata* subsp. *marginata* on flats in the hyperhumid zone.

2.7. Conservation Significant Flora

A desktop inventory of potential conservation significant flora species likely to occur at the survey area was undertaken, by assessing records of threatened or priority flora within 10km of the survey area using the following databases:

- Nature Map Database Search (combined data from DBCA, Western Australia (WA) Museum and WA Herbarium; DBCA, 2007-);
- Protected Matters Search Tool (DAWE, 2021); and
- DBCA database records (DBCA, 2021a; DBCA, 2021b). Note: the data provided to Bio Diverse Solutions did not include species names for records within 10km. Conservation codes and class (i.e. bird, mammal etc.) was the only information included in this dataset.

A full species list has been compiled from all available data (Table A2 in Appendix B), combining results from the desktop survey of 10 km radius of the survey area. It is likely to include species that would not occur in the actual survey area due to a lack of suitable habitat. The data also includes very old records and in some cases the species in question may have become locally or regionally extinct. Species that have previously been recorded within the study area are shown in Map 3 in Appendix A. Conservation categories for Threatened and Priority flora are presented in Tables A6-A7 in Appendix C. NatureMap and Protected matters search tool database searches are provided in Appendix E.

The conservation significance of flora species has been assessed using data from the following sources:

- *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act;* Cth). Administered by the Australian Government Department of Agriculture, Water and the Environment (DAWE);
- *Biodiversity Conservation Act 2016* (*BC Act*; WA). Administered by the Western Australian Department of Biodiversity Conservation and Attractions (DBCA); and
- DBCA Priority Flora list. A non-legislative list maintained by DBCA for management purposes.

As a result of the above-mentioned database searches, three Threatened and 37 Priority species were identified as potentially being present within the survey area (10km buffer). Refer to Appendix B for likelihood of presence analysis.

2.8. Threatened and Priority Ecological Communities

A desktop inventory of potential priority and threatened ecological communities likely to occur at the survey area was undertaken, by assessing records within 10km of the survey area using the following databases:

- Protected matters search tool (DAWE, 2021); and
- DBCA database records (DBCA, 2021c).

Conservation categories for ecological communities are presented in Tables A8-A9 in Appendix C. Protected Matters Search Tool database searches (DAWE, 2021) are provided in Appendix E.

Database results indicated that one ecological community '*Subtropical and Temperate Coastal Saltmarsh*' (CSM) may be present within the survey area. This is verified in the field using diagnostic tools available in the approved conservation advice for CSM (DBCA, 2020; Appendix B). CSM is listed as a Priority Ecological Community ([PEC], P3) within WA under the BC Act (WA) and as a Vulnerable Threatened Ecological Community (TEC) under the EPBC Act (Cth). The CSM ecological community is defined and assessed in the conservation advice consists of organisms including and associated with saltmarsh in coastal regions of sub-tropical and temperate Australia.

2.9. Conservation Significant Fauna

Desktop inventory of potential conservation significant fauna species likely to occur within 10km of the survey area was undertaken using the following databases:

- Nature Map Database Search (combined data from DBCA, WA Museum and WA Herbarium; DBCA, 2007-2021);
- Protected Matters Search Tool (DAWE, 2021); and
- DBCA database records provided by the Shire of Manjimup (DBCA, 2021d). Note: the data provided to Bio Diverse Solutions did not include species names for records within 10km. Conservation codes and class (i.e. bird, mammal etc.) was the only information included in this dataset.

The full species list compiled from all available data (Table A5 Appendix B) is based on observations from a broader area than the survey area and is likely to include species that would not occur in the actual survey area due to a lack of suitable habitat. The data also includes very old records and in some cases the species in question may have become locally or regionally extinct.

The conservation significance of fauna species has been assessed using data from the following sources:

- EPBC Act (Cth). Administered by the Australian Government Department of Agriculture, Water and the Environment (DAWE);
- BC Act (WA). Administered by the WA DBCA.

As a result of the above-mentioned database searches 65 Threatened or Priority fauna species were identified as potentially being present within the survey area (with a 10km buffer). Species that have previously been recorded within the study area are shown in Map 4 in Appendix A. Conservation categories for Threatened and Priority fauna are presented in Tables A6 and A7 in Appendix C. NatureMap and Protected Matters Search Tool database searches are provided in Appendix E.

3. Flora and Vegetation Survey Methodology

An out-of-season reconnaissance level flora and vegetation survey was undertaken by Gemma Maling (Botanist) of Bio Diverse Solutions on the 5th of May 2021. The survey area was surveyed via meandering traverses on foot, to identify the different vegetation types, their condition category and targeted survey for conservation significant species. Areas containing suitable habitat for conservation significant flora were more intensely surveyed. Five relevés were systematically surveyed within representative vegetation types to enable analysis and categorisation across the wider area (refer to Appendix D). The flora was systematically recorded within the relevés and collections of plant specimens were made where further identification was required (under Gemma Maling's Flora Taking Biological Assessment Licence FB62000319). For species that were not flowering and where foliage or nuts / fruit couldn't be used for identification, potential habitat was used as an indication of the likelihood of species occurrence. The vegetation types occurring within the survey area were mapped and described using opportunistic mapping and relevés. Vegetation types were described based on structure, dominant taxa and cover characteristics as defined by relevé data and field observations, by both Muir (1977) and NVIS Level 5 classification systems (NVIS Technical Working Group, 2017).

Information collected within each relevé included:

- Location: coordinates of the relevé using a handheld GPS unit.
- Date and site code.
- Site description: landform, slope, soil colour and type and hydrology.
- Vegetation description: dominant and non-dominant species present within the different growth forms and percentage cover.
- Vegetation condition.

The aim of this survey was to provide context and gather knowledge of the survey area. This type of survey aims to verify the desktop information obtained, and to characterise the flora / vegetation units present within the survey area.

3.1. Survey Limitations and constraints

An assessment of potential survey limitations is outlined below in Table 1, limitations were identified.

Table 1: Assessment of potential survey limitations

Limitation	Comment
Experience of personnel	Gemma Maling has over 5 years' experience as a botanist, initially working with Main Roads, and more recently with Department of Mines, Industry Regulation and Safety (DMIRS), and has a Bachelor of Science (BSc.) Environmental Restoration, and is currently undertaking post graduate studies in Botany at the University of Western Australia.
Survey timing	The client requested the survey be in Autumn and is deemed an out of season for a flora and vegetation survey. This is not consistent with the recommended survey timing and is not consistent with peak flowering times for the majority of species in the area. It is recommended that at spring survey be conducted towards the end of the peak flowering period in this locale in October 2020.
Access restrictions	Access to some areas were restricted as they were inundated during the time of the survey.
Availability of contextual information	Publicly available desktop and background information was readily available to give a broad contextual understanding of the survey area. The data provided by the Shire of Manjimup / DBCA did not include species names and only presented conservation codes / status for records within 10km. Whilst this did not impact the survey itself it cannot be guaranteed that the species outlined in Table A2 is the full suite of species likely to be present in the area. Actual species names for these records will be required for the targeted spring survey.
Survey effort and extent	50 species were identified during the survey, and five relevé data sets collected to gain as complete a picture as possible of flora species present within the survey area.
Disturbances that may affect results	The area adjacent to the survey area is maintained as parkland and utilised for passive recreation. However, it is unlikely these activities impacted the flora survey.

Identification issues	The survey was undertaken on May 5th during the Djeran/Autumn seasons, which is not peak flowering period for many south coast flora species. Therefore, effective physiological taxonomic markers may not be present and was difficult to identify or differentiate some species.

4. Flora and vegetation survey outcomes

During the survey, 50 flora species across 22 families were identified. The most commonly occurring families were Cyperaceae, Myrtaceae and Poaceae. A high presence of weed species were present, with 27 native species identified within the survey area (Table A11 Appendix D), and 23 introduced / alien species. The vegetation units identified across the survey area are described in Section 4.1. Refer to Map 5 in Appendix A for vegetation mapping, and Table A11 in Appendix D for full species list.

4.1. Vegetation Units

Four vegetation types were identified during the survey area, with a relevé sample collected from at least each vegetation unit. Refer to Map 5 in Appendix A for vegetation units across the survey area and Appendix D for the relevant relevé per site. Please note only areas of intact native vegetation are described and mapped. Areas that have been cleared or contain predominantly weed / introduced species (i.e. Completely Degraded or Degraded areas) have not been described or mapped.

Table 2: Summary of vegetation units present within the survey area

Vegetation type	Description	Code	Area (ha)
1	*Melaleuca preissiana / Callistachys lanceolata* Thicket	MCT – Melpre Callan	1.10
2	Tall *Taxandria juniperina / Agonis flexuosa* Woodland	TAW – Callan Agoflex	0.74
3	Open Weedy Patches	OWP	0.30
4	Closed Heath	Heath	0.14
Total			**2.28**

1. Vegetation type: *Melaleuca preissiana / Callistachys lanceolata* Thicket MCT Melpre Callan]

Vegetation Description (NVIS- Level 5): M ^^ *Melaleuca preissiana, Callistachys lanceolata, Astartea* sp.\^Tree\6\c; G ^*Empodisma gracillimum*\sedge\1\c.

Vegetation Description (Muirs): *Melaleuca preissiana* (Moonah), *Callistachys lanceolata* (Woonich) and *Astartea* sp. Woodland, over *Empodisma gracillimum* sedgeland.

Area: 1.1ha.

Site description: Adjacent to the inlet edge along a drainage depression, with sandy loam soils and poor drainage.

Condition: Good to very good.

Represented in Relevé 1 (refer to Appendix D).

a.) b.)

c.) d.)

Figure 2: *Melaleuca preissiana* / *Callistachys lanceolata* Thicket [MCT MelPre Callan] vegetation association within the survey area.

2. Vegetation type: Tall *Taxandria juniperina* / *Agonis flexuosa* woodland [TAW Callan Agofle]

Vegetation Description (NVIS- Level 5): U ^^ *Taxandria juniperina, Agonis flexuosa, Callistachys lanceolata*\^tree\6\c; G ^*Pteridium esculentum, +/- *Rubus* sp., +/- *Dipogon lignosus*\^forb,+/-vine\2\c.

Vegetation Description (Muirs): *Taxandria juniperina* (Native Cedar), *Agonis flexuosa (*Native Peppermint), *Callistachys lanceolata (*Woonich) Woodland, over *Pteridium esculentum* (Bracken Fern), **Rubus* sp. (Blackberry), **Dipogon lignosus* (Dolichos Pea) forbland and vineland.

Area: 0.74ha.

Site description: Mid-slope areas with clay sand, poor drainage and at the edge of a drainage depression area.

Condition: Degraded to Good. In most cases, the understory was highly disturbed due to mowing regimes, weed invasion and weed control efforts.

Represented in Relevé 2 and Relevé 4 (refer to Appendix D).

a.) b.)

c.) d.)

Figure 3: *Taxandria juniperina* / *Agonis flexuosa* Woodland [TAW Callan Agoflex] vegetation association within the survey area.

3. Vegetation type: Open Weedy Patches (OWP)

Vegetation Description (NVIS- Level 5): U:^^*Callistachys lanceolata, Taxandria juniperina*\ +/-Tree\6\r; M: ^^**Rubus* sp., **Solanum nigrum, Histiopteris incisa*\ ^^Heath Shrub, Vine, Fern\3\d; G: ^^**Paspalum distichum, *Cenchrus clandestinus*\^^Grass\2\d.

Vegetation Description (Muirs): *Callistachys lanceolata* (Wonnich) and *Taxandria juniperina* (Native Cedar) sparse Woodland, over **Rubus sp.* (Blackberry), **Solanum nigrum* (Deadly Nightshade), *Histiopteris incisa* (Batswing Fern) closed shrubland/vineland/fernland, over **Paspalum distichum* (Couch) and **Cenchrus clandestinus* (Kikuyu) closed grassland.

Area: 0.30ha.

Site description: Generally the periphery of the survey area observed edge effect and degradation has occurred. Silty loam, poor drainage and at the edge of a drainage depression area.

Condition: Degraded to Good. In most cases, the understory was highly disturbed due to mowing regimes, weed invasion and weed control efforts.

Represented in Relevé 3 (refer to Appendix D).

a.)

b.)

Figure 4: Open Weedy Patches (OWP) vegetation association within the survey area.

4. Vegetation type: Closed Heath (Heath)

Vegetation Description (NVIS- Level 5): U: ^^*Callistachys lanceolata, Taxandria juniperina, Astartea* sp., *Acacia hastulata*\^tree\6\d; G: ^^*Juncus pallidus, Juncus kraussii* subsp. *australiensis, Desmocladus flexuosa*+/-*Sedge*\2\r.

Vegetation Description (Muirs): *Callistachys lanceolata* (Wonnich), *Taxandria juniperina* (Native Cedar), *Astartea* sp., and *Acacia hastulata* closed woodland, over *Juncus pallidus* (Pale Rush), *Juncus kraussii* subsp. *australiensis* (Snogerup), and *Desmocladus flexuosa* sparse sedgeland.

Area: 0.14ha.

Site description: Central to the survey area, with loam soils and likely to be seasonally wet on a drainage depression line.

Condition: Very good.

Represented in Relevé 5 (refer to Appendix D).

a.)

b.)

Figure 5: Closed Heath (Heath) vegetation association within the survey area.

4.2. Vegetation Condition

The vegetation condition for the survey area (Table 3) has been mapped using the condition rating scale (adapted from Keighery 1994) outlined in EPA (2016).

The vegetation ranged from Completely Degraded to Excellent condition throughout the survey area. These classification levels are related to degradation of structure and vegetation integrity by processes such as clearing, fire, weeds, grazing, Phytophthora Dieback and vehicle tracks. The 'Heath' unit is classified as being in Excellent condition, the 'MCT Melpre Callan' unit is in Excellent, Very Good and Good condition, the 'OWP' unit is in Completely Degraded and the 'TAW Callan Agofle' unit are classified as being in Degraded and Excellent condition (Map 6, Appendix A).

Table 3: Vegetation condition rating

Vegetation type	Condition rating	Area (ha)
Closed Heath [Heath]	Excellent	0.14
Melaleuca / Callistachys Thicket [MCT Melpre Callan]	Excellent	0.37
	Very Good	0.67
	Good	0.06
Open Weedy Patches [OWP]	Completely Degraded	0.30
Taxandria / Agonis Woodland [TAW Callan Agofle]	Degraded	0.55
	Excellent	0.19
Total		**2.28**

4.3. Weeds and disturbance

Of the 50 flora species recorded within the survey area, 23 species are introduced. The full suite of weed species recorded is listed below (Table 4), with their corresponding ratings under the WA Weed Strategy (CALM, 1999) and the *Biosecurity and Agriculture Management Act 2007* (BAM Act; WA). The ratings given under the WA Weed Strategy relate to determining the significance of a weed, based on the criteria of invasiveness, impacts, potential for spread and socioeconomic and environmental values, and can be either 'High', 'Moderate', 'Mild', or 'Low' (CALM, 1999).

All species, except Blackberry (*Rubus sp.*), are classed as 'Permitted – s11'. Blackberry is rated as higher risk classed as a 'Declared Pest' – s22(2) under the BAM Act (WA; Map 7, Appendix A). Under the Environmental Weeds Strategy for Western Australia (CALM, 1999) Sweet Vernal Grass, Slender Thistle, Common Sowthistle, Nut Grass, Bleeding Heart, Common Centaury, Lesser Trefoil, Silvery Hair Grass, Kikuyu, Blowfly Grass, Water Couch, Black Nightshade and Cape Gooseberry are rated as 'Moderate'. The remaining species are either rated 'Low' or are not listed.

Table 4: Weed species recorded from the survey area.

