

Whitfords Nodes Foreshore Flora, Fauna and Fungi Survey

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Abbreviations

| Abbreviation | Description |
|--------------------|--|
| BAM Act | <i>Biosecurity and Agriculture Management Act 2007 (WA)</i> |
| BoM | Bureau of Meteorology |
| the City | City of Joondalup |
| cm | centimetres |
| CoJ | City of Joondalup |
| DAFWA | Department of Agriculture and Food Western Australia |
| DEC | Department of Environment and Conservation (now known as Department of Parks and Wildlife) |
| DotE | Department of the Environment (formerly known as Department of Sustainability, Environment, Water, Populations and Communities [SEWPaC]) |
| DRF | Declared Rare Flora |
| ESA | Environmentally Sensitive Area |
| ELA | Eco Logical Australia |
| EPA | Environmental Protection Authority |
| EP Act | <i>Environmental Protection Act 1986 (WA)</i> |
| EPBC Act | <i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i> |
| FCT | Floristic Community Type |
| GPS | Global Positioning System |
| ha | Hectare |
| IBRA | Interim Biogeographical Regionalisation for Australia |
| IUCN | International Union for Conservation of Nature |
| km | Kilometre |
| L | Litre |
| LED | Light Emitting Diode |
| m | Metre |
| mm | Millimetre |
| P | Priority flora or Priority fauna listed by Parks and Wildlife |
| Parks and Wildlife | The Department of Parks and Wildlife |

| Abbreviation | Description |
|--------------|---|
| PEC | Priority Ecological Community |
| PMST | Protected Matters Search Tool |
| PUBF | Perth Urban Bushland Fungi project |
| Q | Quadrat |
| S | Specially protected fauna |
| SEWPaC | Department of Sustainability, Environment, Water, Populations and Communities (now known as Department of the Environment [DotE]) |
| T | Threatened |
| TEC | Threatened Ecological Community |
| VU | Vulnerable |
| WA | Western Australia |
| WAH | Western Australian Herbarium |
| WAM | Western Australian Museum |
| WAPC | Western Australian Planning Commission |
| WC Act | <i>Wildlife Conservation Act 1950 (WA)</i> |
| WoNS | Weed of National Significance |

Executive summary

Eco Logical Australia was commissioned by the City of Joondalup to undertake a flora, fauna and fungi survey within Whitfords Nodes Foreshore, an area of bushland located in the suburbs of Hillarys and Kallaroo, approximately 20 km north-west of Perth. The principle objective of the study was to collect baseline information on ecological values to be utilised in the development of a Whitfords Nodes Foreshore Management Plan by the City of Joondalup.

The flora survey was conducted from the 1st – 2nd of October 2015. The fauna survey was undertaken over five days from the 26th - 30th October 2015. During both surveys, any incidental sightings of fungi were also recorded. Vegetation communities were described through the establishment of eight 10 m x 10 m quadrats. Target weed species, fungi and conservation listed flora were recorded and mapped through systematic traverses. Floristic Community Type (FCT) analysis was also undertaken. Systematic fauna trapping was undertaken over four nights using standard methods at six trap transects. Opportunistic searches and sampling were also carried out, along with nocturnal searches, bird census, hand searches, bat survey and invertebrate survey.

A total of 79 flora taxa were identified within the study area. This total included 51 native and 28 introduced taxa. No Threatened or conservation significant flora species were recorded in the study area. Of the introduced flora species recorded, three are listed as City of Joondalup priority weeds. Two species of fungi were also opportunistically recorded during the survey.

Three vegetation communities were described within the study area. The FCT analysis confirmed that two FCTs occur within the study area:

- FCT 29b - *Acacia* shrublands on taller dunes, southern Swan Coastal Plain (corresponds to ELA vegetation community types 1 and 2: ArActOS and SgOaS)
- FCT 29a - Coastal shrublands on shallow sands (corresponds to ELA vegetation community type 3: OaApRbLOS).

Both FCT 29a and 29b are listed as Priority 3 Priority Ecological Communities.

The condition of the vegetation across the study area was mostly Very Good to Excellent, with some areas in Good or Completely Degraded condition. Lower condition areas were generally associated with parkland and cleared areas.

A total of 53 species of vertebrate fauna taxa were recorded within the study area, including 16 reptiles, 30 birds and seven mammals (two native and five introduced). In addition, 53 invertebrate species from 17 orders were recorded. Three conservation listed fauna species were recorded: *Isoodon obesulus fusciventer* (Quenda), *Merops ornatus* (Rainbow Bee-eater) and *Pandion haliaetus* (Osprey). A further two species (*Calyptorhynchus latirostris* [Carnaby's Black-Cockatoo] and *Synemon gratiosa* [Grace Sun-moth]) are considered likely to occur in the study area. Eleven introduced fauna species were recorded, comprising five mammals, four birds and two invertebrates.

Recommendations for the study area are to implement weed control and to establish a priority weed list for coastal bushland, consider revegetation of degraded areas, remove illegally dumped rubbish, conduct a bushfire assessment and develop a bushfire management plan, implement feral animal control, and consider installing black cockatoo nest tubes in large trees in the southern section of the study area.

1 Introduction

1.1 Project background

Whitfords Nodes Foreshore (the study area) is a coastal area of bushland located in the suburbs of Hillarys and Kallaroo, approximately 20 km north-west of Perth (**Figure 1**). The study area is bound by Northside Drive to the south, Whitfords Avenue and Northshore Drive along the eastern boundary and Merrifield Place to the north (**Figure 1**).

The study area is a Natural Area vested with and managed by the City of Joondalup (the City). The requirement for management plans for Natural Areas was previously identified in the City of Joondalup Biodiversity Action Plan 2009-2019 (City of Joondalup 2015). In accordance with the Action Plan, Eco Logical Australia (ELA) was commissioned by the City to undertake a flora, fauna and fungi survey within the study area. Baseline information collected during the survey will be utilised in the development of a Whitfords Nodes Foreshore Management Plan by the City.

1.2 Legislative framework

This survey has been undertaken to meet requirements under the Western Australian (WA) *Environmental Protection Act 1986* (EP Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The survey is also consistent with WA Environmental Protection Authority (EPA) guidelines. Specifically, the survey was undertaken in accordance with the following:

- EPA Guidance Statement No. 51 - Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA 2004a)
- EPA Guidance Statement No. 56 - Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (EPA 2004b)
- EPA Position Statement No. 3 - Terrestrial Biological Surveys as an Element of Biodiversity Protection (EPA 2002)
- EPA and Department of Environment and Conservation (DEC) Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA and DEC 2010)
- EPBC Act referral guidelines for three Threatened Black Cockatoo species (Department of Sustainability, Environment, Water, Population and Communities [SEWPaC] 2012).

1.3 Project objectives

The objectives of the flora, fauna and fungi survey were to:

- Document, describe and map the vegetation communities present and provide a full species inventory, including fungi records
- Establish the occurrence and extent of EPBC Act listed, Declared Rare Flora [DRF], Priority species and other significant flora within the study area
- Complete statistical analysis to determine the occurrence of Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs)
- Establish the extent and map weed species, according to the priority weed list supplied by the City
- Assess and map vegetation structure and condition
- Establish the occurrence, distribution, population, age and breeding occurrence of native vertebrate fauna species where possible

- Establish the occurrence of conservation significant species, WA *Wildlife Conservation Act 1950* (WC Act), and EPBC Act listed or internationally listed fauna
- Record incidental observations and opportunistic trapping (bycatch) of invertebrates
- Describe and map native vertebrate fauna habitat and condition, in terms of potential to sustain populations
- Make recommendations to conserve biodiversity values.



Figure 1: Study area location

2 Desktop review

2.1 Study area

The study area covers a total area of approximately 79 ha which includes native bushland, parkland, car parks and roads/tracks (**Figure 1**). Approximately 67 ha of the study area contains plant communities of high conservation value and, as such, is considered to be regionally significant and has been designated as part of Bush Forever Site 325. Bush Forever Site 325 covers a larger area that includes the study area and extends north up to Burns Beach (**Figure 1**). The study area comprises Whitfords Nodes Kallaroo in the northern section and Whitfords Nodes Hillarys in the southern section.

Whitfords Nodes Kallaroo is an area of low dunes, sandy beach and a vegetated coastal foreshore reserve approximately 150 m wide. Facilities include a large car park, an ablution block and the Northshore Drive parking station, which provides access to the beach (Natural Areas Consulting 2014a).

Whitfords Nodes Hillarys includes Pinnaroo Point and the Whitfords Nodes Beach Park. Pinnaroo Point comprises a wide sandy beach, low dunes and a vegetated area extending 120-250 m (City of Joondalup 2014). Facilities include a grassed playground area, ablution block and shaded picnic tables. Hillarys Beach Park is located just north of Hillarys Boat Harbour and is a predominately eroding beach, due to impacts to sand flow from harbour activities. The beach is narrow and dunes are high, with vegetated areas 150-300 m wide (Natural Areas Consulting 2014a). Facilities include an extensive grassed picnic and barbeque area, an ablution block and a lookout point. There is a small wetland in the south just north of Northside Drive.

2.2 Bioregion

The Interim Biogeographical Regionalisation for Australia (IBRA) Version 7 recognises 89 geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information. The 89 bioregions are further refined into 419 subregions which are more localised and homogenous geomorphological units in each bioregion (Department of the Environment [DotE] 2015a).