Family	Species	WA Weed Strategy rating (CALM 1999) / BAM Act (WA)
Anthoxanthum	*Anthoxanthum odoratum* (Sweet Vernal Grass)	Moderate / Permitted (s11)
Asparagaceae	*Asparagus aethiopicus*	
Asteraceae	*Cirsium vulgare* (Slender Thistle)	Moderate / Permitted (s11)
Asteraceae	*Hypochaeris radicata* (Flatweed)	- / Permitted (s11)
Asteraceae	*Sonchus oleraceus* (Common Sowthistle)	Moderate / Permitted (s11)
Cerastium	*Cerastium glomeratum* (Mouse Ear Chickweed)	Low / Permitted (s11)
Cyperaceae	*Cyperus rotundus* (Nut grass)	Moderate / Permitted (s11)
Euphorbiaceae	*Homalanthus novo-guineensis* (Bleeding heart)	Moderate / Permitted (s11)
Dicranaceae	*Campylopus introflexus* (Heath star moss)	
Fabaceae	*Dipogon lignosus* (Dolichos Pea)	Low / Permitted (s11)
Gentianaceae	*Centaurium erythraea* (Common centaury)	Moderate / Permitted (s11)
Oxalidaceae	*Oxalis* sp. (Wood sorrels)	- / Permitted (s11)
Fabaceae	*Trifolium dubium* (Lesser trefoil)	Moderate / Permitted (s11)
Pittosporaceae	*Pittosporum undulatum* (sweet pittosporum)	TBA / Permitted (s11)
Plantaginaceae	*Veronica arvensis* (Corn speedwell)	TBA / Permitted (s11)
Poaceae	*Aira caryophyllea* (Silvery Hairgrass)	Moderate / Permitted (s11)
Poaceae	*Cenchrus clandestinus* (Kikuyu)	Moderate / Permitted (s11)
Poaceae	*Briza maxima* (Blowfly Grass)	Moderate / Permitted (s11)
Poaceae	*Paspalum distichum* (Water couch)	Moderate / Permitted (s11)
Phytolaccaceae	*Phytolacca octandra* (Ink Weed)	Mild / Permitted (s11)
Rosaceae	*Rubus* sp. (Blackberry)	- / Declared Pest – s22(2)
Solanacea	*Solanum nigrum* (Black nightshade)	Moderate / Permitted (s11)
Solanacea	*Physalis peruviana* (Cape gooseberry)	Moderate / Permitted (s11)

4.4. Threatened Flora

The scope for this survey was to provide the client with information on any Threatened or Priority flora species that are potentially present within the survey area. For species that were not flowering and that require flowers for accurate identification, a risk assessment was undertaken of habitat suitability (Table A2, Appendix B). Species were deemed either likely or unlikely to occur in the area based on habitat suitability (e.g., soil type, vegetation type, density etc).

Of the 40 Threatened or Priority flora species identified during the desktop assessment (DAWE, 2021; DBCA, 2007-; DBCA, 2021a; DBCA, 2021b), 28 species were identified as likely or possible to occur within the survey area, as determined by the vegetation types and habitat identified in Section 4.1. Of these, four species, *Alexgeorgea ganopoda* (P3), *Andersonia auriculata* (P3), *Acacia semitrullata* (P4) and the fungi *Amanita walpolei* (P2), flowered or fruited during Djeran/Autumn, at the time of the reconnaissance flora survey. None of these species were identified during the flora survey.

24 species of conservation listed flora were therefore identified that are likely or possible to occur within the survey area that flower outside of Djeran/Autumn. Two of these species are threatened flora, *Microtis globula* and *Reedia spathacea.* A spring flora survey is therefore required to determine or eliminate presence of these species within the survey area. Please see Table A2, Appendix B for further details on likelihood of assessment and determination of why an additional flora survey is required.

4.5. Threatened and Priority Ecological Communities

The desktop assessment (DAWE, 2021; DBCA, 2007-; DBCA, 2021c) identified that the ecological community, *Subtropical and Temperate Coastal Saltmarsh* (CSM)*'* was likely to occur within the survey area, mapped across the entire area. Refer to Map 3 in Appendix A for the location of the CSM vegetation unit identified at the survey site. CSM is listed as a Priority Ecological Community (PEC), listed as Priority 3 within WA under the BC Act (WA) and as a Vulnerable Threatened Ecological Community (TEC) under the EPBC Act (Cth), see Section 2.8.

Following the vegetation community survey and assessment, the survey area does not meet criteria as CSM, with key indicator species lacking, specifically typical marsh species such as Samphire, rushes, Seablite and others. Additionally, cover of overstory exceeds 50%, which is a key diagnostic feature of CSM. CSM is typically relatively open and lacks a distinct upper-story or mid-story layer, as observed in all vegetation types across the survey area. Refer to Appendix B for further diagnostic features of CSM.

5. Basic Fauna Survey Methodology

Field survey work was carried out by Dr. Karlene Bain (Ecologist) from Bio Diverse Solutions on the 4th May 2021, in accordance with Guidance Statement 56: *Terrestrial Fauna Surveys* (Environmental Protection Authority [EPA] 2020).

The assessment was carried out in a manner consistent with the following documents developed by the EPA and Department DAWE, formerly the Department of Sustainability, Water, Population, and Communities (DSEWPaC) and Department of the Environment, Water, Heritage and the Arts (DEWHA):

- EPA (2020) Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment;
- DEWHA (2010) Survey guidelines for Australia's threatened birds; and
- DSEWPaC (2012) Referral Guidelines for Three Threatened Black Cockatoo Species; and
- EPA (2009) Technical Guidance - Sampling of short-range endemic invertebrate fauna.

The vegetation units described in Section 4.1 broadly define habitat types across the survey area. The aim of the basic fauna survey was to assess and map the fauna habitat within the survey area, assess the likelihood of conservation fauna species utilising the general area and/or particular vegetation types, recording actual presence of conservation fauna, and undertaking an opportunistic inventory of vertebrate species encountered whilst traversing the survey area on foot.

The conclusions presented are based upon field data collected over a limited period of time and are indicative of the environmental condition of the site at the time. Some fauna species are reported as potentially occurring within the survey area based on the presence of suitable habitat (quality and extent) within the survey area or immediately adjacent. With respect to opportunistic observations, the possibility exists that certain species may not have been detected during field investigations due to seasonal inactivity during the field survey, species present within micro habitats not surveyed, cryptic species able to avoid detection and transient wide-ranging species not present during the survey period.

5.1. Survey Limitations and Constraints

No limitations occurred for this survey. Please see Table 5 below for details.

Table 5: Fauna survey limitations and constraints

Limitation	Comment
Scope	The scope was a basic fauna survey to generally assess the presence/ evidence of fauna species within the survey area, map the fauna habitat, undertake opportunistic inventory of species including priority conservation species.
Disturbances that may affect results	No recent disturbances that may affect results of the survey were identified, e.g., recent fire or grazing.
Intensity of survey	The basic fauna Survey was deemed appropriate given the scope was to identify the general presence of fauna species in the survey area and to describe and map fauna habitat in the survey area.
Sources of information (recent or historic) and availability of contextual information	Publicly available desktop and background information was readily available to give a broad contextual understanding of the site. DBCA database search requests provided by the Shire of Manjimup did not include species names and only presented conservation codes for records within 10km.
Remoteness or access issues	No access restrictions were encountered.
Experience of personnel	Dr Karlene Bain has 24 years of fauna survey experience across the public, NGO and private sectors.
Survey limitations	The autumn timing of the survey limits the detection of breeding shorebirds and amphibians, and the detection of crustacean chimneys. However, habitat-based surveys were able to provide an assessment of likelihood of occurrence for these groups. The data provided by the Shire of Manjimup / DBCA did not contain species names for the records within 10km of the survey area. Whilst this did not impact the survey itself it cannot be guaranteed that the species outlined in Table A5 is the full suite of species likely to be present in the area. Given the depth of local knowledge of the area by Dr. Karlene Bain this was not deemed to be a significant limitation for the survey.

6. Basic Fauna Habitat Survey Outcomes

6.1. Fauna Survey Outcomes

The location of fauna habitat correlates with vegetation units mapped. The location of vegetation and habitat unit mapping and the conservation significant fauna recorded during the survey can be found in Map 8 and 9 (Appendix A), and a full list of fauna species detected can be seen in Table A12 (Appendix D).

During the survey, fauna were observed either directly (observed), or indirectly from calls or from indicators of activity such as tracks, runnels, scats, diggings, bones, feeding remains or scratchings. During the survey, 16 species of fauna were recorded, including ten birds, three mammals, two amphibians and one invertebrate. Refer to Map 9 (Appendix A) and Table A12 (Appendix D).

Notable observations during the fauna survey included:

- Fresh quokka (VU) activity within thickets of *Melaleuca / Callistachys* and adjoining tall heathland areas. Runnels and scat for this species were abundant throughout these areas, suggesting that the area is being used for feeding and as a movement corridor.
- A low level of quenda (P4) activity was detected within thickets of *Melaleuca / Callistachys* and adjoining tall heathland areas, as evidenced by diggings, scat and runnels. This species is likely to be using the area for feeding and as a movement corridor.
- A direct observation of an individual Osprey (*Pandion cristatus*, MI), which was startled from the Swarbrick jetty adjacent to the survey area and landed in a mature *Taxandria juniperina* in the northeast corner of the western cell. This species is commonly seen feeding in the inlet system and perching near the edge of the inlet. There was no evidence of breeding within the survey area, but the mature *Taxandria* within the survey area are potentially suitable habitat for nest construction and roost sites.
- A high level of invasive weed incursion in the northern parts of the survey area, including Blackberry and Dolichos Pea. These species have the potential to severely degrade the quality of fauna habitat through modification of species diversity and vegetation structure and care should be taken that any planned activities do not increase their spread.

The *Melaleuca / Callistachys* thicket and the closed heath vegetation types identified during the survey also provide habitat for a range of common fauna species (Table A12, Appendix D). Some examples of activity indicators for threatened species detected during the survey are presented in Figure 6. Maps 8 and 9 (Appendix A) provide locational details.

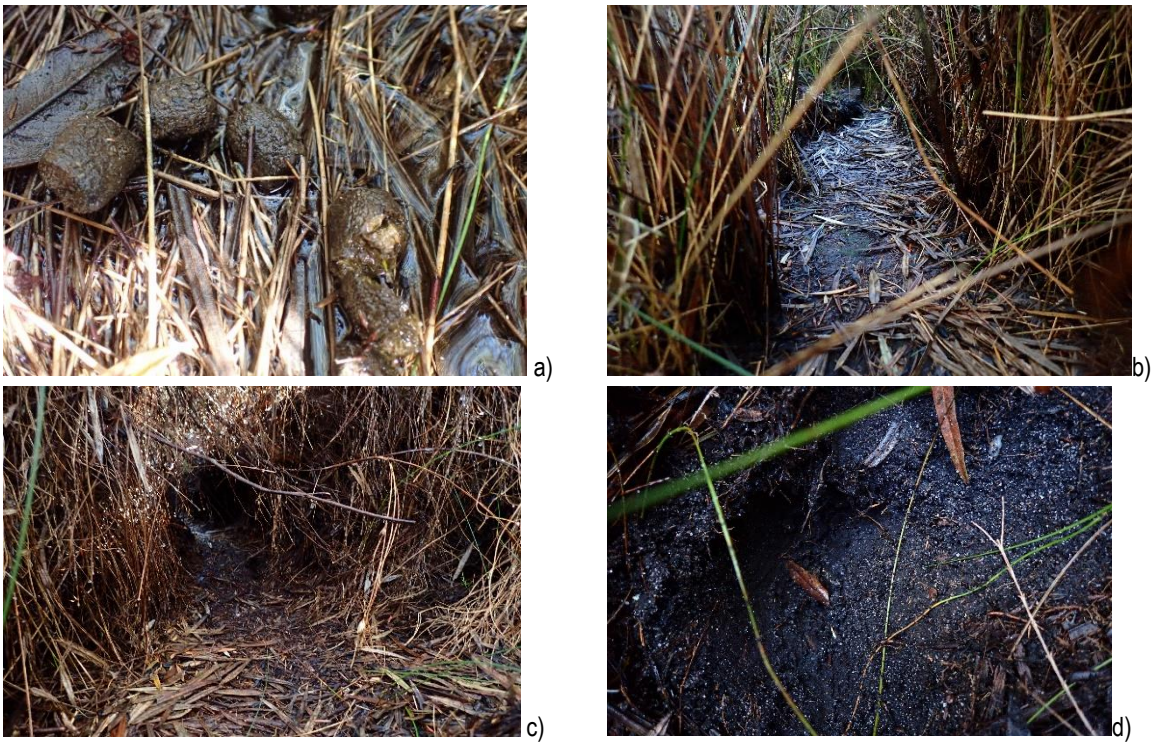

Figure 6: Photographs of evidence of fauna presence within the survey area.
a) Quokka scat; b) Quokka runnel; c) Quenda Runnel; d) Quenda Digging;

7. Summary

7.1. Vegetation, Threatened and Priority Flora and Ecological Communities

The scope for this flora and vegetation survey was to provide the Shire of Manjimup with an understanding of environmental values present within the intact vegetation proposed to be cleared. Specifically, identifying vegetation units to determine presence of priority and threatened ecological communities, and to be used as a baseline for determining likelihood of priority or threatened flora are present. Overall a moderate diversity of flora was recorded, with 27 native species present.

Four vegetation units were recorded during the survey, namely Closed Heath (Heath), *Melaleuca preissiana / Callistachys lanceolata* Thicket (MCT Melpre Callan), Open Weedy Patches (OWP), and *Taxandria juniperina / Agonis flexuosa* Woodland (TAW Callan Agoflex). These vegetation types did not meet diagnostic criteria for the Threatened Ecological Community *Subtropical and Temperate Coastal Saltmarsh* (CSM) recorded within 10 km radius of the area. Vegetation condition ranged from Completely Degraded to Excellent. Disturbances from mowing and extensive weed invasion was observed in the area, with a total of 23 weed species observed. *Rubus* sp., Blackberry, was located within the survey area, which is listed as a Declared Pest' – s22(2) under the *Biosecurity and Agriculture Management Act 2007* (WA).

A total of three threatened flora and 37 priority flora were identified within a 10 km radius of the survey area. Of these, 28 are possible or likely to occur within the survey area. The out-of-season reconnaissance flora survey occurred when four of these species were flowering or fruiting and were not found. Currently, no conservation significant species have been identified. The remaining 24 species require a spring follow-up flora survey to confirm presence or absence within the survey area.

7.2. Fauna Survey

The aim of the fauna survey was to identify and map fauna habitat within the survey area, assess the likelihood of occurrence for conservation significant species, and record the presence of conservation significant fauna.

Conservation significant taxa identified during the survey include: Quokka (VU), Quenda (P4), and Osprey (MI). Two habitat types within the survey area are of particular value for small mammals: thickets of *Melaleuca / Callistachys* and tall closed heath. Mammals in the area, including those that are threatened or priority listed, are using these areas for feeding and as movement corridors along the edge of the inlet system. Any activity that disturbs vegetation in the area will need to ensure that habitat connectivity for these species is maintained. In particular, good and very good quality areas of vegetation with complex vegetation structure must be protected to enable safe passage of animals and maintenance of metapopulation function in this landscape.

A high level of invasive weed inclusion is present in the northern and western parts of the survey area. Species such as Blackberry and Dolichos Pea have the potential to severely degrade the quality of fauna habitat through modification of species diversity and vegetation structure. Care should be taken to ensure these weeds are not spread as a result of any planned activities in the area. In addition, existing weed incursions should continue to be managed to reduce further deterioration of the remnant vegetation in the area.