The study area lies within the Swan Coastal Plain bioregion. The Swan Coastal Plain bioregion is further divided into two subregions:

- Dandaragan Plateau (SWA1): Cretaceous marine sediments are mantled by sands and laterites. Characterised by *Banksia* low woodland, Jarrah - Marri woodland, Marri woodland, and by scrub-heaths on laterite pavement and on gravelly sandplains (Desmond 2001). The subregional area is 383,465 ha (DotE 2015a).
- Perth (SWA2): Low lying coastal plain mainly covered in woodlands. It is dominated by *Banksia* or Tuart on sandy soils, *Casuarina obesa* on outwash plains, and paperbark in swampy areas. In the east, the plain rises to duricrusted Mesozoic sediments dominated by Jarrah woodland. Three phases of marine sand dune development provide relief. The outwash plains, once dominated by *C. obesa*-Marri woodlands and *Melaleuca* shrublands, are extensive only in the south (Mitchell et al. 2002). The subregional area is 1,142,334 ha (DotE 2015a).

The study area falls within the Perth (SWA2) subregion.

2.3 Climate

The Perth subregion experiences a warm, Mediterranean climate with hot dry summers and mild wet winters (Mitchell et al. 2002). Based on climate data from the nearby Bureau of Meteorology (BoM) Wanneroo weather station (station number 9105, rainfall data 1906 – current, located approximately 10 km north of the study area), the study area received a total of 532.5 mm of rainfall for 2015 (BoM 2015). This is below the annual average rainfall of 801.5 mm, with most rainfall occurring during the winter months of June, July and August (164.6 mm, 162.6 mm and 121.9 mm respectively) (BoM 2015). Mean monthly maximum temperatures experienced in the area range from 14.2 °C in July to 41.1 °C in February, and mean monthly minimum temperatures range from 5.1 °C in July to 25 °C in January (based on temperature data recorded at Hillarys Boat Harbour weather station (station number 9265); BoM 2015).

2.4 Landform, geology and soils

The geology of the study area comprises the Safety Bay Sands and is situated on the Quindalup Dune System (Government of WA 2000).

The Quindalup Dune System has formed recently and exhibits undulating and dramatic landscape features. It comprises calcareous coastal Holocene sands on the western margin of the Swan Coastal Plain and contains the most recent Aeolian dunes. The system is characterised by unconsolidated white calcareous sands that form a series of parabolic and nested parabolic dunes and relict cusped beach-ridge plains (Government of WA 2000). The Quindalup dunes are underlain by the Safety Bay Sands formation, which comprises calcareous soils derived from Tamala limestone (Semeniuk 1989).

One major soil type is found in the study area, namely soils associated with the Quindalup Dune System, which are generally loose, white calcareous sands with little organic matter present. They are associated with parabolic dunes of varying age, undulating landscapes within the dune system, and little soil profile development.

2.5 Flora and vegetation

Vegetation within the Perth metropolitan area has been described by Heddle et al. (1980) as vegetation complexes. The vegetation of the study area is mapped as 'Quindalup Complex on Quindalup Dunes'. The Quindalup Complex is a coastal dune complex consisting mainly of two alliances – the strand and foredune alliance and the mobile and stable dune alliance. Local variations include the low closed forest of *Melaleuca lanceolata* – *Callitris preissii* and the closed scrub of *Acacia rostellifera* (Heddle et al. 1980). The pre-European extent remaining within the Swan Coastal Plain IBRA region for the Quindalup Complex is 49% (EPA 2015).

The vegetation of the southern Swan Coastal Plain has been systematically surveyed and defined into Floristic Community Types (FCTs) by Gibson et al. (1994). The floristic analysis defined 30 FCTs, with some groups further subdivided and, in all, a total of 43 types and sub-types have been recognised (Gibson et al. 1994). The Quindalup Complex supports FCTs 17, 19a, 19b, 29a, 29b, 30a2, 30c2, 30b, S11, S13, and S14 (Government of WA 2000).

FCT 29a (Coastal shrublands on shallow sands) has previously been sampled within Bush Forever Site 325¹ and a further four FCTs are inferred to occur within Bush Forever Site 325 (Government of WA 2000):

- 29b *Acacia* shrublands on taller dunes
- S11 Northern *Acacia rostellifera* — *Melaleuca acerosa* shrublands
- S13 Northern *Olearia axillaris* — *Scaevola crassifolia* shrublands
- S14 *Spinifex longifolius* grasslands and low shrublands.

2.6 Conservation and environmentally sensitive areas

Environmentally Sensitive Areas (ESAs) are defined in the Environmental Protection (Environmentally Sensitive Areas) Notice 2005 under section 51B of the EP Act. ESAs include areas declared as World Heritage, areas included on the Register of the National Estate², defined wetlands, vegetation containing Threatened flora, TECs, and Bush Forever sites.

The Bush Forever project developed and implemented a plan to protect 51,000 ha of regionally significant vegetation within the Swan Coastal Plain portion of the Perth metropolitan area. This occurred through the identification of 287 Bush Forever sites representing a minimum (where possible) of 10% of each of the 26 vegetation complexes identified in the Bush Forever study area (Government of WA 2000). Bush Forever identified a strip of coastal vegetation containing the study area as being required to meet retention targets and it was subsequently designated as Bush Forever Site 325.

There are no known records of Threatened flora or TECs within the study area (Department of Parks and Wildlife [Parks and Wildlife] 2015a; DotE 2015b).

2.7 Priority ecological communities

PECs are biological flora or fauna communities that are recognised to be of significance, but do not meet the criteria for a TEC. There are five categories of PECs, none of which are currently protected under legislation (see **Appendix A**). The latest listing of PECs recognises 31 PECs for the Swan Coastal Plain bioregion (Parks and Wildlife 2015b).

The 'Northern Spearwood shrublands and woodlands' (SCP24) Priority 3 PEC is located approximately 3 km to the east of the study area.

2.8 Literature review and database searches

The following Commonwealth and State databases were searched for information relating to conservation significant flora, fauna and fungi in order to compile and summarise existing data and inform the field survey:

- Commonwealth EPBC Act Protected Matters Search Tool (PMST) for Threatened species and communities listed under the EPBC Act (DotE 2015b)

¹ Bush Forever Site 325 encompasses a much larger area than the study area, therefore not all of the FCTs will occur or be inferred to occur within the study area itself.

² The Register of National Estate was closed in 2007 and is no longer a statutory list. The Register of National Estate has been replaced by the National Heritage List under the EPBC Act.

- Parks and Wildlife and WA Museum (WAM) NatureMap online flora and fauna database (Parks and Wildlife 2015c).

A 2 km buffer around the study area was used for the flora and fungi database searches, and for the fauna database searches a 5 km buffer was applied around the study area. The different buffers were considered suitable based on flora and fauna assemblages expected to occur within the study area.

In addition to the databases listed above, the following reports were also reviewed, as requested by the City:

- City of Joondalup priority weeds list
- Local Biodiversity Program (formerly Perth Biodiversity Project) Natural Area Initial Field Assessments and Natural Area Initial Desktop Assessments (City of Joondalup 2009, 2012)
- Joondalup Sorrento Foreshore Reserve Flora, Fauna and Fungi Survey 2014 (Natural Area Consulting 2014)
- Syrinx Coastal Flora Study 2010 (Syrinx 2010).

Conservation codes, categories and criteria for flora and fauna protected under the EPBC Act and WC Act are provided in **Appendix A**.

2.8.1 Conservation significant flora and fungi

Flora

Specific criteria were used to assess the likelihood of occurrence of conservation significant flora potentially occurring in the study area. The likelihood of occurrence assessment was based on the species matching the criteria described in **Appendix B**.

No conservation listed flora species have been previously recorded in the study area (Parks and Wildlife 2015c). An initial 16 conservation listed flora species were identified as possibly occurring based on the desktop review. Of these, nine species were considered to potentially occur including:

- *Marianthus paralius* – listed as Threatened under the WC Act
- *Baeckea* sp. Limestone (N. Gibson & M.N. Lyons 1425) – listed as Priority 1 by Parks and Wildlife
- *Grevillea* sp. Ocean Reef (D. Pike Joon 4) – listed as Priority 1 by Parks and Wildlife
- *Leucopogon maritimus* - listed as Priority 1 by Parks and Wildlife
- *Acacia benthamii* – listed as Priority 2 by Parks and Wildlife
- *Hibbertia spicata* subsp. *leptotheca* - listed as Priority 3 by Parks and Wildlife
- *Pimelea calcicola* - listed as Priority 3 by Parks and Wildlife
- *Sarcozona bicarinata* - listed as Priority 3 by Parks and Wildlife
- *Jacksonia sericea* (Waldjumi) – listed as Priority 4 by Parks and Wildlife.

A full list of possibly occurring conservation listed flora species, including those that are considered unlikely to occur, is presented in **Appendix C**.

Fungi

Specific criteria were used to assess the likelihood of occurrence of fungi species, including conservation significant species, based on the species matching the criteria described in **Appendix B**.

A search of the NatureMap database (Parks and Wildlife 2015c) and review of previous surveys (Natural Areas Consulting 2014) identified 114 species of fungi that possibly occur within the study area based on records of occurrence within a 10 km radius (**Appendix E**). Of these, one species is of conservation

significance: *Lecania turicensis* var. *turicensis*, which is listed as Priority 2 by Parks and Wildlife. This species is considered to potentially occur within the study area as it is known to occur within similar habitat.

2.8.2 Conservation significant fauna

Specific criteria were used to assess the likelihood of occurrence of conservation significant fauna, based on the species matching the criteria described in **Appendix B**.

The desktop review identified a total of 14 conservation significant fauna species that possibly occur within the study area based on records of occurrence within a 5 km radius (**Appendix D**). It should be noted that a number of species were omitted from this list including pelagic mammals, sea turtles, sea birds, and locally extinct species. A number of migratory shorebirds identified from the literature review were included due to the occurrence of a small wetland in the southern section of the study area.

Of the 14 conservation significant fauna species, two species were considered likely to occur:

- *Calyptorhynchus latirostris* (Carnaby's Black-Cockatoo) – listed as Endangered under the EPBC Act and WC Act
- *Merops ornatus* (Rainbow Bee-eater) – listed as Migratory under the EPBC Act and WC Act.