8 References

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9 Appendices

Appendix A – Maps

Appendix B – Conservation Significant Values Likelihood of Occurrence Analysis

Appendix C – Conservation Status Definitions and Condition Scale

Appendix D – Species Lists and Relevé Data

Appendix E - NatureMap and EPBC Act PMST reports

Appendix A

Maps

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BIO DIVERSE SOLUTIONS

Overview Map Scale 1:100,000

Legend

Survey Area

Pre European Vegetation (DPIRD_006)

Nornalup 27

Vegetation SW Forest Region of WA (DBCA_047)

Walpole, Wp

Scale
1:1,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Shire of Manjimup
Walpole Foreshore Area
Walpole, WA 6398

Map 1: Desktop Vegetation Data

	QA Check	*Drawn by*
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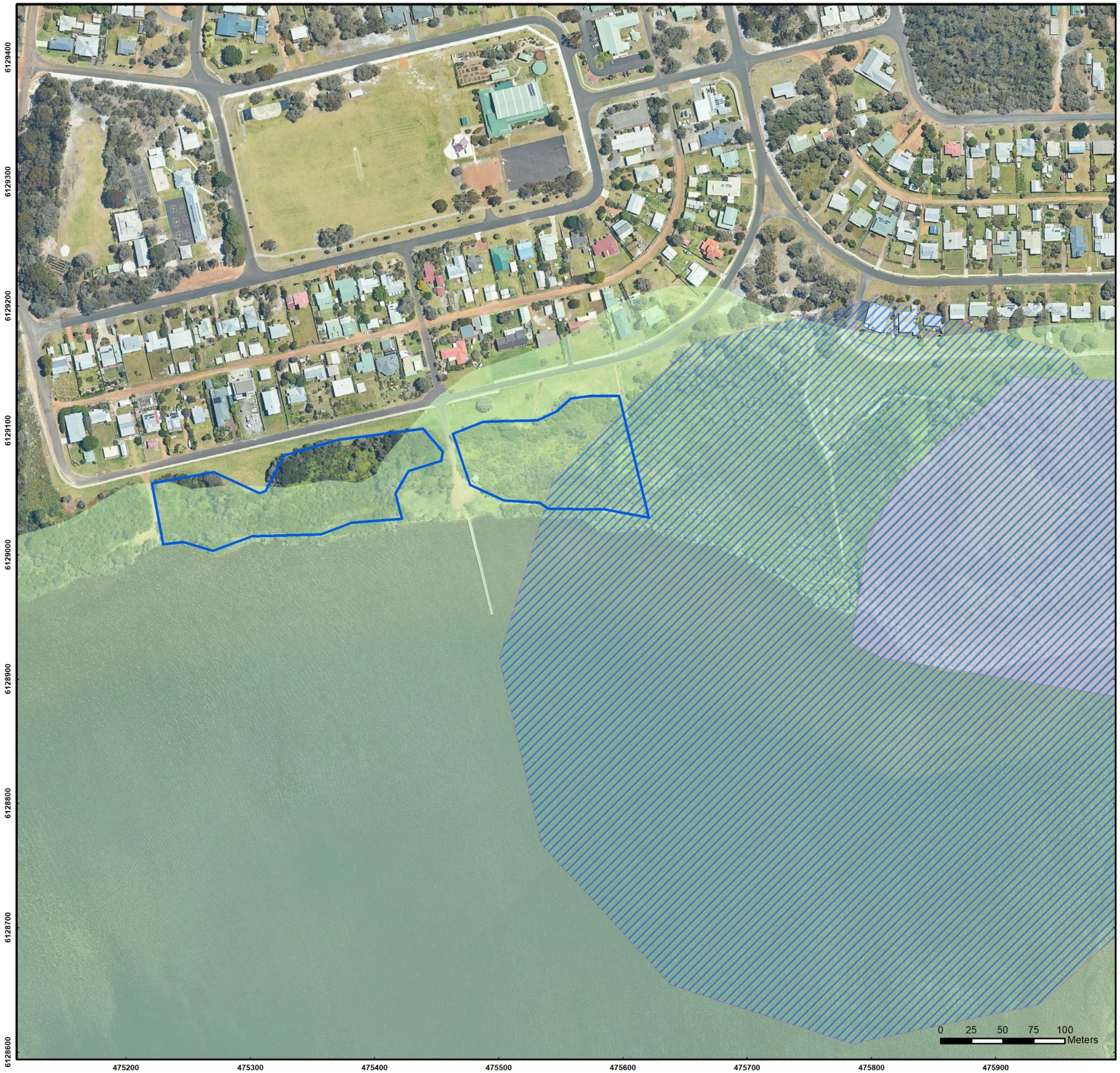
STATUS	*FILE*	*DATE*
FINAL	**MANJ004**	**12/05/2021**



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Overview Map Scale 1:100,000

Legend

- Survey Area
- Environmentally Sensitive Areas (DER-016)

South Coast Significant Wetlands (DPAW-021)

- Bellanger Barrier
- Collier Creek

Scale
1:3,000 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Shire of Manjimup
Walpole Foreshore Area
Walpole, WA 6398

Map 2: Desktop Wetland & ESA Data

	QA Check	*Drawn by*
	BT	**CV**
STATUS **FINAL**	*FILE* **MANJ004**	*DATE* **17/05/2021**

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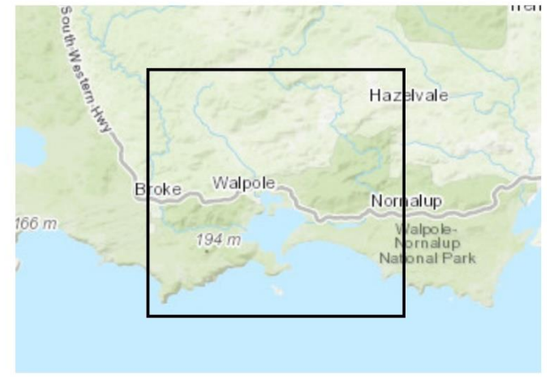


Overview Map Scale 1:100,000

Legend

- Survey Area
- 10km Study Area Buffer

Threatened Ecological Community (TEC-DBCA-038)

- Priority
- Threatened

39-0421FL_TPFL

Conservation Status

- 2
- 3
- 4
- T

39-0421FL_WAHerb

Conservation Code

- 2
- 3
- 4
- T

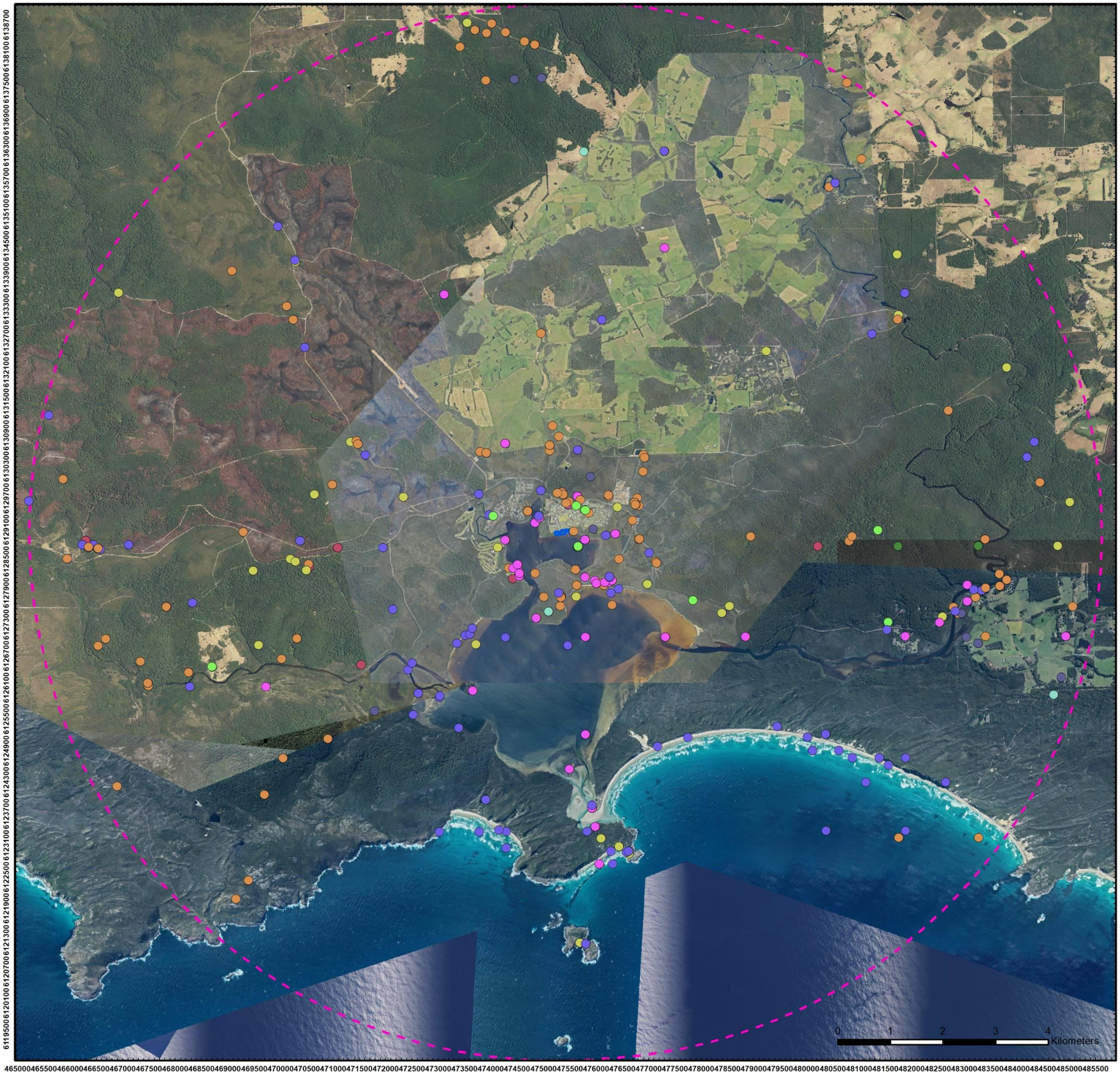
Scale
1:71,000 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Shire of Manjimup
Walpole Foreshore Area
Walpole, WA 6398

Map 3: Desktop Flora and TEC/PEC Data

	QA Check	Drawn by
	BT	CV
STATUS	FILE	DATE
FINAL	MANJ004	17/05/2021



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Overview Map Scale 1:100,000

Legend

- Survey Area
- 10km Study Area Buffer

Threatened & Priority Fauna 10km

Conservation Code

- CD
- CR
- EN
- MI
- OS
- P2
- P3
- P4
- VU

Scale
1:71,000 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Shire of Manjimup
Walpole Foreshore Area
Walpole, WA 6398

Map 4: Desktop Fauna Data

	QA Check	*Drawn by*
	BT	**CV**
STATUS	*FILE*	*DATE*
FINAL	**MANJ004**	**17/05/2021**

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Overview Map Scale 1:100,000

Legend

- Survey Area
- Releve Sites

Vegetation Units

- Closed Heath [Heath]
- Melaleuca/ Callistachys Thicket [MCT Melpre Callan]
- Open Weedy Patches [OWP]
- Taxandria/ Agonis Woodland [TAW Callan Agofle]

Scale
1:1,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Shire of Manjimup
Walpole Foreshore Area
Walpole, WA 6398

Map 5: Vegetation Units & Releve Sites

	QA Check	*Drawn by*
	GM	**CV**
STATUS **FINAL**	*FILE* **MANJ004**	*DATE* **21/05/2021**

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BIO DIVERSE SOLUTIONS

Overview Map Scale 1:100,000

Legend

- Survey Area

Vegetation Condition

- Excellent
- Very Good
- Good
- Degraded
- Completely Degraded

Scale
1:1,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

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Shire of Manjimup
Walpole Foreshore Area
Walpole, WA 6398

Map 6: Vegetation Condition

	QA Check	*Drawn by*
	GM	**CV**
STATUS **FINAL**	*FILE* **MANJ004**	*DATE* **14/05/2021**

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BIO DIVERSE SOLUTIONS

Overview Map Scale 1:100,000

Legend

- Survey Area

Vegetation Units

- Closed Heath [Heath]
- Melaleuca/ Callistachys Thicket [MCT Melpre Callan]
- Open Weedy Patches [OWP]
- Taxandria/ Agonis Woodland [TAW Callan Agofle]

Declared Pest - s22(2)

- *Rubus sp.*

Scale
1:1,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

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Shire of Manjimup
Walpole Foreshore Area
Walpole, WA 6398

Map 7: Priority Flora & Weeds of Significance

	QA Check	Drawn by
	GM	**CV**
STATUS	FILE	DATE
FINAL	**MANJ004**	**21/05/2021**

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Esperance, WA 6450

BIO DIVERSE SOLUTIONS

Overview Map Scale 1:100,000

Legend

Survey Area

Fauna Habitat Values

- Rattus fuscipes Burrow
- Rattus fuscipes Runnel
- Setonix brachyurus Runnel

Fauna Habitat

- Closed Heath [Heath]
- Melaleuca/ Callistachys Thicket [MCT Melpre Callan]
- Open Weedy Patches [OWP]
- Taxandria/ Agonis Woodland [TAW Callan Agofle]

Scale
1:1,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Shire of Manjimup
Walpole Foreshore Area
Walpole, WA 6398

Map 8: Fauna Habitat Values

	QA Check	*Drawn by*
	GM	**CV**
STATUS	*FILE*	*DATE*
FINAL	**MANJ004**	**10/05/2021**

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Esperance, WA 6450

BIO DIVERSE SOLUTIONS

Overview Map Scale 1:100,000

Legend

Survey Area

Vegetation Units

- Closed Heath [Heath]
- Melaleuca/ Callistachys Thicket [MCT Melpre Callan]
- Open Weedy Patches [OWP]
- Taxandria/ Agonis Woodland [TAW Callan Agofle]

Observed Fauna

- F Isoodon fusciventer
- F Setonix brachyurus

Scale
1:1,500 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: WA Now, Landgate Subscription Imagery
Cadastre, Relief Contours and Roads: Landgate 2017
IRIS Road Network: Main Roads Western Australia 2017
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Shire of Manjimup
Walpole Foreshore Area
Walpole, WA 6398

Map 9: Observed Fauna

	QA Check	Drawn by
	GM	CV
STATUS	FILE	DATE
FINAL	MANJ004	10/05/2021

Appendix B

Conservation Significant Values Likelihood of Occurrence Analysis

Table A1: Criteria for assessing the likelihood of occurrence of conservation significant flora within a 10km radius of the survey area

Likelihood	Criteria
Present	Species is recorded within the survey area.
Likely	Species has been previously recorded in close proximity and suitable habitat occurs within the survey area.
Possible	Species previously recorded within 10 km and suitable habitat occurs in the survey area.
Unlikely	Suitable habitat for the species does not occur at the survey area OR Suitable habitat may occur but the species has a highly restricted distribution, is very rare and only known from a limited number of populations.
Highly Unlikely	The survey area is outside the species' natural distribution.

Table A2: Potential conservation significant flora located within 10km of the survey area and likelihood of occurrence analysis (post survey).
NB - Species are sorted by likelihood of presence

Family	Species Name	Conservation Status (WA)	Habitat and Flowering Period (WAH, 1998-)	Flowering Period	Survey in Flowering Period	Likelihood Post Survey	Comment
Orchidaceae	*Corybas abditus*	P3	Black peaty soils. Winter-wet swamps.	Oct to Nov	N	Likely	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Orchidaceae	*Caladenia interjacens*	P4	Sand. Consolidated coastal dunes	Sep to Oct	N	Likely	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Restionaceae	*Alexgeorgea ganopoda*	P3	Peaty sand. Seasonally-wet areas.	Jan, Apr, Nov and Dec	Y	Likely	Survey occurred during flowering season
Ericaceae	*Andersonia auriculata*	P3	Grey or peaty sand, often over laterite. Swampy areas, granite outcrops	Apr to Oct	Y	Likely	Survey occurred during flowering season
Fabaceae	*Acacia semitrullata*	P4	White/grey sand, sometimes over laterite, clay. Sandplains, swampy areas.	May to Oct	Y	Likely	Survey occurred during flowering season
Rutaceae	*Boronia virgata*	P4	Peaty sand or clay. Swampy or waterlogged places	Aug to Dec or Jan to Feb	N	Likely	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Orchidaceae	*Microtis globula*	T	Peaty soils. Winter-wet swamps.	Dec to Jan	N	Possible	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Cyperaceae	*Reedia spathacea*	T	Peaty sand. Swamps, river edges.	Nov to Dec or Jan to Feb	N	Possible	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Brassicaceae	*Rorippa cygnorum*	P2	Occurs on moss swards on granite rocks or along seepage lines below granites, the latter in the eastern part of the range. (Nuytsia. 18: 79-82) Keighery, G.J. Recorded in a series of disjunct populations from the Porongurup Range to north of Walpole in the Jarrah Forest and Warren biogeographic regions		NA	Possible	*Flora survey required - unknown habitat requirements and flowering outside winter survey*
Shizaeaceae	*Schizaea rupestris*	P2	Sand. Gullies, creek banks, shaded moist rock faces.		NA	Possible	*Flora survey required - unknown habitat requirements and flowering outside winter survey*
Amantiaceae	*Amanita walpolei*	P2	This species was originally described from Walpole-Nornalup Nat. Pk., Western Australia where it is said to occur in groups under Eucalyptus jacksonii, Agonis juniperina, E. marginata, and possibly E. diversicolor and in areas dominated by E. calophylla	Fruiting May to Dec	Y	Possible	Survey occurred during fruiting season
Cyperaceae	Caustis sp. Boyanup (G.S. McCutcheon 1706)	P3	White or grey sand. This species is reported from several sites at Boyanup and the Whicher Range in grey sand within low woodlands of Jarrah, Banksia and Marri over mixed shrub and heath (Williams, et al, 2001).	Sept to Dec - limitations from research	N	Possible	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Myrtaceae	*Chamelaucium floriferum* subsp. *diffusum* - previously Chamelaucium sp. Walpole	P2			NA	Possible	*Flora survey required - Unknown habitat, soil, vegetation associations and flowering time*
Fabaceae	*Gastrolobium formosum*	P3	Clay loam. Along river banks or in swamps.	Nov	N	Possible	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Lamiaceae	*Hemigenia microphylla*	P3	Sandy clay, peaty clay, granite. Winter-wet depressions.	Sep to Dec	N	Possible	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Juncaceae	*Juncus meianthus*	P3	Black sand, sandy clay. Creeks, seepage areas.	Nov to Dec or Jan	N	Possible	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Asteraceae	*Leptinella drummondii*	P3	Clay loam, mud. Along rivers	Nov to Dec or Jan to Feb	N	Possible	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Ericaceae	*Leucopogon alternifolius*	P3	Grey/white sand. Swampy areas, seasonally wet areas.	Aug to Dec	N	Possible	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Cyperaceae	*Gahnia sclerioides*	P4	Loam, sandy soils. Moist shaded situations.		NA	Possible	*Flora survey required - associated habitat requirements and unknown flowering period*
Halorgaceae	*Gonocarpus pusillus*	P4	Grey sandy clay. Winter-wet swamps	Nov to Dec	N	Possible	*Flora survey required - associated habitat requirements and flowering outside winter survey*

Table A2 continued.