A further eight conservation significant fauna species were considered to potentially occur:

- *Apus pacificus* (Fork-tailed Swift) - listed as Migratory under the EPBC Act and Schedule 5 under the WC Act
- *Ardea ibis* (Cattle Egret) - listed as Migratory under the EPBC Act and Schedule 5 under the WC Act
- *Ardea modesta* (Eastern Great Egret) – listed as Migratory under the EPBC Act and Schedule 5 under the WC Act
- *Pandion haliaetus* (Osprey) – listed as Migratory under the EPBC Act and Schedule 5 under the WC Act
- *Falco peregrinus* (Peregrine Falcon) – listed as Schedule 7 under the WC Act
- *Neelaps calonotus* (Black-striped Snake) – listed as Priority 3 by Parks and Wildlife
- *Synemon gratiosa* (Graceful Sun-moth) – listed as Priority 4 by Parks and Wildlife
- *Isoodon obesulus* subsp. *fusciventer* (Quenda) – listed as Priority 5 by Parks and Wildlife.

A full list of possibly occurring conservation listed fauna species, including those that are considered unlikely to occur, is presented in **Appendix D**.

3 Methodology

3.1 Survey team and timing

The flora and fungi survey was conducted by Joel Collins (Senior Botanist) from the 1st – 2nd of October 2015. The fauna field survey was conducted by Robert Browne-Cooper (Senior Zoologist), Katrina Zeehandelaar-Adams (Ecologist) and Raymond Pybus (Graduate Ecologist) from the 26th – 30th of October 2015. The timing of the surveys was optimal for this type of assessment. The survey teams' relevant qualifications, experience and licences are provided in **Table 1**.

There was 14.4 mm of rain recorded on the first day of the flora survey, but none recorded during the fauna survey. A total of 257 mm was recorded in the three months prior to the surveys (BoM 2015). This is below the long-term average for the period July – September (369.8 mm), however the timing was still considered suitable for flora and fauna surveys.

Table 1: Survey team

| Name | Qualification | Relevant experience | Licence numbers |
|-----------------------------|--|---|---|
| Flora and Vegetation Survey | | | |
| Joel Collins | BAgribus Hort (Hons) | Extensive flora surveys throughout the South West bioregions and in particular the Swan Coastal Plain. | Flora scientific collection Licence No. SL011387 DRF collection licence No.14-1516 |
| Fauna survey | | | |
| Robert Browne-Cooper | BSc Biological Science | Extensive fauna surveys within the Swan Coastal Plain and most WA bioregions. Includes target surveys for relevant conservation listed species, baseline and level 2 surveys. | Regulation 17: Licence to take fauna for scientific purposes. Licence no. SF010504 |
| Katrina Zeehandelaar-Adams | BSc (Hons) Conservation Biology and Management | Various fauna surveys within the Swan Coastal Plain, Pilbara, Mid-west and South West of WA. | |
| Raymond Pybus | BSc Environmental Biology | Field survey experience in the Swan Coastal Plain and other regions of WA. | |

3.2 Flora, vegetation and fungi survey

The survey design was aligned with methodology outlined in EPA Guidance Statement No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA 2004a) and the Perth Urban Bushland Fungi project (PUBF; PUBF 2009).

3.2.1 Flora and vegetation

The number of quadrats established to describe vegetation communities was informed using aerial imagery and previous background survey reports. Dominant vegetation communities were described and included dominant species, structure and overall condition. The survey involved the use of 10 m x 10 m quadrats and opportunistic sampling of species not recorded within the quadrats to inform a species inventory of the study area. EPA Guidance Statement No. 51 states a minimum of two quadrats per vegetation community are required to be established (EPA 2004a). Eight quadrats were installed within the study area and their locations are provided in **Figure 2**.

The following data were recorded as part of the flora and vegetation survey:

- Vegetation structure classes, cover of all species observed in quadrats and dominant species lists for each vegetation community in accordance with Keighery (1994)
- Full species inventory (angiosperm and gymnosperm) of both native and introduced species across the study area
- Vegetation condition assessment in accordance with Keighery (1994)
- Other observational data such as abiotic/environmental variables.

A targeted survey was completed within the study area for conservation listed flora, communities and weeds including:

- Threatened flora listed under the EPBC Act
- Threatened (Declared Rare) Flora listed under the latest WA Wildlife Conservation (Rare Flora) Notice
- Priority flora recognised by Parks and Wildlife
- Declared Pest plants under the WA *Biosecurity and Agriculture Management Act 2007* (BAM Act), and Weeds of National Significance (WoNS)
- Introduced weed species listed on the City's priority weed list.

The survey methodology involved personnel walking meandering transects across the study area as well as outside the study area boundary if required. The locations of ELA transects are shown in **Figure 2**.

In addition to point locations, the following data were collected for any conservation listed species identified in the study area:

- Number of individuals and/or percent cover (recording a range of coordinates if necessary)
- Estimates were made for groups of individuals within a 20 m radius and for large populations to record a significant area polygon
- Reproductive phase (flowering, fruiting, etc.)
- Description of dominant vegetation unit in which the species is located
- Associated dominant species
- Photograph of the plant in situ.

The detailed weed survey was completed in conjunction with the conservation listed flora and vegetation survey. This included pest plants, priority weeds, declared pest plants and WoNS. Particular focus was made along the boundaries of the study area, along tracks and other areas of increased disturbance.

When encountered, mapping of weeds was undertaken using 'point' or 'density' mapping, or a combination of both. Where density mapping was used, four density categories were used: <5%, 6-30%, 31-60% and >61% cover for each species.

Except where specifically noted, the field survey was undertaken using an Android Nexus 7 tablet operating the ArcGIS Collector app. These units can have errors of 3-20 m (subject to availability of satellites on the day) with an average of 5 m.

3.2.2 FCT analysis

Flora species lists for each quadrat were entered into the statistical analysis package Primer (version 6.1.11). The complete dataset of Gibson et al. (1994) was entered into Primer and merged with the ELA datasets to allow comparisons of all ELA quadrats against all Gibson et al. (1994) FCT quadrats. The taxonomy of each species was aligned with that used by Gibson et al. (1994) to permit direct comparison between datasets. All data were analysed using presence/absence of each species within each quadrat. Species richness (total number of species) was calculated for each quadrat.

The combined dataset was analysed using hierarchical cluster analysis (Everitt 1980). The Primer routine uses hierarchical agglomerative clustering, which takes a similarity matrix and successively fuses the samples into groups and the groups into larger clusters, starting with the highest mutual similarities then gradually lowering the similarity level at which groups are formed (Clarke and Warwick 2001). The result of hierarchical clustering is represented by a dendrogram, with the x-axis representing the full set of samples (in this case, the quadrats sampled by ELA and Gibson et al. (1994)), and the y-axis defining a similarity level at which two samples or groups are considered to have fused.

The purpose of this analysis was to determine whether the quadrats sampled in the study area were similar in species composition to any of the quadrats sampled by Gibson et al. (1994) and therefore similar to an FCT assigned by Gibson et al. (1994). If quadrats in the study area were similar in species composition to Gibson et al. (1994), they would be fused into a group together in the dendrogram. Hierarchical clustering was performed on similarity matrices computed using the Bray-Curtis coefficient and using the 'group average' cluster mode (refer to Clarke and Warwick 2001 for more information).

3.2.3 Specimen identification and nomenclature

Nomenclature used for the flora species within this report follows the WA Plant Census as available on FloraBase (Western Australian Herbarium [WAH] 2015). Voucher specimens were collected in the field of all actual or potential conservation listed flora species. Collections were made of other species, if required, that commonly occurred in the habitat of the conservation listed species to enable correct identification. All collections were assigned a unique collecting number.

Specimen identification was undertaken by ELA Senior Botanist Joel Collins and ELA Botanist Sarah Dalglish. Species identification utilised taxonomic literature and keys with all specimens confirmed using the WAH reference collection. Suitable material that meets WAH specimen lodgement requirements, such as flowering material and range extensions, will be submitted along with Threatened and Priority Report forms to Parks and Wildlife, as required by conditions of collection licences issued under the WC Act.

3.2.4 Fungi

During the survey, any incidental sightings of fungi were recorded in accordance with the PUBF survey methods (PUBF 2005).

For each sighting of fungi, the following data were collected:

- Coordinates of the location (points for individual fungi or polygons for populations)
- Description of vegetation community
- Description of the substrate (soil type or wood type)
- Description of the fungi form (gilled, pored, cup, puffball, shell, etc.)

- Estimation of population size
- Photograph of the fungi in situ.

3.3 Fauna survey

The survey design was aligned with methodology outlined in the EPA's Guidance Statement No. 56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (EPA 2004b), the principles outlined in EPA Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection (EPA 2002), and the Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA and DEC 2010).

3.3.1 Habitat assessment and trap site selection

Habitat characteristics were defined primarily on flora and vegetation assemblages identified by ELA during the flora, vegetation and fungi survey. Aerial images of the study area were examined prior to the survey to select indicative locations for fauna trapping sites and to ensure that all major habitat types were sampled.

Trapping sites (transects) were located to sample the habitat (vegetation - soil association) in areas expected to support a relatively high diversity of terrestrial fauna assemblages based on knowledge of faunal habitat preference of the northern Swan Coastal Plain.

The coordinates and details of trap transects are provided in **Appendix F** and **Figure 2**.