Family	Species Name	Conservation Status (WA)	Habitat and Flowering Period (WAH, 1998-)	Flowering Period	Survey in Flowering Period	Likelihood Post Survey	Comment
Halorgaceae	*Gonocarpus simplex*	P4	Peaty sand. Swamps, seasonally inundated areas.	Nov to Dec	N	Possible	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Orchidaceae	*Microtis pulchella*	P4	Peaty sand. Winter-wet swamps.	Nov to Dec or Jan	N	Possible	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Myrtaceae	*Verticordia lehmannii*	P4	Sandy clay. Winter-wet flats.	Jan or Apr to Jun or Aug or Dec	N	Possible	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Aizoaceae	*Carpobrotus pulcher*	P2			NA	Possible	*Flora survey required - Unknown habitat, soil, vegetation associations and flowering time*
Myrtaceae	*Chamelaucium* sp. Nornalup (N.G. Marchant 76/125)	P2			NA	Possible	*Flora survey required - Unknown habitat, soil, vegetation associations and flowering time*
Droseraceae	*Drosera huegelii* var. *phillmanniana*	P2			NA	Possible	*Flora survey required - Unknown habitat, soil, vegetation associations and flowering time*
Proteaceae	*Synaphea intricata*	P3	Sand, peaty sand. Flats, swampy areas	Sep to Oct	N	Possible	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Halorgaceae	*Myriophyllum trifidum*	P4	Peaty sand. Swamps, river edges.	Nov to Dec or Jan	N	Possible	*Flora survey required - associated habitat requirements and flowering outside winter survey*
Proteaceae	*Banksia verticillata*	T	Sandy loam. On or beside granite outcrops	Jan to Apr	N	Unlikely	Incorrect associated habitat
Sphagnaceae	*Sphagnum novozelandicum*	P2	Moss associated with defined narrow and permanently flowing creeklines		NA	Unlikely	Incorrect associated habitat
Rutaceae	*Boronia anceps*	P3	White sand, gravelly laterite. Seasonally swampy heath. Not previously recorded in vicinity	Sept to Dec or Jan	N	Unlikely	Incorrect location
Myrtaceae	*Eucalyptus brevistylis*	P4	Sandy loam, sand.	Jan to Feb or Apr to Nov	N	Unlikely	Unlikely
Pleurophascaceae	*Pleurophascum occidentale*	P4	Grows with other mosses under the cover of myrtaceous and other shrubs. Known to occur in a wide range of habitat including shallow soils on the edge of granite, deep white sand on laterite, sandy clay loam on sandstone, pink sand on sandstone as well as sandy soils some distance from granite outcrops	Nov	N	Unlikely	Usually associated with Granite, but posed granite. It is common beneath shrubs of Agonis flexuosa, Thryptomene saxicola, and Calytrix acutifolia. Mosses common in the vicinity are Campylopus bicolor . Needs Confirming.
Malvaceae	*Thomasia quercifolia*	P4	Coastal heath on secondary limestone (Wheeler et al. 2002).	Apr, Aug, Oct, Nov or Dec	N	Unlikely	Incorrect soil type
Asparagaceae	*Chamaexeros longicaulis*	P2	Grey or white sand, sandy clay with lateritic gravel.	Oct to Nov	N	Unlikely	Incorrect soil type
Solanceae	*Anthocercis sylvicola*	P3	Sand.	Oct	N	Unlikely	Incorrect soil type
Fabaceae	*Aotus carinata*	P4	Sandy soils. Seasonally wet flats.	Sept to Nov	N	Unlikely	Incorrect soil type
Proteaceae	*Banksia serra*	P4	Gravel, sand or clay loam over laterite. Hillslopes	Jul to Sept	N	Unlikely	Incorrect soil type
Proteaceae	*Banksia sessilis* var. *cordata*	P4	White/grey sand. Coastal limestone	Jul to Oct	N	Unlikely	Incorrect soil type
Loganiaceae	*Adelphacme minima*	P3	Post Fire	Sept to Oct, Nov to Jan	N	Unlikely	Incorrect associated habitat

Table A3: Conservation Code definitions for Threatened and Priority Ecological Communities located within 10km of the survey area.

Community Name	Status	Description	Survey Outcome
Subtropical and Temperate Coastal Saltmarsh	Priority 3 (WA) VU (EPBC Act)	Consists of the assemblage of plants, animals and micro-organisms associated with saltmarsh in coastal regions of sub-tropical and temperate Australia (south of 23oS latitude). The habitat is coastal areas under tidal influence. In southern latitudes saltmarsh are the dominant habitat in the intertidal zone and often occur in association with estuaries. It is typically restricted to the upper intertidal environment, generally between the elevation of the mean high tide, and the mean spring tide. The community consists mainly of salt-tolerant vegetation (halophytes) including: grasses, herbs, reeds, sedges and shrubs. Succulent herbs and grasses generally dominate and vegetation is generally <0.5m tall with the exception of some reeds and sedges. Many species of non-vascular plants are also found in saltmarsh, including epiphytic algae, diatoms and cyanobacterial mats. Saltmarsh consists of many vascular plant species but is dominated by relatively few families. There is also typically a high degree of endemism at the species level. The two most widely represented coastal saltmarsh plant families are the Chenopodiaceae and Poaceae. Four structural saltmarsh forms are currently recognised based on dominance of a particular vegetation type: • dominance by succulent shrubs (e.g. Tecticornia) • dominance by grasses (e.g. Sporobolus virginicus) • dominance by sedges and grasses (e.g. Juncus kraussii, Gahnia trifida) • dominance by herbs (e.g. low-growing creeping plants such as Wilsonia backhousei, Samolus repens, Schoenus nitens).	Not present within the survey area – identified as within 10 km of the survey area by the desktop survey Coastal Saltmarsh [CSM] Vegetation unit

Table A4: Condition thresholds for the 'Subtropical and Temperate Saltmarsh' ecological community

Condition Category	Minimum patch size	Weeds	Dieback
Moderate/High	0.4 ha with no more than 30m between individual patches	< 50% perennial weed cover	May be present or absent

Subtropical and Temperate Coastal Saltmarsh: Approved Conservation Advice (DWER, 2013) description and key diagnostic features

The community "consists of the assemblage of plants, animals and micro-organisms associated with saltmarsh in coastal regions of sub-tropical and temperate Australia (south of 23 Degrees S latitude). It occurs on the coastal margin, along estuaries and coastal embayments and on low wave energy coast in places with at least some tidal connection, including rarely-inundated supratidal areas, intermittently opened or closed lagoons, and groundwater tidal influences. The community occurs on sandy or muddy substrate and may include coastal clay pans and similar habitats. It consists of dense to patchy areas of characteristic coastal saltmarsh plant species that include salt- tolerant herbs, succulent shrubs or grasses, and may also include bare sediment as part of the mosaic. It can occur where the proportional cover by tree canopy such as mangroves, *Melaleucas* or *Casuarinas* or seagrass is not greater than 50%.' (DBCA, 2020).

The description, area and condition thresholds that apply to the EPBC-listed TEC of the same name, also apply to this Priority ecological community. The approved conservation advice, available spatial mapping for the ecological community, and description above indicates that this PEC is likely to occur within the survey area.

Step 1: Key diagnostic characteristics

The ecological community is the assemblage of organisms including and associated with coastal subtropical and temperate saltmarsh. Key diagnostic characteristics for describing the *Coastal Saltmarsh* ecological community include:

- occurs below 23° S latitude - from the central Mackay coast on the east coast of Australia, southerly around to the Carnarvon bioregion on the west coast of Australia, and including the Tasmanian coast;
- occurs on the coastal margin, along estuaries and coastal embayments and on low wave energy coasts;
- may occur on offshore coastal islands;
- occurs primarily on sandy, muddy substrate and may include coastal clay pans; and
- consists of dense to patchy areas of characteristic coastal saltmarsh plant species (that may also include bare sediment as part of the mosaic) that have a connection with a tidal regime (i.e. in intertidal and supratidal zones).

Key ecologically significant species comprising this ecological community are as follows:

- *Sporobolus virginicus* (salt couch) - the most widely distributed saltmarsh plant
- *Sarcocornia quinqueflora* (beaded glasswort/samphire) - dominates in wetter parts of coastal saltmarsh zone
- *Juncus kraussii* (rush) - dominates in fresher conditions at landward fringe/upstream estuary in coastal saltmarsh zone
- *Samolus repens* (creeping brookweed, water pimpernel; monogeneric in Australia) - low-growing herb
- *Suaeda australis* (seabite) - in drier, better drained conditions than *Sarcocornia*
- *Tecticornia pergranulata* (blackseed samphire) - succulent shrub up to1 m (rare in NSW)
- *Triglochin striata* (three-ribbed or stalked arrowgrass) - common in less well drained depressions of saltmarsh plain
- *Gahnia filum* (clumped sedge) - can grow up to 1.5 m.

In addition, a sub-grouping of this vegetation type is identified as the 'South-western coast Group', characteristic of the following species:

- *T. halocnemoides*
- *Rhagodia baccata*
- *Atriplex hypoleuca*
- *Frankenia tetrapetala*
- *T. indica bidens*
- *T. Pterygosperma pterygosperma*
- *Atriplex paludosa.*

Table A5: Potential conservation significant fauna located within 10km of the survey area and likelihood of occurrence analysis (post survey).

Family	Scientific Name	Vernacular	Status (WA) / EPBC Act (Cth)	Desktop Search			Habitat Description & Survey Method	Habitat Present (Y/N)	Likelihood of detection of species if present	Species Present (Y/N)	Comments
				Naturemap	PMST	DBCA					
Scolopacidae	*Actitis hypoleucos*	Common Sandpiper	MI / MI	X	X		Almost entirely coastal, coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats	Y	HIGH	N	
Apodidae	*Apus pacificus*	Fork-tailed Swift	MI / MI		X		Dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh (Higgins 1999). Almost exclusively aerial, flying from less than 1 m to at least 300 m above ground over inland plains but sometimes above foothills or in coastal areas.	Y	HIGH	N	
Procellariidae	*Ardenna carneipes*	Flesh-footed Shearwater, Fleshy-footed Shearwater	VU / MI	X	X		Mainly occurs in the subtropics over continental shelves and slopes and occasionally inshore waters. Breeds on islands in burrows on sloping ground in coastal forest, scrubland, shrubland or grassland.	N	Not Applicable. No habitat present	N	
Procellariidae	*Ardenna grisea*	Sooty Shearwater	MI / MI		X		Marine species. Occurs in pelagic (open ocean) sub-tropical, sub-Antarctic and Antarctic waters.	N	Not Applicable. No habitat present	N	
Migidae	*Bertmainius mysticus*	Mystical pygmy trapdoor spider	P2 / -	X			Shallow burrows on the bark of karri and marri trees (*Eucalyptus diversicolor* and *Corymbia calophylla*) or in soil on the banks of creek lines and gullies.	N	Not Applicable. No habitat present	N	
Migidae	*Bertmainius tingle*	Tingle pygmy trapdoor spider	EN/ EN	X	X		Shallow burrows on the bark of tingle trees (*Eucalyptus guilfoylei*, *E. jacksonii* and *E. brevistylis*), karri trees (*E. diversicolor*) or marri (*Corymbia calophylla*) or in soil on the banks of creek lines and gullies.	N	Not Applicable. No habitat present	N	
Potoroidae	*Bettongia penicillata subsp. ogilbyi*	Woylie	CR/ EN	X	X		Tall eucalypt forests and woodlands, dense myrtaceous shrublands, and kwongan (proteaceous) or mallee heath	N	Not Applicable. No habitat present	N	
Ardeidae	*Botaurus poiciloptilus*	Australasian Bittern	EN / EN		X		Wetlands, permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds (e.g. Phragmites, Cyperus, Eleocharis, Juncus, Typha, Baumea, Bolboschoenus) or cutting grass (Gahnia) growing over a muddy or peaty substrate	N	Not Applicable. No habitat present	N	
Scolopacidae	*Calidris acuminata*	Sharp-tailed Sandpiper	MI / MI		X		Muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	N	Not Applicable. No habitat present	N	
Scolopacidae	*Calidris canutus*	Red Knot, knot	EN / EN & MI	X	X		Intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs.	N	Not Applicable. No habitat present	N	
Scolopacidae	*Calidris ferruginea*	Curlew Sandpiper	CR / CR & MI	X	X		Intertidal mudflats in sheltered coastal areas, non-tidal swamps, lakes and lagoons near the coast, and occasionally around ephemeral and permanent lakes and dams with bare edges of mud or sand	N	Not Applicable. No habitat present	N	
Scolopacidae	*Calidris melanotos*	Pectoral Sandpiper	MI / MI		X		Shallow fresh to saline wetlands.	Y	HIGH	N	
Scolopacidae	*Calidris tenuirostris*	Great Knot	CR / CR & MI	X			Intertidal mudflats and sandflats in sheltered coasts, including bays harbours and estuaries.	N	Not Applicable. No habitat present	N	
Cacatuidae	*Calyptorhynchus banksii subsp. naso*	Forest Red-tailed Black Cockatoo	VU / VU	X	X		Foraging habitat includes vegetation containing proteaceous heath/woodland, eucalypt woodlands or forest (particularly Marri and Jarrah forest) and Pinus spp. Breeding habitat includes large, mature trees containing suitable sized hollows, proximate to high quality feeding habitat.	N	Not Applicable. No habitat present	N	
Cacatuidae	*Calyptorhynchus baudinii*	Baudin's Cockatoo, White-tailed Long-billed Black Cockatoo	EN / EN	X	X		Hollows of large, mature trees. Foraging habitat includes vegetation containing proteaceous heath/woodland, eucalypt woodlands or forest (particularly Marri and Jarrah forest) and Pinus spp.	N	Not Applicable. No habitat present	N	
Cacatuidae	*Calyptorhynchus latirostris*	Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo	EN / EN	X	X		Eucalypt woodlands, especially those that contain salmon gum and wandoo, and in shrubland or kwongan heathland dominated by hakea, dryandra, banksia and grevillea species. It also occurs in remnant patches of native vegetation on land otherwise cleared for agriculture. It also forages in forests containing marri, jarrah or karri	N	Not Applicable. No habitat present	N	