3.3.2 Animal ethics

The survey was conducted as per ELA's Wildlife Procedure Manual Animal Care and Use Code Requirements, which conforms to Section 5 of the Australian code of practice for the care and use of animals for scientific purposes (National Health and Medical Research Council 2013). In addition, the Parks and Wildlife licence under which trapping was conducted has a set of conditions to be adhered to, which relate to minimising harm and stress to fauna. Animal ethics considerations focus on the following:

- Minimising the duration of time that animals are in traps
- Minimising trapped animals' exposure to harmful environmental conditions
- Minimising risk of introduction or spreading known fauna pathogens between populations
- Appropriate and minimal animal handling
- Appropriate release conditions.

All animals captured during the fauna survey were identified in the field and released at the point of capture.

3.3.3 Sampling methods

The survey was undertaken using a variety of sampling techniques, both systematic and opportunistic. Systematic sampling refers to data methodically collected over a fixed time period in a discrete habitat type or location, using an equal or standardised sampling effort across multiple sample locations. This approach provides a range of detection methods that covers the full suite of vertebrate fauna assemblages. Opportunistic sampling includes data collected non-systematically from both fixed sampling sites and as opportunistic records from chance encounters with fauna. This method generally accounts for the majority of bird species and a significant proportion of other fauna groups recorded.

Trapping

Systematic fauna trapping was undertaken over four consecutive nights using standard methods at six trap transects located across the study area. All Elliot, cage and camera traps were set with universal

bait made from a mixture of rolled oats, peanut butter and sardines. Trap transect locations are shown in **Figure 2** and full details of trap arrangement are presented in **Appendix F**. At each sample transect, the following fauna traps were established:

- Five 20 L pitfall traps set at approximately 20 m intervals and set with flywire mesh drift fence, representing 120 pitfall trap nights
- Five funnel traps set at approximately 20 m intervals and set with flywire mesh drift fence, representing 120 funnel trap nights
- Two Elliot A traps. One set at each end of the transect, totalling 48 Elliot A trap nights
- One cage trap, totalling 24 cage trap nights
- One motion camera, totalling 24 motion camera trap nights.

Bird census

At each of the six fauna trap transects, bird census was carried out over three consecutive mornings during the trap checking. Birds were identified by visual detection and by call within an approximate 20 m radius of each pitfall trap for approximately five minutes. The bird census provided systematic sampling across the study area during the period of high bird activity in the early morning.

Opportunistic sampling and sightings

Opportunistic fauna recording was an integral technique of this fauna study. Opportunistic recordings were made at all times during the field survey, such as whilst establishing and checking traps, and during bird census. These records formed a significant proportion of the bird observations. Tracks, diggings, scats, burrows and other signs of fauna activity were recorded where possible.

Hand searching

This method involved the use of hand rakes to search within microhabitats for terrestrial fauna, primarily inactive reptiles. Search locations included beneath leaf litter, logs and other ground debris. This method was kept to a minimum in view of the small size of the study area, to avoid damage to native vegetation and disturbance to limited fauna shelter sites and habitat resources.

Nocturnal searching

Nocturnal and twilight searching was conducted using Light Emitting Diode (LED) head torches to detect active crepuscular (dusk active) and nocturnal fauna by eye-shine. This method targets crepuscular and nocturnal mammals, owls, frogs and geckos. Searching was conducted by traversing walk tracks whilst spotlighting into adjacent bushland within the study area. The nocturnal and twilight survey occurred over a period of approximately two hours by two ecologists, from 18:30 to 20:30 hours on 26 October 2015.

Bat survey

Sampling for microchiropteran bats was undertaken during the twilight and nocturnal periods on 26 October 2015. Two bat detectors were deployed to record ultrasonic bat calls. Detectors included a SongMeter SM2 ® placed at a fixed location along a potential flyway (track), and Anabat SD2 ® held in the hand while traversing during nocturnal searches. Each of the two detectors was operating for approximately two hours, from 18:30 to 20:30 hours. Specialised software is able to visualise ultrasonic bat echolocation calls recorded on the bat detectors into a corresponding graphical representation for analysis. Most bats species have a unique call which appears as a 'fingerprint' graph output. Bat calls were analysed by comparing recorded calls with reference calls by Alicia Scanlon, an ELA ecologist specialising in bat survey and identification. Bat survey locations are shown in **Figure 2**.

Invertebrates

Invertebrates were recorded opportunistically by observations, during hand searching for vertebrates, or as bycatch within fauna traps. Invertebrates were identified to order, and where possible genus. Identification of invertebrates to species level was not required under the Scope of Works for this survey.

3.3.4 Taxonomy and nomenclature

Nomenclature used for the vertebrate fauna species within this report follows the WAM Checklist of the Vertebrates of Western Australia, as available on the WAM website (WAM 2015). Where common names were not stated for certain species, the following references were consulted:

- Amphibians: Tyler and Doughty (2009)
- Reptiles: Wilson and Swan (2012)
- Birds: Morcombe (2007)
- Mammals: Menkhorst and Knight (2011).

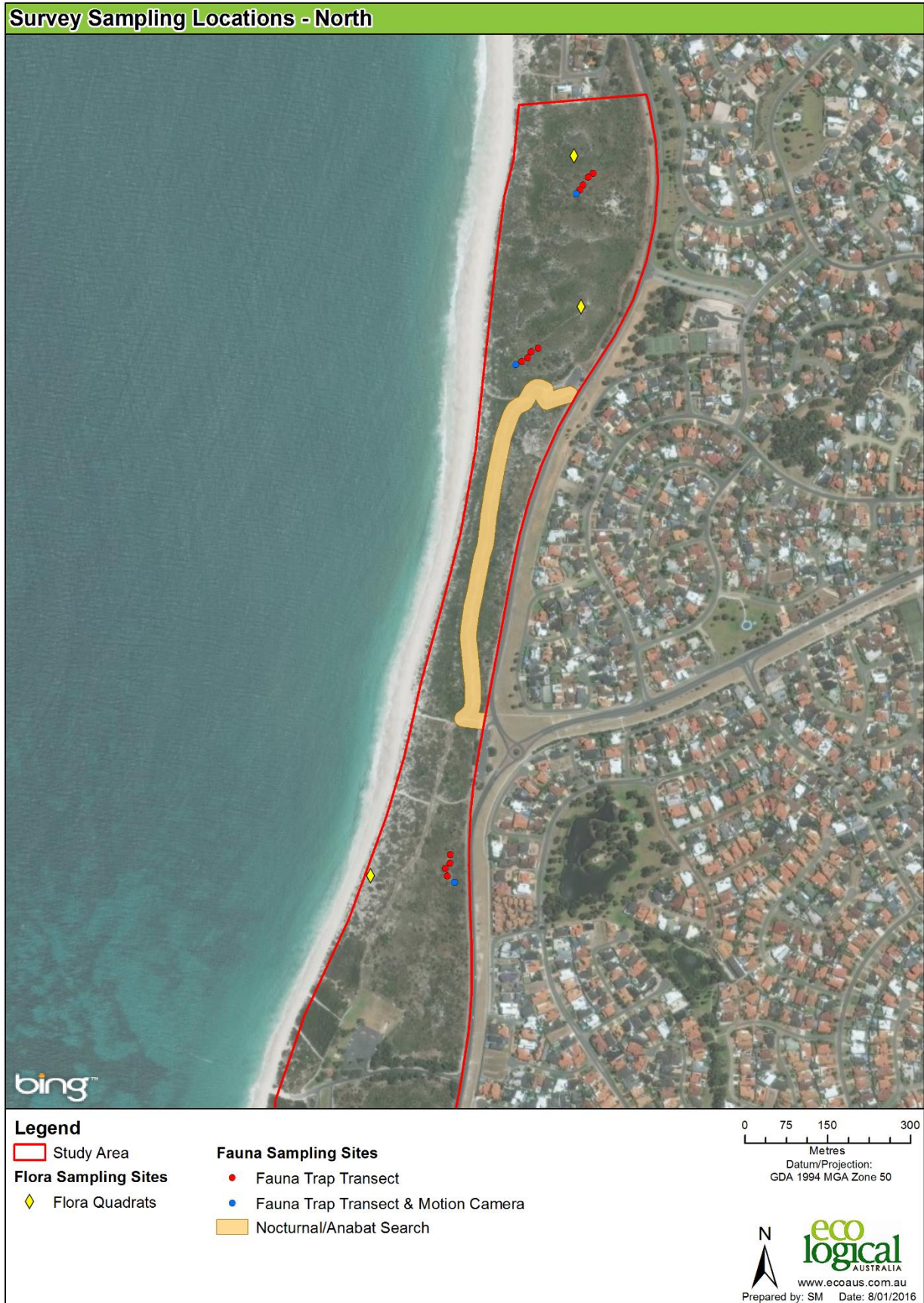


Figure 2: Flora, fungi and fauna sampling site locations

Survey Sampling Locations - South



Legend

Study Area

Flora Sampling Sites

Flora Quadrats

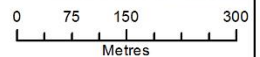
Fauna Sampling Sites

Fauna Trap Transect

Fauna Trap Transect & Motion Camera

Song Meter

Nocturnal/Anabat Search



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4 Results

4.1 Flora, vegetation and fungi

4.1.1 Flora

A total of 79 flora taxa were identified within the study area. This total included 51 (65% of the total) native and 28 (35% of the total) introduced taxa (**Appendix G**). The taxa comprised 38 families and 68 genera. The most commonly occurring families were Fabaceae (10 taxa), Poaceae (nine taxa) and Asteraceae (seven taxa). *Acacia* (Fabaceae) was the most common genus with six taxa recorded in the study area.

The mean native species richness for quadrats sampled was 23 species per quadrat (range: 12-31 species per quadrat). The flora species matrix is provided in **Appendix H**.

A full flora species list, including species that could potentially occur based on records within a 5 km radius, is presented in **Appendix I**. Floristic quadrat data are provided in **Appendix J**.