Table A5 continued

Family	Scientific Name	Vernacular	Status (WA) / EPBC Act (Cth)	Desktop Search			Habitat Description & Survey Method	Habitat Present (Y/N)	Likelihood of detection of species if present	Species Present (Y/N)	Comments
				Naturemap	PMST	DBCA					
Cycliosomatidae	*Cynotelopus notabilis*	Western Australian Pill Millipede	EN / -	X			Deep litter, particularly at the base of any large Tingle or Karri trees. Species has been found under rocks associated with granite tors, under logs, karri bark, and in leaf litter within high rainfall karri and tingle forests.	N	Not Applicable. No habitat present	N	
Dasyuridae	*Dasyurus geoffroii*	Chuditch, Western Quoll	VU / VU	X	X		Woodland or forest. Logs must have a diameter > 30 cm and a hollow with 7–20 cm diameter and 1 m length.	N	Not Applicable. No habitat present	N	
Diomedeidae	*Diomedea amsterdamensis*	Amsterdam Albatross	CR/ -		X		Marine, pelagic seabird. It nests in open patchy vegetation (among tussocks, ferns or shrubs) near exposed ridges or hillocks. Sleeps and rests on ocean waters when not breeding	N	Not Applicable. No habitat present	N	
Diomedeidae	*Diomedea dabbenena*	Tristan Albatross	CR/ EN & MI		X		Marine, pelagic seabird that sleeps and rests on ocean waters when not breeding.	N	Not Applicable. No habitat present	N	
Diomedeidae	*Diomedea epomophora*	Southern Royal Albatross	VU / VU & MI		X		Marine, pelagic seabird that sleeps and rests on ocean waters when not breeding.	N	Not Applicable. No habitat present	N	
Diomedeidae	*Diomedea exulans*	Wandering Albatross	VU / VU & MI		X		Marine, pelagic seabird that sleeps and rests on ocean waters when not breeding.	N	Not Applicable. No habitat present	N	
Diomedeidae	*Diomedea sanfordi*	Northern Royal Albatross	EN / EN & MI		X		Marine, pelagic and aerial. Habitat includes subantarctic, subtropical, and occasionally Antarctic waters	N	Not Applicable. No habitat present	N	
Elapidae	*Elapognathus minor*	Short-nosed Snake	P2 / -	X			Heath, swamps and wet sclerophyll forest. Inhabits heaths edging swamps and shelters in low dense vegetation such as tussocks and sedges	Y	LOW	N	This species is likely to be dormant at the time of survey
Parastacidae	*Engaewa walpolea*	Walpole Burrowing Crayfish	EN/ EN	X	X		Habitat usually has very moist soils and a shallow, very accessible watertable. These habitats include surface seepages, swamp plains and shallow swampy creeklines	Y	MOD	N	No mounds or individuals were evident and there was surface water present across a large proportion of the survey area at the time of survey. This species is generally associated with peaty soils, which were not present within the survey area.
Galaxiidae	*Galaxiella munda*	Mud minnow	VU / -	X			Relatively undisturbed, permanent stream habitats (rather than the ephemeral wetland habitats where black-stripe minnow are typically found). Prefers small, gently flowing creeks and streams. Found in low pH environments (as low as pH 3), but low salt tolerance (susceptible to salinisation)	N	Not Applicable. No habitat present	N	
Galaxiidae	*Galaxiella nigrostriata*	Blackstriped Dwarf Galaxias,	EN /		X		Generally found in ephemeral, tannin-stained wetland habitats. Slow-running, tea-coloured streams usually in sandy areas. Also found in swamps, small ponds and roadside ditches. Lives in the vegetated shallows of some freshwater lakes. Water is typically acidic (pH 4.5-6.5) and darkly tannin-stained.	N	Not Applicable. No habitat present	N	
Myobatrachidae	*Geocrinia lutea*	Nornalup Frog, Walpole Frog	P4 / -	X			Dense riparian vegetation on peaty sand, bordering streams and seeps. Often on the edge of a forest.	Y	HIGH	N	
Geotriidae	*Geotria australis*	Pouched Lamprey	P3 / -	X			Species is anadromous and requires estuaries and coastal waters connected to freshwater rivers and streams with slow flowing, fine sediment microhabitats where spawning and development of ammocoetes occurs.	N	Not Applicable. No habitat present	N	
Procellariidae	*Halobaena caerulea*	Blue Petrel	- / VU		X		Pelagic, occasionally over shallow waters.	N	Not Applicable. No habitat present	N	
Muridae	*Hydromys chrysogaster*	Water-rat, Rakali	P4 / -	X			Permanent fresh or brackish water, subalpine streams and other inland waterways to lakes, swamps, and farm dams	Y	HIGH	N	
Laridae	*Hydroprogne caspia*	Caspian Tern	MI / MI		X		Sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred. They also occur on near-coastal or inland terrestrial wetlands that are either fresh or saline, especially lakes (including ephemeral lakes), waterholes, reservoirs, rivers and creeks	N	Not Applicable. No habitat present	N	

Table A5 continued

Family	Scientific Name	Vernacular	Status (WA) / EPBC Act (Cth)	Desktop Search			Habitat Description & Survey Method	Habitat Present (Y/N)	Likelihood of detection of species if present	Species Present (Y/N)	Comments
				Naturemap	PMST	DBCA					
Peramelidae	*Isoodon fusciventer*	Quenda, southwestern brown bandicoot	P4 / -	X			Scrubby, often swampy, vegetation with dense cover up to 1 m high, often feeding in adjacent forest and woodland that is burnt on a regular basis. Forest, woodlands, heath and coastal scrub, usually on sandy combination soils.	Y	HIGH	Y	Diggings present in low numbers throughout the thicket and heath components of the vegetation
Scolopacidae	*Limosa lapponica*	Bar-tailed Godwit	MI (& VU or CR at subsp. level) / MI (& VU or CR at subsp. level)	X	X		Inhabit estuarine mudflats, beaches and mangroves.	N	Not Applicable. No habitat present	N	
Scolopacidae	*Limosa lapponica menzbieri*	Northern Siberian Bar-tailed Godwit	CR (& MI at sp. level) / CR (& MI at sp. level) /		X		Occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It 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 & Davies 1996).	N	Not Applicable. No habitat present	N	
Procellariidae	*Macronectes giganteus*	Southern Giant-Petrel	MI / VU & MI		X		Marine; Antarctic to subtropical waters.	N	Not Applicable. No habitat present	N	
Procellariidae	*Macronectes halli*	Northern Giant Petrel	MI / EN & MI		X		Marine, oceanic; mainly in subantarctic waters.	N	Not Applicable. No habitat present	N	
Motacillidae	*Motacilla cinerea*	Grey Wagtail	MI / MI		X		Species has a strong association with water (wetlands, water courses banks of lakes and marshes, artificial wetlands).	Y	HIGH	N	
Percichthyidae	*Nannatherina balstoni*	Balston's Pygmy Perch	VU / VU		X		Acidic, tannin-stained freshwater pools, streams and lakes in peat flats within 30 km of the coast of south-west Western Australia. The species prefers shallow water, and is commonly associated with tall sedge thickets and inundated riparian vegetation (Allen et al. 2002; Morgan et al. 1998).	N	Not Applicable. No habitat present	N	
Macropodidae	*Notamacropus eugenii subsp. derbianus*	Tammar Wallaby	P4 / -	X			Dense, low vegetation for daytime shelter and open grassy areas for feeding. This species inhabits coastal scrub, heath, dry sclerophyll forest and thickets in mallee and woodland.	Y	HIGH	N	
Scolopacidae	*Numenius madagascariensis*	Eastern Curlew	CR / CR & MI	X	X		Intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons.	N	Not Applicable. No habitat present	N	
Laridae	*Onychoprion anaethetus*	Bridled Tern	MI / MI		X		Occupy tropical and subtropical seas, breeding on islands, including vegetated coral cays, rocky continental islands and rock stacks. Bridled Terns are only rarely found in inshore continental waters and along mainland coastlines, though the species is reported to breed on the mainland of far southern Western Australia (Higgins & Davies 1996; Johnstone & Storr 1998).	N	Not Applicable. No habitat present	N	
Anatidae	*Oxyura australis*	Blue-billed Duck	P4 / -	X			Prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation	N	Not Applicable. No habitat present	N	
Procellariidae	*Pachyptila turtur subantarctica*	Fairy Prion (southern)	- / VU		X		Sub-Antarctic seas and islands while breeding. Subtropical seas non breeding time; rarely inshore expect when sheltering from storms.	N	Not Applicable. No habitat present	N	
Accipitridae	*Pandion cristatus*	Osprey, Eastern Osprey	MI / MI	X			Littoral and coastal habitats and terrestrial wetlands and offshore islands. Requires extensive areas of open fresh, brackish or saline water for foraging	Y	HIGH	Y	Adult startled from the Swarbrick jetty and landed in a mature *Taxandria juniperina* on the NW corner of the western survey cell
Psittacidae	*Pezoporus flaviventris*	Western Ground Parrot	CR / CR	X			Preferred habitat includes low coastal and near coastal heathlands, unburnt for at least five years (Higgins 1999).	N	Not Applicable. No habitat present	N	
Dasyuridae	*Phascogale tapoatafa subsp. wambenger*	South-western Brush-tailed Phascogale, Wambenger	CD / -	X			Sclerophyll forests and open woodlands that contain hollow-bearing trees.	N	Not Applicable. No habitat present	N	
Diomedeidae	*Phoebetria fusca*	Sooty Albatross	EN / VU & MI		X		Marine; pelagic in subtropical and subantarctic waters. Breeds on islands in the southern Indian and Atlantic Oceans	N	Not Applicable. No habitat present	N	

Table A5 continued.

Family	Scientific Name	Vernacular	Status (WA) / EPBC Act (Cth)	Desktop Search			Habitat Description & Survey Method	Habitat Present (Y/N)	Likelihood of detection of species if present	Species Present (Y/N)	Comments
				Naturemap	PMST	DBCA					
Pseudocheiridae	*Pseudocheirus occidentalis*	Western Ringtail Possum, ngwayir	CR / CR	X	X		Suitable habitat in the southern forests includes Jarrah, Marri or Karri dominated forests. South coast habitat includes coastal heath, Jarrah/Marri woodland and forest, Peppermint Tree woodland, myrtaceous heaths and shrublands, Bullich dominated riparian zones and Karri Forest (DPAW 2014)	N	Not Applicable. No habitat present	N	
Procellariidae	*Pterodroma mollis*	Soft-plumaged Petrel	- / VU		X		Is a marine, oceanic species.	N	Not Applicable. No habitat present	N	
Procellariidae	*Puffinus huttoni*	Hutton's Shearwater	EN / -	X			Marine species. Breeds in burrows on gentle to steep mountain slopes under tussock grass or low alpine scrubland.	N	Not Applicable. No habitat present	N	
Macropodidae	*Setonix brachyurus*	Quokka	VU / VU	X	X		Woodland, forest, coastal heath, thicket and riparian vegetation	Y	HIGH	Y	High level of scat and runnel activity throughout the survey area
Myobatrachidae	*Spicospina flammocaerulea*	Sunset frog	VU/ EN		X		Peat swamps	N	Not Applicable. No habitat present	N	
Stercorariidae	*Stercorarius antarcticus*	Brown Skua	P4 / -	X			During the breeding season, the subspecies is found on subantarctic islands, with nests located from the coast up to several kilometres inland. They also nest on offshore islets. During the non-breeding period all birds depart from Maquarie Island and Heard Island and disperse/migrate over oceanic waters away from their nesting localities	N	Not Applicable. No habitat present	N	
Laridae	*Sternula nereis nereis*	Australian Fairy Tern	VU / VU		X		Sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline	N	Not Applicable. No habitat present	N	
Diomedeidae	*Thalassarche carteri*	Indian Yellow-nosed Albatross	EN / VU & MI		X		Marine bird, located in subtropical and warmer subantarctic waters (Marchant & Higgins 1990).	N	Not Applicable. No habitat present	N	
Diomedeidae	*Thalassarche cauta cauta*	Shy Albatross	VU / VU & MI		X		Marine species. Breeds on rock islands.	N	Not Applicable. No habitat present	N	
Diomedeidae	*Thalassarche cauta steadi*	White-capped Albatross	VU / VU & MI		X		Marine species and occurs in subantarctic and subtropical waters.	N	Not Applicable. No habitat present	N	
Diomedeidae	*Thalassarche impavida*	Campbell Albatross	VU / VU & MI		X		Marine sea bird inhabiting sub-Antarctic and subtropical waters from pelagic to shelf-break water habitats	N	Not Applicable. No habitat present	N	
Diomedeidae	*Thalassarche melanophris*	Black-browed Albatross	EN / VU & MI		X		Marine species that inhabits Antarctic, subantarctic and temperate waters and occasionally enters the tropics.	N	Not Applicable. No habitat present	N	
Laridae	*Thalasseus bergii*	Crested Tern	MI / MI	X			Coastal bays and inlets, lakes and large rivers	N	Not Applicable. No habitat present	N	
Charadriidae	*Thinornis rubricollis*	Hooded Plover, Hooded Dotterel	P4 / -	X			Ocean sandy beaches and coastal lakes.	N	Not Applicable. No habitat present	N	
Scolopacidae	*Tringa nebularia*	Common Greenshank, greenshank	MI / MI		X		Inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass.	N	Not Applicable. No habitat present	N	
Hyriidae	*Westralunio carteri*	Carter's Freshwater Mussel	VU / -	X	X		Patchily distributed in sandy/muddy sediments of freshwater lakes, rivers and streams with greatest densities associated with woody debris and overhanging riparian vegetation near stream banks and edges of lakes/dams	N	Not Applicable. No habitat present	N	

Appendix C

Conservation Status Definitions and Condition Scale

Table A6: Conservation code definitions for flora and fauna as listed as threatened or specially protected.

Threatened, Extinct and Specially Protected fauna or flora are species which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

Threat Category	Definition
Threatened - Critically endangered species (CR)	Facing an extremely high risk of extinction in the wild in the immediate future
Threatened - Endangered species (EN)	Facing a very high risk of extinction in the wild in the near future
Threatened - Vulnerable species (VU)	Facing a high risk of extinction in the wild in the medium-term future
Threatened - Extinct (EX)	There is no reasonable doubt that the last member of the species has died
Threatened – Extinct in the wild (EW)	Species 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
Specially protected species - Migratory species (MI)	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 are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.
Specially protected species – Conservation Dependent (CD)	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened,
Specially protected species – Other specially protected species (OS)	Fauna otherwise in need of special protection to ensure their conservation

Table A7: Conservation code definitions for flora and fauna as listed as Priority.

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3.

Threat Category	Definition
Priority 1: Poorly-known species	Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, 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.
Priority 2: Poorly-known species	Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g., national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation.
Priority 3: Poorly-known species	Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat.
Priority 4: Rare, Near Threatened and other species in need of monitoring	(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Table A8: Conservation code definitions for ecological communities listed as threatened (TEC).

Threat Category	Definition
Presumed Totally Destroyed (PD)	An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.
Critically Endangered (CR)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.
Endangered (EN)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.
Vulnerable (VU)	An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

Table A9: Conservation code definitions for ecological communities listed as priority (PEC).

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community List under priorities 1, 2 and 3.

Threat Category	Definition
Priority One (P1)	Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤100ha), and appear to be under immediate threat.
Priority Two (P2)	Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation.
Priority Three (P3)	(i)Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii)communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or; (iii)communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc.
Priority Four (P4)	Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.
Priority Five (P5)	Conservation Dependent ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Table A10: Condition Rating Scale (adapted from Keighery 1994) outlined in EPA (2016a).

Vegetation Condition Rating	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
Very good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.

Appendix D

Species Lists and Relevé Data

Table A11: Flora Species List recorded within survey area.