4.1.2 Conservation significant flora

Following the field survey, the likelihood of occurrence ratings of conservation listed flora species identified in the desktop assessment were revised to provide a more accurate reflection of the possibility of these species occurring, based on current habitat and condition within the study area (**Appendix C**).

No conservation significant flora were recorded in the study area. Following the survey, the likelihood of occurrence for all the potentially occurring flora species was reduced to unlikely (**Appendix C**). This was due to the study area being well surveyed and the lack of suitable habitat for these species.

4.1.3 Introduced flora

Introduced (weed) species represented approximately one third of the total species recorded in the study area with a total of 28 taxa recorded. This number of introduced species is typical for remnant vegetation in the Perth metropolitan area, with many of the species recorded in disturbed areas such as along the edge of tracks, edges of remnant vegetation and cleared/parkland areas.

A full list of weed species recorded from the study area is included in **Appendix K** and location information is provided in **Appendix L**.

Of the 28 weed species recorded, three are on the City's priority weed list (**Figure 3**):

- **Euphorbia terracina*
- **Gazania linearis*
- **Pelargonium capitatum*.

Euphorbia terracina* and **Pelargonium capitatum* were recorded throughout the study area in low densities (<5%; **Figure 4). **E. terracina* and **P. capitatum* were recorded at higher densities (31-60%) along the edges of paths, parkland and remnant vegetation (**Figure 3** and **Figure 4**). **P. capitatum* was also recorded at higher densities (6-30% and 31-60%) along the coast in the foredune vegetation. **Gazania linearis* was recorded from only one isolated patch in low density (<5%) in the northern half of

the study area, adjacent to the northern-most carpark off Northshore Drive (**Figure 4**). These three species are not listed as Declared Pests under the BAM Act or as WoNS.



Figure 3: *Euphorbia terracina (left); *Pelargonium capitatum (centre); *Gazania linearis (right)

Numerous other non-target weed species were recorded within the study area (**Appendix K**). Several introduced grasses and herbs including **Agave americana* and **Anagallis arvensis* were recorded in isolated locations with population sizes over 15 individuals (**Appendix L**). Areas of higher weed density occurred along the path edges and in disturbed areas.

Target Weeds - North



Legend

Study Area

Target Weeds

**Euphorbia terracina* - <5%

**Euphorbia terracina* - 6-30%

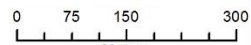
**Euphorbia terracina* - 31-60%

**Gazania linearis* - <5%

**Pelargonium capitatum* - <5%

**Pelargonium capitatum* - 6-30%

**Pelargonium capitatum* - 31-60%



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Figure 4: Target weed species

Target Weeds - South



Legend

Study Area

Target Weeds

**Euphorbia terracina* - <5%

**Euphorbia terracina* - 6-30%

**Pelargonium capitatum* - <5%

**Pelargonium capitatum* - 6-30%

0 75 150 300

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

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4.1.4 Vegetation communities and condition

Vegetation communities

Three vegetation communities were recorded within the study area (**Table 2** and **Figure 6**):

- **Vegetation community 1 (ArAcTOS):** *Acacia rostellifera* and *Acacia cyclops* tall open shrubland over *Spyridium globulosum* and *Olearia axillaris* shrubland to open shrubland over *Melaleuca systema*, *Rhagodia baccata* subsp. *baccata* and *Acanthocarpus preissii* low shrubland over *Lepidosperma gladiatum* open sedgeland. It is common for *Acacia rostellifera* to form dense thickets in this vegetation community. Other associated species include *Acacia lasiocarpa* var. *lasiocarpa*, *Clematis pubescens*, *Hardenbergia comptoniana*, *Leucopogon parviflorus*, *Poa poiformis*, *Scaevola crassifolia* and *Templetonia retusa*. *Spinifex hirsutus* is commonly found on the dunes adjacent to the beach.
- **Vegetation community 2 (SgOaS):** *Spyridium globulosum* and *Olearia axillaris* shrubland to open shrubland over *Melaleuca systema*, *Acacia lasiocarpa* var. *lasiocarpa* and *Acanthocarpus preissii* low shrubland over *Lomandra maritima* open herbland. Other associated species include *Conostylis candicans*, *Gompholobium tomentosum*, *Hardenbergia comptoniana*, *Hibbertia subvaginata*, *Lepidosperma squamatum*, *Leucopogon parviflorus*, *Rhagodia baccata* subsp. *baccata* and *Santalum acuminata*. This vegetation community was recorded on the higher dune system in the north of the study area. The key difference to vegetation community 1 was the absence of *Acacia rostellifera* and *Acacia cyclops* in the upper stratum.
- **Vegetation community 3 (OaApRbLOS):** *Olearia axillaris*, *Acanthocarpus preissii* and *Rhagodia baccata* subsp. *baccata* low shrubland over *Spinifex hirsutus* very open grassland. Other associated species include *Scaevola crassifolia*, *Lepidosperma gladiatum* and *Carpobrotus virescens*.

In addition to the three vegetation communities, two areas designated as ‘Parkland’ and three areas designated as ‘Revegetation’ were identified within the study area (**Figure 6**). Parkland areas comprised grassed areas with some remnant native trees such as *Eucalyptus gomphocephala* (Tuart) and *Agonis flexuosa* (Peppermint), and also contained some eastern states Sheoak (*Casuarina* sp.). Three Revegetation areas were identified in the middle of the study area. Neither Parkland nor Revegetation areas were considered in the assessment of vegetation condition.

Table 2: Vegetation communities identified within the study area

| Vegetation community | Description | Condition | Extent within study area |
|----------------------|--|----------------------------------|--------------------------|
| 1: ArAcTOS | <i>Acacia rostelifera</i> and <i>Acacia cyclops</i> tall open shrubland over <i>Spyridium globulosum</i> and <i>Olearia axillaris</i> shrubland to open shrubland over <i>Melaleuca systema</i> , <i>Rhagodia baccata</i> subsp. <i>baccata</i> and <i>Acanthocarpus preissii</i> low shrubland over <i>Lepidosperma gladiatum</i> open sedgeland. | Excellent to Completely Degraded | 52.1 ha |



| | | | |
|----------|---|-------------------|--------|
| 2. SgOaS | <i>Spyridium globulosum</i> and <i>Olearia axillaris</i> shrubland to open shrubland over <i>Melaleuca systema</i> , <i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i> and <i>Acanthocarpus preissii</i> low shrubland over <i>Lomandra maritima</i> open herbland. | Excellent to Good | 7.8 ha |
|----------|---|-------------------|--------|



| | | | |
|--------------|---|-------------------|--------|
| 3. OaApRbLOS | <i>Olearia axillaris</i> , <i>Acanthocarpus preissii</i> and <i>Rhagodia baccata</i> subsp. <i>baccata</i> low shrubland over <i>Spinifex hirsutus</i> very open grassland. | Excellent to Good | 7.2 ha |
|--------------|---|-------------------|--------|



Vegetation condition

The condition of the vegetation within the study area ranged from Excellent to Completely Degraded (**Figure 7** and **Table 3**). Areas in Excellent condition occurred where remnant vegetation was largely intact, with few weeds or impacts from other disturbances. Significant disturbances affecting vegetation condition within the study area included clearing / trampling (e.g. bike tracks, unauthorised paths), weed infestation and altered fire regimes.

Vegetation community 1 was considered to be in mostly Very Good condition, with some areas in the far northern and far southern sections in Excellent condition. A small portion of vegetation community 1 was Completely Degraded and corresponds to an area close to the road along the far north-eastern boundary of the study area (**Figure 6** and **Figure 7**).

The majority of vegetation community 2 was in Excellent condition (**Figure 6** and **Figure 7**).

Vegetation community 3 was largely in Very Good to Good condition. This vegetation community had a high incidence of weed cover and diversity which was out-competing native species, particularly in the ground layer. A small portion of vegetation community 3 was in Excellent condition and occurred adjacent to the beach, along the far north-western boundary of the study area (**Figure 6** and **Figure 7**).

Table 3: Vegetation condition within the study area

| Vegetation condition | Total area (ha) | Portion of study area (%) |
|----------------------------|-----------------|---------------------------|
| Excellent | 22.3 | 28.2 |
| Very Good | 29.3 | 37.1 |
| Good | 14.2 | 18.0 |
| Completely Degraded | 1.3 | 1.6 |
| Tracks / paths / car parks | 6.4 | 8.2 |
| Parkland | 4.8 | 6.2 |
| Revegetation | 0.4 | 0.5 |
| Total area (ha) | 79 | 100 |

Revegetation areas

Three areas that were undergoing revegetation were identified during the survey. These areas were adjacent to tracks and carparks, at Pinnaroo Point in the centre of the study area (**Figure 6**

Figure 6). These areas had only recently been rehabilitated and were still in the early stages of growth (**Figure 5**).



Figure 5: Revegetation site within the study area

Vegetation Communities, Parkland and Rehabilitation Areas - North



Figure 6: Vegetation communities, Parkland and Revegetation areas

Vegetation Communities, Parkland and Rehabilitation Areas - South



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Legend

Study Area

Tracks and Car Parks

Vegetation Communities

ArAcTOS

OaApRbLOS

Parkland

Revegetation

0 75 150 300

Metres

Datum/Projection:
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Figure 7: Vegetation condition

Vegetation Condition - South



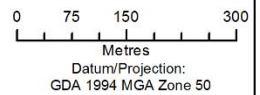
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Legend

- Study Area
- Tracks and Car Parks
- Parkland
- Revegetation

Vegetation Condition

- Excellent
- Very Good
- Good
- Completely Degraded



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4.1.5 FCT analysis

Results of the cluster analysis indicated that all except one (WN_Q8) of the ELA quadrats established in the study area grouped together and had high similarities to each other, with WN_Q4 and WN_Q6 the most similar at 75%, WN_Q12 joined at 73%, WN_Q10 joined at 71%, and WN_Q2 joined at 55%. WN_Q14 and WN_Q16 had a high similarity to each other at 68% and joined the group at 48% similarity.

All ELA quadrats, except WN_Q8, joined the Gibson et al. (1994) quadrat TRIG_01 at 42% similarity, which is classed as FCT 29b (**Figure 8**). FCT 29b is described as “*Acacia* shrublands on taller dunes, southern Swan Coastal Plain” (Gibson et al. 1994) and is currently listed as a Priority 3 PEC (Parks and Wildlife 2015b).

FCT 29b is largely restricted to the Quindalup Dune System and has been recorded from Seabird to south of Mandurah. Average species richness for FCT 29b is 35.6 species per quadrat and average weed frequency is low at 3.4 species / quadrat (Gibson et al. 1994). FCT 29b does not have consistent dominants, but species such as *Acacia lasiocarpa* and *Melaleuca systema* are common indicator species of this FCT (Gibson et al. 1994). The typical species that represent FCT 29b (known to occur in >75% of Gibson et al. (1994) quadrats) were recorded within ELA’s quadrats, along with other dominants such as *Acacia rostellifera*, *Acanthocarpus preissii*, *Rhagodia baccata* and *Lomandra maritima* (Gibson et al. 1994).

One ELA quadrat (WN_Q8) did not group with the other ELA quadrats and had a separate similarity with the Gibson et al. (1994) quadrat BURN-2 at 28% (**Figure 9**). This FCT is classed as FCT 29a “Coastal shrublands on shallow sands” and is currently listed as a Priority 3 PEC (Parks and Wildlife 2015b). FCT 29a is also largely restricted to the Quindalup Dune System and has been recorded from Seabird to Garden Island and consists mostly of heaths on shallow sands over limestone close to the coast. Average species richness for FCT 29a is 40.7 species per quadrat and average weed frequency is high at 11.2 species / quadrat (Gibson et al. 1994). FCT 29a does not have consistent dominants, but species such as *Spyridium globulosum*, *Rhagodia baccata*, *Acanthocarpus preissii* and *Olearia axillaris* occur frequently (Gibson et al. 1994).

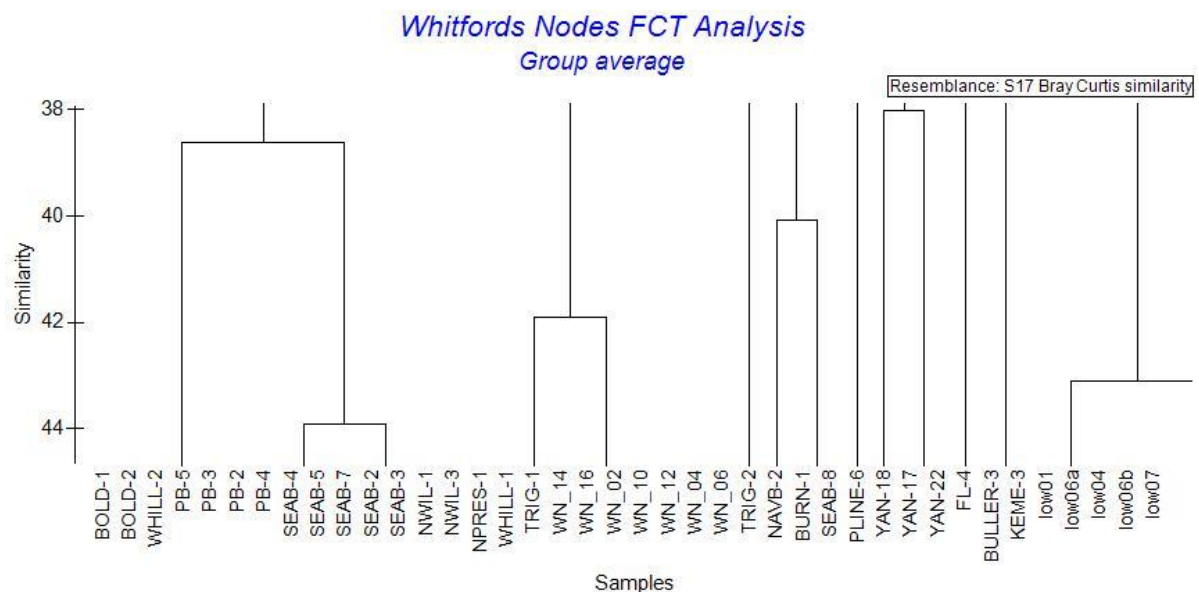


Figure 8: Dendrogram displaying ELA quadrats grouping with TRIG-1 (FCT 29b)

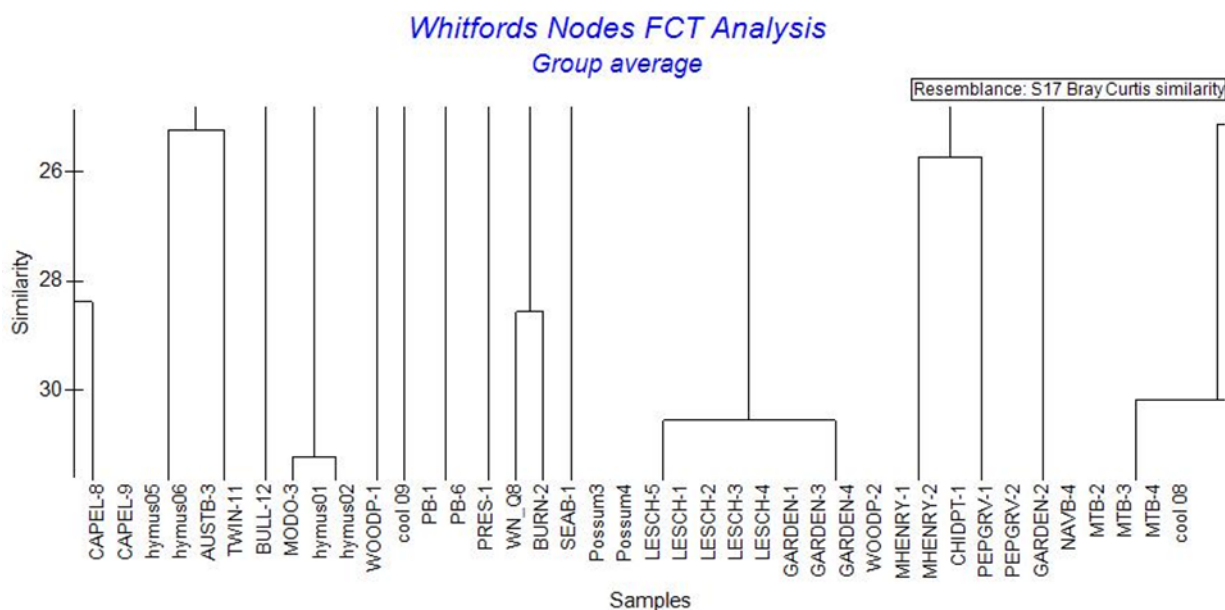


Figure 9: Dendrogram displaying ELA quadrat WN_Q8 grouping with BURN-2 (FCT 29a)

4.1.6 Environmentally sensitive areas

No ESAs were recorded within the study area. The vegetation communities present in the study area are not analogous to any known TECs as confirmed by statistical analysis.

4.1.7 Priority ecological communities

The vegetation communities present in the study area are analogous to two Priority 3 PECs as confirmed by statistical analysis. These are summarised in **Table 4** and shown in **Figure 10**.

Vegetation communities 1 and 2 (ArActOS and SgOaS) represent the Priority 3 PEC 'Acacia shrublands on taller dunes, southern Swan Coastal Plain'. This PEC is classed as FCT 29b by Gibson et al. (1994). Vegetation community 3 (OaApRbLOS) represents the Priority 3 PEC 'Coastal shrublands on shallow sands'. This PEC is classed as FCT 29a by Gibson et al. (1994).

Table 4: Priority Ecological Communities

| Priority Ecological Community | Conservation status | Floristic Community Type | Representative vegetation communities |
|--|---------------------|--------------------------|---|
| Acacia shrublands on taller dunes, southern Swan Coastal Plain | Priority 3 | FCT 29b | Vegetation community 1 (ArActOS): <i>Acacia rostellifera</i> and <i>Acacia cyclops</i> tall open shrubland |
| | | | Vegetation community 2 (SgOaS): <i>Spyridium globulosum</i> and <i>Olearia axillaris</i> shrubland to open shrubland |
| Coastal shrublands on shallow sands | Priority 3 | FCT 29a | Vegetation community 3 (OaApRbLOS): <i>Olearia axillaris</i> , <i>Acanthocarpus preissii</i> and <i>Rhagodia baccata</i> subsp. <i>baccata</i> low shrubland |



Figure 10: Priority Ecological Communities

Priority Ecological Communities - South



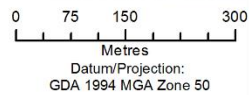
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Legend

- Study Area
- Tracks and Car Parks

Priority Ecological Communities

- FCT 29a: Coastal shrublands on shallow sands (Priority 3 PEC) - OaApRbLOS
- FCT 29b: *Acacia* shrublands on taller dunes, southern Swan Coastal Plain (Priority 3 PEC) – ArAcTOS and SgOaS



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 Prepared by: SM Date: 13/01/2016

4.1.8 Fungi

Two fungi species were recorded during the survey: *Schizophyllum commune* (Split-Gill Fungus) and *Pycnoporus coccineus* (Scarlet Bracket Fungus; **Figure 11**). Both species are common, saprotrophic (decomposer) fungi that occur on dead wood, rotting logs and stumps. *P. coccineus* also often occurs on white-rotted wood (Bougher 2009). Both species were recorded at only one location within the study area (**Table 5** and **Figure 11**). Neither species is of conservation significance.