Family	Genus	Species	Subspecies	Common Name	Cons Code
Apiaceae	*Centella*	*asiatica*		Centella	
Aspleniaceae	*Asplenium*	*flabellifolium*		Necklace Fern	
Asparagaceae	*Asparagus*	*aethiopicus*			*
Asteraceae	*Cirsium*	*vulgare*		Slender Thistle	*
Asteraceae	*Hypochaeris*	*radicata*		Flatweed	*
Asteraceae	*Sonchus*	*oleraceus*		Common Sowthistle	*
Caryophyllaceae	*Cerastium*	*glomeratum*		Mouse Ear Chickweed	*
Cyperaceae	*Cyperus*	*rotundus*		Nut Grass	*
Cyperaceae	*Ficinia*	*nodosa*		Knotted Club Rush	
Cyperaceae	*Gahnia*	*decomposita*			
Cyperaceae	*Gahnia*	*trifida*		Coastal Saw Sedge	
Cyperaceae	*Lepidosperma*	*effusum*		Spreading Sword Sedge	
Cyperaceae	*Lepidosperma*	*gladiatum*		Coastal Sword Sedge	
Dennstaedtiaceae	*Pteridium*	*esculentum*		Bracken Fern	
Dennstaedtiaceae	*Histiopteris*	*incisa*		Water Fern	
Dicranaceae	*Campylopus*	*introflexus*		Heath Star Moss	*
Euphorbiaceae	*Homalanthus*	*novo-guineensis*		Bleeding Heart	*
Fabaceae	*Dipogon*	*lignosus*		Dolichos Pea	*
Fabaceae	*Acacia*	*hastulata*			
Fabaceae	*Callistachys*	*lanceolata*		Wonnich	
Fabaceae	*Trifolium*	*dubium*		Lesser Trefoil	*
Gentianaceae	*Centaurium*	*erythraea*		Common Centaury	*
Goodeniaceae	*Dampiera*	*hederacea*		Karri Dampiera	
Haemodoraceae	*Anigozanthos*	*viridis*			
Juncaceae	*Juncus*	*kraussii*	*australiensis*	Snogerup	
Juncaceae	*Juncus*	*pallidus*		Pale Rush	
Malvaceae	*Thomasia*	sp.			
Marasmiaceae	*Anthracophyllum*	*archeri*		Fungi	
Myrtaceae	*Agonis*	*flexuosa*		Peppermint	
Myrtaceae	*Astartea*	sp.			
Myrtaceae	*Melaleuca*	*preissiana*		Moonah	
Myrtaceae	*Melaleuca*	*rhaphiophylla*		Swamp Paperbark	
Myrtaceae	*Taxandria*	*juniperina*		Native Cedar	
Myrtaceae	*Taxandria*	*linearifolia*			
Myrtaceae	*Taxandria*	*parviceps*			
Oxalidaceae	*Oxalis*	sp.		Wood Sorrels	*
Pittosporaceae	*Billardiera*	*heterophylla*		Native Blue Bell	
Pittosporaceae	*Pittosporum*	*undulatum*		Sweet Pittosporum	*
Plantaginaceae	*Veronica*	*arvensis*		Corn Speedwell	*
Poaceae	*Aira*	*caryophyllea*		Silvery Hairgrass	*
Poaceae	*Anthoxanthum*	*odoratum*		Sweet Vernal Grass	*
Poaceae	*Briza*	*maxima*		Blowfly Grass	*
Poaceae	*Cenchrus*	*clandestinus*		Kikuyu	*
Poaceae	*Paspalum*	*distichum*		Water Couch	*
Phytolaccaceae	*Phytolacca*	*octandra*		Ink Weed	*
Restionaceae	*Chaetanthus*	*aristatus*			
Restionaceae	*Desmocladus*	*flexuosus*			
Rosaceae	*Rubus*	sp.		Blackberry	*
Solanaceae	*Physalis*	*peruviana*		Cape Gooseberry	*
Solanaceae	*Solanum*	*nigrum*		Black Nightshade	*

Relevé	R1	**Veg Code**	MCT Melpre Callan	**Date Surveyed**	05/05/2021
Location	MANJ004, Walpole Foreshore – north-east corner of survey site				
GPS (Lat, Long)	34°58'51''S 116°43'46''E				
Landform and Slope	Drainage Depression				
Soils	Sandy Loam				
Hydrology	Poor Drainage				
Vegetation description	(NVIS): M ^^ *Melaleuca preissiana, Callistachys lanceolata, Astartea* sp.\^Tree\6\c; G ^*Empodisma gracillimum*\sedge\1\c . *(*Muirs*): Melaleuca preissiana* (Moonah)*, Callistachys lanceolata* (Woonich) and *Astartea* sp. Woodland, over *Empodisma gracillimum* sedgeland				
Condition	Very Good				
Comments					

Life Form	**Dominant Species**	**Other Species**	**Cover (%)**
Trees >30m			
Trees 10-30m			
Trees <10m	*Melaleuca preissiana, Callistachys lanceolata, Astartea* sp.	*Agonis flexuosa, *Pittosporum undulatum*	30-70%
Shrub >2m			
Shrub 1-2m			
Shrub 0.5-1m			
Shrub <0.5m	*Anigozanthos viridis*		
Sedge	*Empodisma gracillimum*	*Lepidosperma effusum, Ficinia nodosa*	30-70%
Herb	**Trifolium dubium* (Clover), *Pteridium esculentum, Centella asiatica (Gotu Kola)*	**Sonchus oleraceus* (thistle)	
Grass	**Cenchrus clandestinus* (Kikuyu)	**Papspalum distichum* (Couch)	

Relevé	R2	**Veg Code**	TAW Callan Agoflex	**Date Surveyed**	05/05/2020
Location	MANJ004 Walpole Foreshore – north-west area of site				
GPS (Lat, Long)	34°58'51''S 116°43'45''E				
Landform and Slope	Drainage Depression				
Soils	Clay sand				
Hydrology	Poor drainage				
Vegetation description	(NVIS): U ^^ *Taxandria juniperina, Agonis flexuosa, Callistachys lanceolata*\^tree\6\c; G ^*Pteridium esculentum, +/- *Rubus* sp., +/- **Dipogon lignosus*\^forb,+/-vine\2\c (Muirs): *Taxandria juniperina* (Native Cedar), *Agonis flexuosa (*Native Peppermint), *Callistachys lanceolata (*Woonich) Woodland, over *Pteridium esculentum* (Bracken Fern), **Rubus* sp. (Blackberry), **Dipogon lignosus* (Dolichos Pea) forbland and vineland.				
Condition	Degraded				
Comments					

Life Form	**Dominant Species**	**Other Species**	**Cover (%)**
Trees >30m			
Trees 10-30m			
Trees <10m	*Agonis flexuosa, Taxandria juniperina*	*Melaleuca rhaphiophylla, *Homalanthus novo-guineensis, Callistachys lanceolata, Astartea sp. *Pittosporum undulatum*	30-70%
Shrub >2m			
Shrub 1-2m			
Shrub 0.5-1m			
Shrub <0.5m			
Sedge			
Herb	*Pteridium esculentum*	**Rubus* sp., **Dipogon lignosus*	30-70%
Grass			

Relevé	R3	**Veg Code**	(OWP) Open Weed Patch	**Date Surveyed**	05/05/2021
Location	MANJ004, Walpole Foreshore – northern area of site				
GPS (Lat, Long)	34°58'50''S, 116°43'47''E				
Landform and Slope	Drainage Depression				
Soils	Silty Loam				
Hydrology	Poor Drainage				
Vegetation description	(NVIS): U:^^*Callistachys lanceolata, Taxandria juniperina*\ +/-Tree\6\r; M: ^^**Rubus* sp., **Solanum nigrum, Histiopteris incisa*\ ^^Heath Shrub, Vine, Fern\3\d; G: ^^**Paspalum distichum, *Cenchrus clandestinus*\^^Grass\2\d. (Muirs): *Callistachys lanceolata* (Wonnich) and *Taxandria juniperina* (Native Cedar) sparse Woodland, over **Rubus sp.* (Blackberry), **Solanum nigrum* (Deadly Nightshade), *Histiopteris incisa* (Batswing Fern) closed shrubland/vineland/fernland, over **Paspalum distichum* (Couch) and **Cenchrus clandestinus* (Kikuyu) closed grassland.				
Condition	Completely Degraded				
Comments	-				

Life Form	**Dominant Species**	**Other Species**	**Cover (%)**
Trees >30m			
Trees 10-30m			
Trees <10m	*Callistachys lanceolata, Taxandria juniperina*	*Agonis flexuosa*	<10%
Shrub >2m			
Shrub 1-2m			
Shrub 0.5-1m			
Shrub <0.5m	*Solanum nigrum* (Nightshade), **Rubus* sp., *Histiopteris incisa*	*Pteridium esculentum, Dampiera hederacea*	70-100%
Sedge		*Ficinia nodosa, Lepidosperma effusum*	70-100%
Herb	**Trifolium dubium* (Clover)	*Anthracophyllum* sp. (fungi)	70-100%
Grass	**Paspalum distichum* (Couch), **Cenchrus clandestinus* (Kikuyu)		70-100%

Relevé	R4	**Veg Code**	(TAW) Callan Agoflex	**Date Surveyed**	05/05/2020
Location	MANJ004 Walpole Foreshore – south-west of site area				
GPS (Lat, Long)	34°58'49''S, 116°43'54''E				
Landform and Slope	Drainage Depression				
Soils	Clay sand				
Hydrology	Poor drainage				
Vegetation description	(NVIS): U ^^ *Taxandria juniperina, Agonis flexuosa, Callistachys lanceolata*\^tree\6\c; G ^*Pteridium esculentum, +/- *Rubus* sp., +/- **Dipogon lignosus*\^forb,+/-vine\2\c (Muirs): *Taxandria juniperina* (Native Cedar), *Agonis flexuosa (*Native Peppermint), *Callistachys lanceolata (*Woonich) Woodland, over *Pteridium esculentum* (Bracken Fern), **Rubus* sp. (Blackberry), **Dipogon lignosus* (Dolichos Pea) forbland and vineland.				
Condition	Degraded				
Comments	-				

Life Form	**Dominant Species**	**Other Species**	**Cover (%)**
Trees >30m			
Trees 10-30m			
Trees <10m	*Taxandria juniperina, Agonis flexuosa, Callistachys lanceolata*	*Astartea* sp.	30-70%
Shrub >2m			
Shrub 1-2m			
Shrub 0.5-1m			
Shrub <0.5m	**Physalis peruviana*		30-70%
Sedge	*Ficinia nodosa*		30-70%
Herb	*Centella asiatica*		30-70%
Grass			

Relevé	R5	**Veg Code**	(HCH) Heath Closed Heath	**Date Surveyed**	05/05/2021
Location	MANJ004 Walpole Foreshore – south-east area of site				
GPS (WGS 84)	34°58'51''S, 116°43'55''E				
Landform and Slope	Drainage Depression				
Soils	Loam				
Hydrology	Seasonally Wet				
Vegetation description	(NVIS): U: ^^*Callistachys lanceolata, Taxandria juniperina, Astartea* sp., *Acacia hastulata*\^tree\6\d; G: ^^*Juncus pallidus, Juncus kraussii* subsp. *australiensis, Desmocladus flexuosa*+/-*Sedge*\2\r (Muirs): *Callistachys lanceolata* (Wonnich), *Taxandria juniperina* (Native Cedar), *Astartea* sp., and *Acacia hastulata* closed woodland, over *Juncus pallidus* (Pale Rush), *Juncus kraussii* subsp. *australiensis* (Snogerup), and *Desmocladus flexuosa* sparse sedgeland.				
Condition	Excellent				
Comments	-				

Life Form	**Dominant Species**	**Other Species**	**Cover (%)**
Trees >30m			
Trees 10-30m			
Trees <10m	*Taxandria juniperina, Astartea* sp., *Acacia hastulata*		70-100%
Shrub >2m			
Shrub 1-2m			
Shrub 0.5-1m			
Shrub <0.5m	*Billardiera heterophylla, Anigozanthos viridis*		<10%
Sedge	*Juncus pallidus, Juncus kraussii* subsp. *australiensis, Lepidosperma effusum, Chaetanthus aristatus, Desmocladus flexuosus*		<10%
Herb			
Grass			

Table A12: Fauna species recorded within survey area.

Species	Common Name	Conservation Code	Comments
Acanthorhynchus superciliosus	Western Spinebill		
Anthochaera carunculata	Red Wattlebird		
Cherax sp.	Koonac		
Crinia glauerti	Clicking Frog		
Eopsaltria georgiana	White-breasted Robin		
Gerygone fusca	Western Gerygone		
Isoodon fusciventer	Quenda	P4	Runnels and a small number of diggings indicating low level use of the area
Litoria adelaidensis	Slender Tree Frog		
Malurus splendens	Splendid Fairy-wren		
Pandion cristatus	Osprey	MI	Startled from the Swarbrick jetty adjacent to the survey area and landed in mature *Taxandria juniperina* in the northeast corner of the western cell.
Phylidonyris novaehollandiae	New Holland Honeyeater		
Rattus fuscipes	Western Bush Rat		Burrows midslope in the woodland. Runnels in the thickets
Rhipidura leucophrys	Willie Wagtail		
Sericornis frontalis	White-browed Scrubwren		
Setonix brachyurus	Quokka	VU	Runnels and scats abundant, suggesting the area is used as a corridor
Stagonopleura oculata	Red-eared Firetail		

Appendix E

NatureMap and EPBC Act PMST reports

NatureMap
Mapping Western Australia's biodiversity

NatureMap 10km Fauna Species Report

Created By Guest user on 19/04/2021

Kingdom	Animalia
Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Line'
Vertices	34° 58' 51" S,116° 43' 43" E 34° 58' 49" S,116° 43' 54" E 34° 58' 48" S,116° 43' 58" E 34° 58' 49" S,116° 43' 59" E 34° 58' 52" S,116° 43' 59" E 34° 58' 52" S,116° 43' 56" E 34° 58' 52" S,116° 43' 53" E 34° 58' 52" S,116° 43' 48" E 34° 58' 52" S,116° 43' 45" E 34° 58' 52" S,116° 43' 43" E 34° 58' 51" S,116° 43' 43" E
Group By	Family

Family	Species	Records
Acanthizidae	6	250
Accipitridae	11	95
Aegothelidae	1	2
Aeshnidae	1	5
Anapidae	2	3
Anatidae	8	107
Anhingidae	1	5
Aracanidae	2	2
Araneidae	4	8
Ardeidae	4	22
Argiolestidae	1	1
Arkyidae	1	1
Arrenuridae	1	1
Artamidae	1	15
Atemnidae	1	9
Athericidae	1	4
Atherinidae	3	3
Atriplectididae	2	3
Aturidae	1	4
Aulopodidae	1	1
Austrocorduliidae	1	1
Balaenopteridae	1	1
Bothriuridae	1	22
Brentidae	1	1
Bythitidae	1	1
Cacatuidae	1	3
Caddidae	1	2
Caenidae	1	4
Campephagidae	1	26
Carangidae	1	1
Casuariidae	1	8
Ceratopogonidae	1	17
Charadriidae	2	52
Cheloniidae	1	2
Chernetidae	2	3
Chironomidae	26	87
Chthoniidae	2	35
Clinidae	1	1
Columbidae	2	33
Copepoda	1	1
Corduliidae	2	8
Corvidae	1	103
Cracticidae	4	118
Cuculidae	3	38
Culicidae	1	1
Dasyuridae	3	13
Desidae	2	2
Dicruridae	4	147
Diodontidae	1	1
Dytiscidae	4	7
Ecnomidae	1	5
Elapidae	6	18
Empididae	1	4
Engraulidae	1	1
Estrildidae	1	40
Eusiridae	1	1
Falconidae	4	19
Galaxiidae	3	7
Garypinidae	1	5
Gekkonidae	1	8
Geotriidae	1	2
Gerreidae	1	1
Glaucosomatidae	1	1
Gobiesocidae	1	1
Gobiidae	4	5
Gomphidae	1	2
Gripopterygidae	3	17
Haematopodidae	2	41
Halcyonidae	2	87
Henicopidae	1	1
Heteroceridae	1	1
Heterodontidae	1	3