The low number of fungi species recorded is likely due to the dry conditions at the time of the survey. A list of fungi species recorded in nearby areas, which could potentially be present within the study area, is presented in **Appendix E**.



Figure 11: Fungi species recorded within the study area (from left to right): *Schizophyllum commune* and *Pycnoporus coccineus*

Table 5: Fungi species locations

| Species | Easting | Northing |
|------------------------------|---------|----------|
| <i>Schizophyllum commune</i> | 380328 | 6479445 |
| <i>Pycnoporus coccineus</i> | 380550 | 6479141 |

4.1 Fauna

4.1.1 Fauna habitat

Three vegetation communities were identified within the study area, comprising low coastal shrubland, tall open shrubland throughout the majority of the study area, and higher dune systems in the north of the study area. These vegetation communities can be classed into one broad fauna habitat type: Quindalup dune mixed shrublands on sandy soils.

This habitat type provides foraging and nesting habitat for a range of coastal shrubland birds, including honeyeaters, wrens and other insectivorous birds, as well as habitat for a range of terrestrial and fossorial reptiles, such as skinks, snakes and geckos. The small lake at the southern end of the study area provides suitable habitat for several common wetland birds and frog species, as well as a water source for a wide range of fauna. Large trees (Tuart, Peppermint and planted Sheoak) located within parklands and carparks in the southern half of the study area provide nesting and roosting habitat for larger nectar feeding and insectivorous birds.

4.1.2 Fauna species

A total of 53 vertebrate fauna species were recorded within the study area. This comprised 16 native reptiles, 30 birds (26 native and four introduced) and seven mammals (two native and five introduced) (**Appendix M**). In addition, 53 invertebrate species from 17 orders were also recorded (**Appendix O**).

A full list of vertebrate fauna recorded and potentially occurring within the study area is provided in **Appendix M**.

4.1.2.1 Conservation significant species

Three conservation listed species were recorded during the fauna survey:

- *Merops ornatus* (Rainbow Bee-eater) – listed as Schedule 5 under the WC Act and Migratory under the EPBC Act
- *Pandion haliaetus* (Osprey) - listed as Schedule 5 under the WC Act and Migratory under the EPBC Act
- *Isodon obesulus fusciventer* (Quenda) – listed as Priority 5 by Parks and Wildlife.

Records of conservation significant fauna locations are presented in **Appendix P**.

The Rainbow Bee-eater was heard calling at one location in the southern portion of the study area (**Figure 12**). As an aerial forager, the study area would provide an abundance of food during the spring-summer period of migrational occupation. Disturbed areas such as sandy clearings, embankments or bare ground also provide potential nesting areas.

An Osprey nest was recorded on top of a communication tower in the southern portion of the study area (**Figure 12**). An adult was observed feeding a chick in the nest, indicating that the species is utilising the study area for breeding.

The Quenda was detected using a motion camera set within dense *Acacia* shrubland in the south-east corner of the study area (**Figure 12** and **Appendix N**). Only one individual was recorded during the survey, however it is likely that several individuals of this species occur throughout the study area. It is likely that the presence of the small lake at the southern end of the study area provides a water source for the Quenda.

Carnaby's Black-Cockatoo was not recorded within the study area during the survey, however the study area contains potentially suitable habitat for the species. A cluster of several mature Tuart trees at Hillarys

Beach Park within the study area provides suitable roosting habitat and the adjacent small wetland at the southern end of the study area provides a freshwater source in proximity for roosting cockatoos (**Figure 12** and **Appendix P**). This area is a documented known roosting site for Carnaby's Black-Cockatoo according to unpublished data in the Storr-Johnstone Bird Data Bank (Western Australian Planning Commission [WAPC] 2011). These Tuart trees could also represent potential breeding habitat, however no suitable hollows were observed during the survey. The study area supports low coastal Quindalup dune shrublands and lacks high foraging value for the species (i.e. Proteaceous (*Banksia*) and Myrtaceous species (Marri and Jarrah)). The study area has low to moderate value foraging habitat, primarily *Acacia saligna* which frequently has wood-boring grubs on which Carnaby's Black-Cockatoo feeds. An additional, but relatively minor, food source is the small stand of Tuart trees that would provide seasonal nectar. For these reasons, it is considered likely that the species would occur within the study area.

The Graceful Sun-moth was identified from the database searches as potentially occurring in the study area. This species is listed as Priority 4 by Parks and Wildlife, and has previously been recorded from nearby areas including Hepburn Heights; approximately 7.5 km east south-east of the study area. This species is only detectable in March during its breeding season; however the study area supports suitable breeding habitat, *Lomandra maritima*, which is the host plant for moth larvae. This plant was found to occur in moderately dense patches in the northern half of the study area. It is therefore considered likely that the Graceful Sun-moth would occur in the study area.

Five of the 14 conservation significant species identified in the desktop study were considered to have the potential to occur in the study area, as, while they were not recorded during the survey, potential suitable habitat occurs within the study area:

- Eastern Great Egret
- Fork-tailed Swift
- Cattle Egret
- Peregrine Falcon
- Black-striped Snake.

The remaining four conservation significant species are considered unlikely to occur within the study area (**Appendix D**).

4.1.2.2 Other fauna species

Mammals

Two native and five introduced mammals were recorded within the study area (**Appendix M**).

The nocturnal survey recorded one microchiropteran bat, *Chalinolobus gouldii* (Gould's Wattled Bat), feeding aerially in clearings which are ideal bat flyways. This bat is common across most of Australia and could use the study area for foraging and potentially for roosting in the larger trees in the southern portion of the study area.

Five introduced mammal species were recorded: **Felis catus* (Feral or Domestic Cat), **Mus musculus* (House Mouse), **Oryctolagus cuniculus* (Rabbit), **Rattus rattus* (Black Rat), and **Vulpes vulpes* (Red Fox). Feral/Domestic Cats and Black Rats were recorded by motion cameras throughout the study area, and several House Mice were trapped in pitfall traps in the centre of the study area (**Appendix N**). Several Rabbit warrens and one Red Fox warren was also opportunistically recorded. Locations of introduced fauna species recorded are provided in **Figure 13** and **Appendix P**.

Birds

Thirty bird species were recorded during the bird census and opportunistically (**Appendix M**). Most of the recorded species are widespread throughout the South West of WA and are considered common on the northern Swan Coastal Plain. They include a range of seasonal and resident nectar feeders such as honey eaters and wattle birds, opportunistic insectivores such as *Gerygone fusca* (Western Gerygone), *Malurus splendens* (Splendid Fairy-wren), and *Smicrornis brevirostris* (Weebill), as well as raptors such as *Falco cenchroides* (Nankeen Kestrel). Large trees in the parklands and carparks in the southern half of the study area provide nesting and roosting habitat for common mid-size birds, including *Corvus coronoides* (Australian Raven), *Cracticus tibicen* (Magpie) and *Cracticus torquatus* (Grey Butcherbird).

Four introduced bird species were recorded in the study area: **Columba livia* (Domestic Pigeon), **Streptopelia chinensis* (Spotted Turtle-Dove), **Streptopelia senegalensis* (Laughing Turtle-Dove) and **Trichoglossus haematodus* subsp. *moluccanus* (Rainbow Lorikeet). These species are common throughout the Swan Coastal Plain bioregion. The Rainbow Lorikeet is an aggressive competitor for food and nesting habitat with native species, and will often out-compete other fauna for nesting hollows.

Reptiles

Sixteen reptile species were recorded during the survey, primarily trapped in funnel and pitfall traps, representing 148 captures (**Appendix M**). All species recorded are considered common and widespread throughout the Perth subregion and wider South West of WA. None are listed as conservation significant. The most commonly recorded species was *Ctenotus fallens* (West Coast Ctenotus) which made up about half (75) of the overall captures. Most reptile captures were via funnel traps (60%) or pitfall trapped (30%); the remainder were recorded in Elliot and cage traps. Based on the database searches, it is likely that additional reptile species are present within the study area but were not trapped or observed during the survey (**Appendix M**).

One species recorded, *Lialis burtonis* (Burton's Legless Lizard) is a specialist predator of skink lizards, and its occurrence indicates an adequate abundance of small skinks in the study area to support a population of this species (**Appendix N**). Three of the largest skink species occurring on the Swan Coastal Plain were present within the study area, which indicates a relatively high reptile diversity: *Egernia kingii* (King's Skink), *Tiliqua occipitalis* (Western Blue-tongue) and *Tiliqua rugosa* subsp. *rugosa* (Bobtail).

All reptiles trapped were considered to be in good physical condition and some were noted as immature or sub-adult age reptiles. None of the captured reptiles were considered as hatchling or neonate.

Amphibians

No amphibians were recorded during the survey. It is likely that conditions during the fauna survey were too dry for amphibians to be recorded. Two species have been recorded within 5 km of the study area in nearby bushland areas, including *Limnodynastes dorsalis* (Western Banjo Frog) and *Myobatrachus gouldii* (Turtle Frog) (**Appendix M**). The Turtle Frog in particular is considered likely to occur in the study area as this species does not rely on wetlands for breeding. It is most readily detected via breeding calls during rainy spring nights. In addition, the small lake at the southern end of the study area would likely provide suitable habitat for tree frogs reliant on water to breed, such as *Litoria adelaidensis* (Slender Tree Frog) and *L. moorei* (Motorbike Frog).

Invertebrates

A total of 53 invertebrate species from 17 orders were collected opportunistically and as bycatch during the fauna survey (**Appendix O**). This included four ants, one bee, seven beetles, five bugs, one

centipede, two cicadas, three cockroaches, two dragonflies, one earwig, three flies, one grasshopper, two isopods, one katydid, one lacewing, one mole cricket, one mosquito, one millipede, three moths, one scorpion, one silverfish, seven spiders, one tick and three wasps. The invertebrate species diversity within the study area is expected to be high given the extent of good quality remnant native bushland habitat comprising a range of native flora species. The species recorded represent a small sample of the invertebrate diversity expected to be present within the study area.