Hirundinidae	2	91
Hydrobiosidae	1	3
Hydrophilidae	1	1
Hydropsychidae	1	4
Hydroptilidae	1	2
Hydryphantidae	1	1
Hylidae	1	6
Hyriidae	2	5
Iulomorphidae	3	17
Labridae	3	3
Lamponidae	2	3
Laridae	6	124
Lepidoptera	1	2
Leptoceridae	6	22
Leptophlebiidae	5	29
Libellulidae	1	1
Limnodynastidae	3	11
Lycosidae	6	42
Macropodidae	3	25
Maluridae	4	157
Meliphagidae	8	331
Mesoveliidae	1	1
Metopidiotrichidae	1	59
Microcanthidae	1	2
Micropholcommatidae	1	3
Migidae	2	13
Mimetidae	1	2
Mugilidae	1	1
Muraenidae	1	1
Muridae	3	42
Myobatrachidae	6	143
Naididae	1	6
Nematoda	1	1
Neosittidae	1	3
Nicodamidae	1	14
Oligochaeta	1	11
Oniscidae	2	8
Ostracoda	1	1
Oxidae	1	1
Pachycephalidae	4	54
Paradoxosomatidae	1	2
Pararchaeidae	1	1
Parastacidae	3	62
Pardalotidae	3	72
Pelecanidae	1	59
Peramelidae	1	11
Percichthyidae	1	1
Perthidae	1	16
Petroicidae	4	112
Phalacrocoracidae	5	85
Phalangeridae	1	1
Philopotamidae	1	1
Philorheithridae	1	1
Phreodrilidae	1	2
Physeteridae	1	1
Platycephalidae	1	1
Pleuronectidae	1	1
Podargidae	2	11
Podicipedidae	2	5
Pomatostomidae	1	17
Potoroidae	1	3
Procellariidae	2	2
Prodidomidae	1	1
Pseudocheiridae	1	7
Pseudotyrannochthoniidae	1	7
Psittacidae	12	365
Pygopodidae	1	1
Rallidae	4	23
Recurvirostridae	1	1
Salticidae	2	2
Scincidae	6	54
Scirtidae	1	2
Scolopacidae	4	19
Scolopendridae	1	30
Scorpaenidae	1	1
Scorpididae	1	2
Serranidae	3	4
Sillaginidae	2	2
Simuliidae	1	15
Sparassidae	1	1
Sphaerotheriidae	1	25
Stiphidiidae	1	2
Sulidae	1	1
Sylviidae	1	1
Symphytognathidae	1	1
Syngnathidae	3	3
Synodontidae	1	1
Synthemistidae	3	5
Talitridae	1	1
Tarsipedidae	1	1
Telephlebiidae	2	5
Temnocephalidea	1	5
Tetragnathidae	1	1
Tetraodontidae	2	2
Theridiidae	1	2
Threskiornithidae	2	15
Tipulidae	1	12
Triaenonychidae	1	1
Tripterygiidae	3	3
Trombidiformes	1	12
Veliidae	1	2
Vespertilionidae	5	61
Ziphiidae	1	1
Zodariidae	1	4
Zosteropidae	1	100

TOTAL	**376**	**4067**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Acanthizidae					
1.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
2.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
3.	24262	*Acanthiza inornata (Western Thornbill)*			
4.	25530	*Gerygone fusca (Western Gerygone)*			
5.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
6.	30948	*Smicrornis brevirostris (Weebill)*			
Accipitridae					
7.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
8.	25536	*Accipiter fasciatus (Brown Goshawk)*			
9.	24285	*Aquila audax (Wedge-tailed Eagle)*			
10.	24288	*Circus approximans (Swamp Harrier)*			
11.		*Elanus axillaris*			
12.	24290	*Elanus caeruleus subsp. axillaris (Australian Black-shouldered Kite)*			
13.	24293	*Haliaeetus leucogaster (White-bellied Sea-Eagle)*			
14.	24295	*Haliastur sphenurus (Whistling Kite)*			
15.	47965	*Hieraaetus morphnoides (Little Eagle)*			
16.		*Lophoictinia isura*			
17.	48591	*Pandion cristatus (Osprey, Eastern Osprey)*		IA	
Aegothelidae					
18.	25544	*Aegotheles cristatus (Australian Owlet-nightjar)*			
Aeshnidae					
19.		*Aeshnidae sp.*			
Anapidae					
20.		*Chasmocephalon flinders*			
21.		*Chasmocephalon tingle*			Y
Anatidae					
22.	24312	*Anas gracilis (Grey Teal)*			
23.	24315	*Anas rhynchotis (Australasian Shoveler)*			
24.	24316	*Anas superciliosa (Pacific Black Duck)*			
25.	24319	*Biziura lobata (Musk Duck)*			
26.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
27.	24322	*Cygnus atratus (Black Swan)*			
28.	24328	*Oxyura australis (Blue-billed Duck)*		P4	
29.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
Anhingidae					
30.	47414	*Anhinga novaehollandiae (Australasian Darter)*			
Aracanidae					
31.		*Caprichthys gymnura*			
32.		*Capropygia unistriata*			
Araneidae					
33.		*Arachnura higginsi*			
34.		*Araneus sydneyicus*			
35.		*Austracantha minax*			
36.		*Eriophora biapicata*			
Ardeidae					
37.	41324	*Ardea modesta (great egret, white egret)*			
38.	24341	*Ardea pacifica (White-necked Heron)*			
39.		*Egretta novaehollandiae*			
40.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
Argiolestidae					
41.		*Megapodagrionidae sp.*			
Arkyidae					
42.		*Arkys walckenaeri*			
Arrenuridae					
43.		*Arrenuridae sp.*			
Artamidae					
44.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
Atemnidae					
45.		*Oratemnus curtus*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Athericidae					
46.		*Athericidae sp.*			
Atherinidae					
47.		*Atherinosoma elongata*			
48.		*Atherinosoma wallacei*			
49.		*Craterocephalus pauciradiatus*			
Atriplectididae					
50.		*Atriplectides dubius*			
51.		*Atriplectididae sp.*			
Aturidae					
52.		*Aturidae sp.*			
Aulopodidae					
53.		*Aulopus purpurissatus*			
Austrocorduliidae					
54.		*Austrocorduliidae sp.*			
Balaenopteridae					
55.	24044	*Balaenoptera acutorostrata (Dwarf Minke Whale)*			
Bothriuridae					
56.		*Cercophonius sulcatus*			
Brentidae					
57.		*Brentidae sp.*			
Bythitidae					
58.		*Dipulus hutchinsi*			
Cacatuidae					
59.		*Eolophus roseicapillus*			
Caddidae					
60.		*Hesperopilio mainae*			
Caenidae					
61.		*Caenidae sp.*			
Campephagidae					
62.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
Carangidae					
63.		*Pseudocaranx dentex*			
Casuariidae					
64.	24470	*Dromaius novaehollandiae (Emu)*			
Ceratopogonidae					
65.		*Ceratopogonidae sp.*			
Charadriidae					
66.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
67.	48135	*Thinornis rubricollis (Hooded Plover, Hooded Dotterel)*		P4	
Cheloniidae					
68.	25335	*Caretta caretta (Loggerhead Turtle)*		T	
Chernetidae					
69.		*Calymmachernes angulatus*			
70.		*Conicochernes globosus*			
Chironomidae					
71.		*Aphroteniinae sp.*			
72.		*Botryocladius freemani*			
73.		*Chironominae sp.*			
74.		*Cladotanytarsus sp. A (SAP)*			
75.		*Cricotopus 'parbicinctus'*			
76.		*Gymnometriocnemus sp. 1 (=V44 = ortho sp. C & R)*			
77.		*Harrisius sp. A (SAP)*			
78.		*Harrisius sp. B (SFM)*			
79.		*Orthoclad sp. 5 (SFM)*			
80.		*Orthocladiinae sp.*			
81.		*Parakiefferiella variegatus*			
82.		*Paralimnophyes pullulus (V42)*			
83.		*Paramerina levidensis*			
84.		*Polypedilum nr. convexum (SAP)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
85.		*Polypedilum watsoni*			
86.		*Rheotanytarsus sp. (SFM)*			
87.		*Rheotanytarsus underwoodi*			
88.		*Riethia v4*			
89.		*Riethia v5*			
90.		*Stempellina sp. 1 (SFM)*			
91.		*Stictocladius occidentalis*			
92.		*Stictocladius sp.u*			
93.		*Tanypodinae sp.*			
94.		*Tanytarsus palmatus*			
95.		*Tanytarsus sp. I (SAP)*			
96.		*Thienemanniella sp. (V19) (SAP)*			
Chthoniidae					
97.		*Austrochthonius australis*			
98.		*Lagynochthonius australicus*			
Clinidae					
99.		*Heteroclinus roseus*			
Columbidae					
100.	24409	*Phaps chalcoptera (Common Bronzewing)*			
101.	25587	*Phaps elegans (Brush Bronzewing)*			
Copepoda					
102.		*Calanoida sp.*			
Corduliidae					
103.		*Corduliidae sp.*			
104.		*Procordulia affinis*			
Corvidae					
105.	25592	*Corvus coronoides (Australian Raven)*			
Cracticidae					
106.	25595	*Cracticus tibicen (Australian Magpie)*			
107.	25596	*Cracticus torquatus (Grey Butcherbird)*			
108.	25597	*Strepera versicolor (Grey Currawong)*			
109.	24426	*Strepera versicolor subsp. plumbea (Grey Currawong)*			
Cuculidae					
110.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
111.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
112.	24432	*Chrysococcyx lucidus subsp. plagosus (Shining Bronze Cuckoo)*			
Culicidae					
113.		*Culicidae sp.*			
Dasyuridae					
114.	24088	*Antechinus flavipes subsp. leucogaster (Yellow-footed Antechinus, Mardo)*			
115.	24092	*Dasyurus geoffroii (Chuditch, Western Quoll)*		T	
116.	48070	*Phascogale tapoatafa subsp. wambenger (South-western Brush-tailed Phascogale, Wambenger)*		S	
Desidae					
117.		*Badumna microps*			
118.		*Baiami tegenarioides*			
Dicruridae					
119.	24443	*Grallina cyanoleuca (Magpie-lark)*			
120.	25610	*Myiagra inquieta (Restless Flycatcher)*			
121.	48096	*Rhipidura albiscapa (Grey Fantail)*			
122.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
Diodontidae					
123.		*Tragulichthys jaculiferus*			
Dytiscidae					
124.		*Dytiscidae sp.*			
125.		*Sternopriscus browni*			
126.		*Sternopriscus minimus*			
127.		*Sternopriscus sp.*			
Ecnomidae					
128.		*Ecnomidae sp.*			
Elapidae					
129.	25251	*Echiopsis curta (Bardick)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
130.	25250	*Elapognathus coronatus (Crowned Snake)*			
131.	25290	*Elapognathus minor (Short-nosed Snake)*		P2	
132.	25252	*Notechis scutatus (Tiger Snake)*			
133.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
134.	30818	*Rhinoplocephalus bicolor (Square-nosed Snake)*			
Empididae					
135.		*Empididae sp.*			
Engraulidae					
136.		*Engraulis australis*			
Estrilidae					
137.	24645	*Stagonopleura oculata (Red-eared Firetail)*			
Eusiridae					
138.		*Eusiridae sp.*			
Falconidae					
139.	25621	*Falco berigora (Brown Falcon)*			
140.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
141.	25623	*Falco longipennis (Australian Hobby)*			
142.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
Galaxiidae					
143.		*Galaxias maculatus*			
144.	34028	*Galaxias occidentalis (Western Minnow)*			
145.	34026	*Galaxiella munda (mud minnow, western dwarf galaxias)*		T	
Garypinidae					
146.		*Protogarypinus giganteus*			
Gekkonidae					
147.	24980	*Christinus marmoratus (Marbled Gecko)*			
Geotriidae					
148.	34030	*Geotria australis (Pouched Lamprey)*		P3	
Gerreidae					
149.		*Gerres subfasciatus*			
Glaucosomatidae					
150.		*Glaucosoma hebraicum*			
Gobiesocidae					
151.		*Aspasmogaster occidentalis*			
Gobiidae					
152.		*Arenigobius bifrenatus*			
153.		*Callogobius depressus*			
154.		*Eviota sp.*			
155.		*Favonigobius lateralis*			
Gomphidae					
156.		*Gomphidae sp.*			
Gripopterygidae					
157.		*Gripopterygidae sp.*			
158.		*Newmanoperla exigua*			
159.		*Riekoperla occidentalis*			
Haematopodidae					
160.	25627	*Haematopus fuliginosus (Sooty Oystercatcher)*			
161.	24487	*Haematopus longirostris (Pied Oystercatcher)*			
Halcyonidae					
162.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
163.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
Henicopidae					
164.		*Dichelobius flavens*			
Heteroceridae					
165.		*Heteroceridae sp.*			
Heterodontidae					
166.		*? ?*			
Hirundinidae					
167.	24491	*Hirundo neoxena (Welcome Swallow)*			
168.	48061	*Petrochelidon nigricans (Tree Martin)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Hydrobiosidae					
169.		*Hydrobiosidae sp.*			
Hydrophilidae					
170.		*Hydrophilidae sp.*			
Hydropsychidae					
171.		*Hydropsychidae sp.*			
Hydroptilidae					
172.		*Hydroptilidae sp.*			
Hydryphantidae					
173.		*Hydryphantidae sp.*			
Hylidae					
174.	25378	*Litoria adelaidensis (Slender Tree Frog)*			
Hyriidae					
175.		*Hyriidae sp.*			
176.	34113	*Westralunio carteri (Carter's Freshwater Mussel)*		T	
Iulomorphidae					
177.		*Atelomastix ellenae*			
178.		*Atelomastix francesae*			
179.		*Samichus decoratus*			
Labridae					
180.		*Coris auricularis*			
181.		*Notolabrus parilus*			
182.		*Pictilabrus sp.*			
Lamponidae					
183.		*Asadipus kunderang*			
184.		*Lampona brevipes*			
Laridae					
185.		*Chroicocephalus novaehollandiae*			
186.	48587	*Hydroprogne caspia (Caspian Tern)*		IA	
187.	25638	*Larus pacificus (Pacific Gull)*			
188.	48116	*Stercorarius antarcticus (Brown Skua)*		P4	
189.	48594	*Sternula nereis (Fairy Tern)*			
190.	48597	*Thalasseus bergii (Crested Tern)*		IA	
Lepidoptera					
191.		*Lepidoptera (non-pyralid)*			
Leptoceridae					
192.		*Condocerus aptus*			
193.		*Lectrides parilis*			
194.		*Leptoceridae sp.*			
195.		*Notalina sp. AV15 (PSW)*			
196.		*Notoperata sp. AV4 (SFM)*			
197.		*Triplectides sp. AV1 (SFM)*			
Leptophlebiidae					
198.		*Bibulmena kadjina*			
199.		*Leptophlebiid genus S sp. AV1*			
200.		*Leptophlebiidae sp.*			
201.		*Nousia sp. AV16*			
202.		*Nyungara bunni*			
Libellulidae					
203.		*Libellulidae sp.*			
Limnodynastidae					
204.	25410	*Heleioporus eyrei (Moaning Frog)*			
205.	25412	*Heleioporus psammophilus (Sand Frog)*			
206.	25415	*Limnodynastes dorsalis (Western Banjo Frog)*			
Lycosidae					
207.		*Artoria cingulipes*			
208.		*Artoria flavimana*			
209.		*Artoriopsis expolita*			
210.		*Venator immansueta*			
211.		*Venatrix pullastra*			
212.		*Venonia micarioides*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Macropodidae					
213.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
214.	48024	*Notamacropus eugenii subsp. derbianus (Tammar Wallaby, Tammar)*		P4	
215.	24145	*Setonix brachyurus (Quokka)*		T	
Maluridae					
216.	25650	*Malurus elegans (Red-winged Fairy-wren)*			
217.	25654	*Malurus splendens (Splendid Fairy-wren)*			
218.	25655	*Stipiturus malachurus (Southern Emu-wren)*			
219.	24554	*Stipiturus malachurus subsp. westernensis (Southern Emu-wren)*			
Meliphagidae					
220.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
221.	24561	*Anthochaera carunculata (Red Wattlebird)*			
222.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
223.	24567	*Epthianura albifrons (White-fronted Chat)*			
224.	47962	*Glyciphila melanops (Tawny-crowned Honeyeater)*			
225.	25661	*Lichmera indistincta (Brown Honeyeater)*			
226.	48071	*Phylidonyris niger (White-cheeked Honeyeater)*			
227.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
Mesoveliidae					
228.		*Mesoveliidae sp.*			
Metopidiotrichidae					
229.		*Australeuma peckorum*			Y
Microcanthidae					
230.		*Neatypus obliquus*			
Micropholcommatidae					
231.		*Raveniella peckorum*			
Migidae					
232.	47853	*Bertmainius mysticus (mystical pygmy trapdoor spider)*		P2	Y
233.	47894	*Bertmainius tingle (Tingle pygmy trapdoor spider)*		T	
Mimetidae					
234.		*Australomimetus djuka*			
Mugilidae					
235.		*Mugil cephalus*			
Muraenidae					
236.		*Gymnothorax prasinus*			
Muridae					
237.	24215	*Hydromys chrysogaster (Water-rat, Rakali)*		P4	
238.	24243	*Rattus fuscipes (Western Bush Rat)*			
239.	24245	*Rattus rattus (Black Rat)*	Y		
Myobatrachidae					
240.	25398	*Crinia georgiana (Quacking Frog)*			
241.	25399	*Crinia glauerti (Clicking Frog)*			
242.	25404	*Geocrinia leai (Ticking Frog)*			
243.	25405	*Geocrinia lutea (Nornalup Frog, Walpole Frog)*		P4	
244.	25406	*Geocrinia rosea (Roseate Frog)*			
245.	25419	*Metacrinia nichollsi (Forest Toadlet)*			
Naididae					
246.		*Naididae sp.*			
Nematoda					
247.		*Nematoda sp.*			
Neosittidae					
248.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
Nicodamidae					
249.		*Ambicodamus marae*			
Oligochaeta					
250.		*Oligochaeta sp.*			
Oniscidae					
251.		*Haloniscus sp.*			
252.		*Oniscidae sp.*			
Ostracoda					
253.		*Ostracoda (unident.)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Oxidae					
254.		*Oxidae sp.*			
Pachycephalidae					
255.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
256.	25677	*Falcunculus frontatus (Crested Shrike-tit)*			
257.	24616	*Falcunculus frontatus subsp. leucogaster (Western Shrike-tit, Crested Shrike-tit)*			
258.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
Paradoxosomatidae					
259.		*Akamptogonus novarae*			
Pararchaeidae					
260.		*Ozarchaea harveyi*			
Parastacidae					
261.	33939	*Cherax cainii (Marron)*			
262.	33947	*Engaewa walpolea (Walpole Burrowing Crayfish)*		T	
263.		*Parastacidae sp.*			
Pardalotidae					
264.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
265.	24625	*Pardalotus punctatus subsp. punctatus (Spotted Pardalote)*			
266.	25682	*Pardalotus striatus (Striated Pardalote)*			
Pelecanidae					
267.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
Peramelidae					
268.	48588	*Isoodon fusciventer (Quenda, southwestern brown bandicoot)*		P4	
Percichthyidae					
269.		*Nannoperca vittata*			
Perthidae					
270.		*Perthiidae sp.*			
Petroicidae					
271.	24652	*Eopsaltria georgiana (White-breasted Robin)*			
272.	47997	*Melanodryas cucullata (Hooded Robin)*			
273.	25693	*Microeca fascinans (Jacky Winter)*			
274.	48066	*Petroica boodang (Scarlet Robin)*			
Phalacrocoracidae					
275.		*Microcarbo melanoleucos*			
276.	25697	*Phalacrocorax carbo (Great Cormorant)*			
277.	24665	*Phalacrocorax fuscescens (Black-faced Cormorant)*			
278.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
279.	25699	*Phalacrocorax varius (Pied Cormorant)*			
Phalangeridae					
280.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			
Philopotamidae					
281.		*Hydrobiosella michaelseni*			
Philorheithridae					
282.		*Philorheithridae sp.*			
Phreodrilidae					
283.		*Phreodrilidae sp.*			
Physeteridae					
284.	24073	*Physeter macrocephalus (Sperm Whale)*		T	
Platycephalidae					
285.		*Platycephalus sp.*			
Pleuronectidae					
286.		*Ammotretis rostratus*			
Podargidae					
287.	25703	*Podargus strigoides (Tawny Frogmouth)*			
288.	24679	*Podargus strigoides subsp. brachypterus (Tawny Frogmouth)*			
Podicipedidae					
289.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
290.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
Pomatostomidae					

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
291.	24683	*Pomatostomus superciliosus (White-browed Babbler)*			
Potoroidae					
292.	24162	*Bettongia penicillata subsp. ogilbyi (Woylie, Brush-tailed Bettong)*		T	
Procellariidae					
293.	41326	*Ardenna carneipes (Flesh-footed Shearwater, Fleshy-footed Shearwater)*		T	
294.	24715	*Puffinus huttoni (Hutton's Shearwater)*		T	
Prodidomidae					
295.		*Myandra bicincta*			
Pseudocheiridae					
296.	24166	*Pseudocheirus occidentalis (Western Ringtail Possum, ngwayir)*		T	
Pseudotyrannochthoniidae					
297.		*Pseudotyrannochthonius giganteus*			
Psittacidae					
298.		*Barnardius zonarius*			
299.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
300.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black Cockatoo)*		T	
301.	24733	*Calyptorhynchus baudinii (Baudin's Cockatoo, White-tailed Long-billed Black Cockatoo)*		T	
302.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
303.	48400	*Calyptorhynchus sp. (white-tailed black cockatoo)*		T	
304.	24738	*Neophema elegans (Elegant Parrot)*			
305.	24739	*Neophema petrophila (Rock Parrot)*			
306.	41348	*Pezoporus flaviventris (Western Ground Parrot)*		T	
307.	25720	*Platycercus icterotis (Western Rosella)*			
308.	24745	*Platycercus icterotis subsp. icterotis (Western Rosella)*			
309.		*Purpureicephalus spurius*			
Pygopodidae					
310.	25008	*Pygopus lepidopodus (Common Scaly Foot)*			
Rallidae					
311.	25727	*Fulica atra (Eurasian Coot)*			
312.	25730	*Gallirallus philippensis (Buff-banded Rail)*			
313.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
314.	24771	*Porzana tabuensis (Spotless Crake)*			
Recurvirostridae					
315.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
Salticidae					
316.		*Maratus pavonis*			
317.		*Servaea incana*			
Scincidae					
318.	42368	*Acritoscincus trilineatus (Western Three-lined Skink)*			
319.	25049	*Ctenotus labillardieri*			
320.	25100	*Egernia napoleonis*			
321.	30919	*Hemiergis gracilipes (skink)*			
322.	25117	*Hemiergis peronii subsp. peronii*			
323.	25154	*Lerista microtis subsp. microtis*			
Scirtidae					
324.		*Scirtidae sp.*			
Scolopacidae					
325.	41323	*Actitis hypoleucos (Common Sandpiper)*		IA	
326.	24790	*Calidris tenuirostris (Great Knot)*		T	
327.	30932	*Limosa lapponica (Bar-tailed Godwit)*		IA	
328.	24798	*Numenius madagascariensis (Eastern Curlew)*		T	
Scolopendridae					
329.		*Cormocephalus hartmeyeri*			
Scorpaenidae					
330.		*Scorpaena n. sp. A*			
Scorpididae					
331.		*Scorpis aequipinnis*			
Serranidae					
332.		*Acanthistius serratus*			
333.		*Caesioperca rasor*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
334.		*Epinephelides armatus*			
Sillaginidae					
335.		*Sillaginodes punctata*			
336.		*Sillago schomburgkii*			
Simuliidae					
337.		*Simuliidae sp.*			
Sparassidae					
338.		*Isopeda leishmanni*			
Sphaerotheriidae					
339.	43347	*Cynotelopus notabilis (Western Australian Pill Millipede)*		T	
Stiphidiidae					
340.		*Karriella walpolensis*			Y
Sulidae					
341.	48008	*Morus serrator (Australasian Gannet)*			
Sylviidae					
342.	25758	*Megalurus gramineus (Little Grassbird)*			
Symphytognathidae					
343.		*Symphytognatha picta*			
Syngnathidae					
344.		*Heraldia nocturna*			
345.		*Lissocampus runa*			
346.		*Urocampus carinirostris*			
Synodontidae					
347.		*Saurida grandisquamis*			
Synthemistidae					
348.		*Archaeosynthemis occidentalis*			
349.		*Archaeosynthemis spiniger*			
350.		*Synthemistidae sp.*			
Talitridae					
351.		*Talitridae sp.*			
Tarsipedidae					
352.	24167	*Tarsipes rostratus (Honey Possum, Noolbenger)*			
Telephlebiidae					
353.		*Austroaeschna anacantha*			
354.		*Telephlebiidae sp.*			
Temnocephalidea					
355.		*Temnocephalidea sp.*			
Tetragnathidae					
356.		*Pinkfloydia harveii*			
Tetraodontidae					
357.		*Contusus brevicaudus*			
358.		*Torquigener pleurogramma*			
Theridiidae					
359.		*Emertonella maga*			
Threskiornithidae					
360.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
361.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
Tipulidae					
362.		*Tipulidae sp.*			
Triaenonychidae					
363.		*Lomanella peltonychium*			
Tripterygiidae					
364.		*Helcogramma decurrens*			
365.		*Lepidoblennius marmoratus*			
366.		*Trinorfolkia clarkei*			
Trombidiformes					
367.		*Acariformes sp.*			
Veliidae					

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
368.		*Veliidae sp.*			
Vespertilionidae					
369.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
370.	24187	*Chalinolobus morio (Chocolate Wattled Bat)*			
371.	24195	*Nyctophilus gouldi (Gould's Long-eared Bat)*			
372.	41424	*Nyctophilus major (Greater Long-eared Bat)*			
373.	24206	*Vespadelus regulus (Southern Forest Bat)*			
Ziphiidae					
374.	24083	*Ziphius cavirostris (Cuvier's Beaked Whale)*			
Zodariidae					
375.		*Storosa tetrica*			
Zosteropidae					
376.	25765	*Zosterops lateralis (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 wholely 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.

Australian Government

Department of Agriculture, Water and the Environment

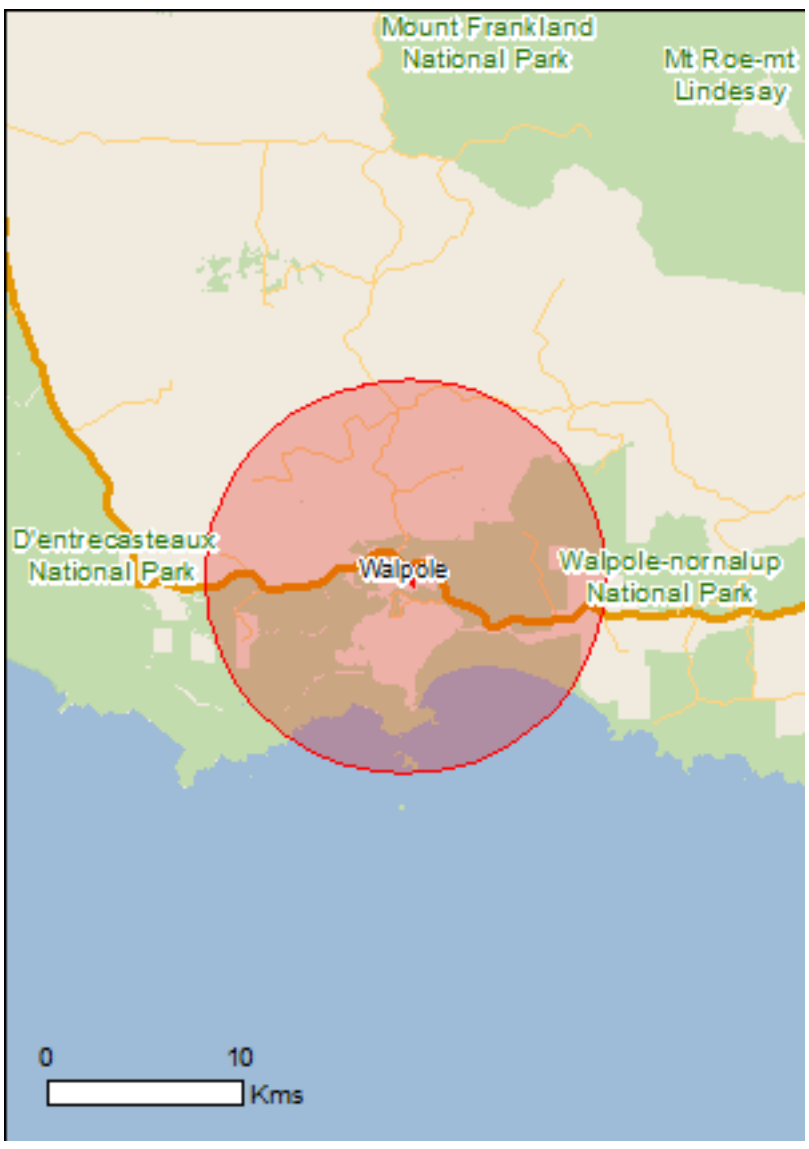
EPBC Act Protected Matters Report

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: 19/04/21 17:28:52



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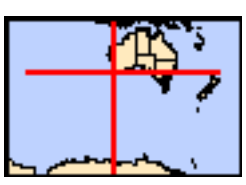

Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	53
Listed Migratory Species:	44

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	64
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	3
Regional Forest Agreements:	1
Invasive Species:	20
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

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

Name	Status	Type of Presence
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to 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
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

Name	Status	Type of Presence
Halobaena caerulea		
Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica menzbieri		
Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Critically Endangered	Species or species habitat 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
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 likely to occur within area
Phoebetria fusca		
Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to 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	Foraging, feeding or related behaviour 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
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		
Engaewa walpolea		
Walpole Burrowing Crayfish [82676]	Endangered	Species or species habitat known to occur within area
Fish		
Galaxiella nigrostriata		
Blackstriped Dwarf Galaxias, Black-stripe Minnow [88677]	Endangered	Species or species habitat may occur within area
Nannatherina balstoni		
Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Spicospina flammocaerulea		
Sunset Frog [64782]	Vulnerable	Species or species

Name	Status	Type of Presence
		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 likely to occur within area
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area
[Megaptera novaeangliae](#) Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	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 likely to occur within area
[Setonix brachyurus](#) Quokka [229]	Vulnerable	Species or species habitat known to occur within area
Other		
[Bertmainius tingle](#) Tingle Pygmy Trapdoor Spider [89126]	Endangered	Species or species habitat known to occur within area
[Westralunio carteri](#) Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat likely to occur within area
Plants		
[Banksia verticillata](#) Granite Banksia, Albany Banksia, River Banksia [8333]	Vulnerable	Species or species habitat likely to occur within area
[Caladenia harringtoniae](#) Harrington's Spider-orchid, Pink Spider-orchid [56786]	Vulnerable	Species or species habitat may occur within area
[Calectasia cyanea](#) Blue Tinsel Lily [7669]	Critically Endangered	Species or species habitat may occur within area
[Diuris drummondii](#) Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat known to occur within area
[Drakaea micrantha](#) Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat known to occur within area
[Kennedia glabrata](#) Northcliffe Kennedia [16452]	Vulnerable	Species or species habitat likely to occur within area
[Microtis globula](#) South-Coast Mignonette Orchid [6780]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
[Reedia spathacea](#)		
Reedia [2995]	Critically Endangered	Species or species habitat known to occur within area
Reptiles		
[Caretta caretta](#)		
Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
[Chelonia mydas](#)		
Green Turtle [1765]	Vulnerable	Breeding likely to occur within area
[Dermochelys coriacea](#)		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Sharks		
[Carcharias taurus (west coast population)](#)		
Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely 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]		Breeding known to occur within area
[Ardenna grisea](#)		
Sooty Shearwater [82651]		Species or species habitat may occur within area
[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
[Hydroprogne caspia](#)		
Caspian Tern [808]		Breeding 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

Name	Threatened	Type of Presence
		habitat may occur within area
[Onychoprion anaethetus](#) Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat likely 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
[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 area
[Carcharhinus longimanus](#) Oceanic Whitetip Shark [84108]		Species or species habitat may occur within 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	Breeding likely to occur within area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Breeding likely 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		Species or species

Name	Threatened	Type of Presence
Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994] Manta birostris		habitat may occur within area
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	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 Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat 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 likely to 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 known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land -

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea 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 likely to 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
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 known to occur within area

Name	Threatened	Type of Presence
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat 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
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Puffinus assimilis Little Shearwater [59363]		Breeding known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Breeding known to occur within area
Puffinus griseus Sooty Shearwater [1024]		Species or species habitat may occur within area
Sterna anaethetus Bridled Tern [814]		Foraging, feeding or related behaviour likely to occur within area
Sterna caspia Caspian Tern [59467]		Breeding 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

Name	Threatened	Type of Presence
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
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely 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 breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		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
Leptoichthys fistularius Brushtail Pipefish [66248]		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 runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		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

Name	Threatened	Type of Presence
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]	Endangered	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely 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

Name	Status	Type of Presence
Delphinus delphis Common Dophin, 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	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		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

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Mount Frankland South	WA
Unnamed WA29777	WA
Walpole-Nornalup	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 Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
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
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
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-34.980722 116.728507,-34.980221 116.731651,-34.980098 116.732251,-34.979992 116.732949,-34.980045 116.733228,-34.98066 116.733389,-34.981118 116.73326,-34.980995 116.73164,-34.981118 116.730159,-34.981188 116.728614,-34.980731 116.728518

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

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

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

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