Apis mellifera (European Honey Bee) was recorded from several locations within the study area (**Figure 13**). A number of individuals were found in pitfall traps, however no bee hives were recorded during the survey. This species competes with a range of native species that use hollows for nesting and roosting, as well as a range of nectar-feeding fauna. GPS coordinates of European Honey Bee hives are presented in **Appendix P**.

The introduced *Ommatoiulus moreletii* (Portuguese Millipede) was also recorded throughout the study area. This species is known to be distasteful and therefore avoided by many predators. It plays a useful role in breaking down organic matter in the soil; however, they are considered pests when they reach high population levels (Department of Agriculture and Food WA [DAFWA] 2015b). This species has become widespread across the Perth metropolitan area in both bushland and suburban areas.



Figure 12: Conservation significant fauna locations and habitats



Figure 13: Introduced fauna locations

Introduced Fauna Locations - South



Legend

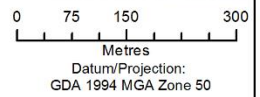
Study Area

Introduced Fauna

- Black Rat Observed (motion camera)
- House Mouse Trapped
- Fox Warren
- Rabbit Observed (motion camera)
- Rabbit Warren

Other Threats to Fauna / Fauna Habitats

- Kids Cubby House
- Rubbish



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5 Discussion

5.1 Flora, fungi and vegetation

A total of 79 flora taxa were identified within the study area. This total included 51 native and 28 introduced taxa. The number of native flora species recorded is comparable to the number of species recorded in similar coastal bushland areas. For example, 38 native flora taxa were previously recorded within part of Bush Forever Site 325 (Keighery et al. 1992). This was estimated to be greater than 60% of the total expected native flora (Government of WA 2000). At Mindarie Keys, a total of 85 taxa comprising 37 plant families were recorded (Ecoscape 2004) whereas at Sorrento Foreshore Reserve total of 44 flora species from 19 families were identified including 21 native and 23 introduced species (Natural Areas Consulting 2014b). The floristic diversity recorded at Whitfords Nodes is considered to be high for remnant vegetation in a coastal, urbanised area.

Twenty-eight weed species were recorded from the study area, three of which are on the City of Joondalup's priority weed list: *Euphorbia terracina*, *Gazania linearis* and *Pelargonium capitatum*. None of the weeds recorded are listed as Declared Pests under the BAM Act or as WoNS. Weed control along tracks and in areas of high density (31-60%) is recommended to control priority weeds and other introduced species.

Three vegetation communities were described within the study area. This was determined on the basis that dominant species for each structural level occurred within each quadrat. This was further supported by the FCT analysis, which used statistical analysis to provide information on how floristically similar the ELA quadrats were to Gibson et al. (1994) quadrats, based on species presence/absence. The FCT analysis confirmed that all the ELA quadrats, except for WN_Q8, had the highest similarity to Gibson et al. (1994) FCT 29b - *Acacia* shrublands on taller dunes, southern Swan Coastal Plain. WN_Q8 had the highest similarity to Gibson et al. (1994) FCT 29a - Coastal shrublands on shallow sands. Both FCT 29a and 29b are listed as Priority 3 PECs.

With an average of 23 native species recorded per quadrat during the survey, the floristic species diversity of the study area is lower than what has been typically recorded in the Quindalup Dune System (Gibson et al. 1994). FCT 29a has an average species richness of 40.7 species per quadrat and high average weed frequency at 11.2 species per quadrat (Gibson et al. 1994). FCT 29b has an average species richness of 35.6 species per quadrat and low average weed frequency at 3.4 species per quadrat (Gibson et al. 1994). ELA had a lower species richness with an average of 16.4 species per quadrat and moderate weed frequency of seven species per quadrat. However, Gibson et al. (1994) established quadrats that represented the highest condition and species diversity found for each FCT within the region, therefore, lower species counts are expected when sampling areas with lower vegetation condition.

The study area contains a range of disturbances which is reflected in the condition of the vegetation. Several areas recorded as Good condition would benefit from revegetation activities, including unused tracks and paths, and the northern section where grassy weeds and rabbit activity are degrading vegetation (**Figure 14**). Revegetating these areas would also benefit a range of fauna species, including the Quenda. These areas should be revegetated with local native species, such as those present from the corresponding vegetation community types.

Two species of fungi were recorded within the study area. Both species were recorded in areas of Excellent vegetation condition and are an indication of a healthy functioning ecosystem within these areas. Fungi may fruit at any time of the year around Perth, but within bushland areas most fungi will fruit between May and July (Bougher 2009). There is great variation both within and across fungi species and many fungi do not fruit at the same time or location each year. This indicates that there are many more species of fungi that potentially occur within the study area, and that the diversity and abundance of species will change between years (Bougher 2009).



Figure 14: Example of a suitable area for revegetation (north-western corner of the study area)

5.2 Fauna

The study area provides an important area of remnant coastal fauna habitat within the City of Joondalup. The vegetation communities and habitat resources it contains support a diverse and species-rich assemblage of native birds and reptiles, and the bushland is considered to have high local conservation value. The study area is connected in the north to additional coastal remnant vegetation in Mullaloo, and to the east to Ern Halliday Reserve, although this is fragmented by Whitfords Ave. The study area is fragmented to the south by Hillarys Boat Harbour and Sorrento Quay, preventing dispersal to the south by many reptiles, mammals, amphibians and invertebrates.

A total of 53 vertebrate fauna species were recorded within the study area. This comprised 16 native reptiles, 30 birds and seven mammals. In addition, 53 invertebrate species from 17 orders were also recorded. The fauna assemblages recorded within the study area are considered to be diverse for remnant vegetation in a coastal, urbanised area. Based on the desktop review, it is likely that additional species are present within the study area but were not recorded during the survey (**Appendix M**).

The study area provides habitat and connectivity for many bird species and is important for the continued presence of a range of local reptile species. The occurrence of the Rainbow Bee-eater and Osprey

highlight the foraging and potential breeding value of the study area for avifauna. It is also an important site for the Priority listed Quenda given the paucity of suitable habitat (i.e. large tracts of dense bushland) left in the locality for this species to persist.

The presence of the small wetland in the southern section of the study area is likely to attract a range of conservation significant fauna to the study area. A number of migratory shorebirds, Quenda and Carnaby's Black-Cockatoo are likely to use this wetland as a water source, particularly in the summer months when other water sources are scarce. Wetlands provide a drought refuge for many birds, mammals and invertebrates, and are core habitat for some waterbirds and amphibians.

Rabbit activity was observed across the study area, including warrens, diggings and scats. Feral/Domestic Cats were also recorded several times via motion camera, and one Red Fox den was recorded in the centre of the site. In addition, House Mice and Black Rats were also recorded. Feral fauna activity in suburban bushland remnants is not uncommon, however such activity is detrimental to native fauna and fauna habitats. Rabbits can out-compete native species for food resources and habitat, cause serious erosion problems and prevent native vegetation from regenerating. Red Foxes and Feral/Domestic Cats prey on reptiles, birds and mammals. Black Rats and House Mice can also destroy native vegetation and prey on small native fauna. All introduced fauna have the ability to spread disease, which can also impact native fauna and vegetation.

Despite the certainty of introduced fauna preying on native fauna within the study area, this does not appear to have had a significant impact on reptile assemblages. Sixteen native reptiles were recorded and in relatively high numbers, indicating a healthy and viable assemblage of reptile species. The fact that Quenda are also persisting is a positive indication that the study area represents a refuge for a range of native fauna. Feral animal control could potentially increase numbers of Quenda, reptiles and a wide range of avifauna within the study area.

Given the diversity and high number of individuals recorded, reptiles provide an insight into the quality and condition of fauna habitat of the study area, and its ability to support viable fauna populations. One species recorded, *Lialis burtonis* (Burton's Legless Lizard), is a specialist predator of skink lizards, and its occurrence indicates an adequate abundance of small skinks in the study area to support a population of this species. Three of the largest skink species occurring on the Swan Coastal Plain were present within the study area, indicating a rich reptile diversity.

All reptile specimens trapped were considered to be in good physical condition and some were immature or sub-adult age reptiles. These are likely to be offspring from the 2014 spring breeding season and indicate that the study area supports viable reptile populations. None of the captured reptiles were considered as hatchling or neonate. Hatchlings from the current 2015 spring breeding season would be expected to emerge during late summer in 2016, which is the normal hatching season for reptiles in the South West of WA.

No trapping of avifauna was undertaken, therefore discussion on health and viability of populations is difficult; however, the study area supports a diverse range of birds. Generalist species common in a wide variety of habitats were recorded, as well as several species with more specific habitat preferences, including Splendid Fairy-wren, *Rhipidura fuliginosa* (Grey Fantail) and Weebill. This indicates the study area supports relatively intact habitat suitable for a wide range of native avifauna.

The study area appears to support a rich invertebrate diversity, however a targeted invertebrate survey would need to be undertaken to formally assess species richness. There have been few detailed invertebrate surveys across the Swan Coastal Plain, therefore it is difficult to draw comparisons to other similar bushland remnants even if a detailed survey was undertaken.

Existing revegetation activities were observed within the study area, which will assist in improving fauna habitats. Any other heavily degraded or cleared areas would benefit from revegetation to increase habitat quality for fauna within the study area.

Existing or potential threatening processes to native fauna within the study area include:

- Predation from introduced fauna
- Feral species competition for food and habitat resources
- Habitat degradation through weed invasion, plant pathogens, illegal human activity, and introduced mammal grazing
- Altered fire regimes.

6 Recommendations

Whitfords Nodes Foreshore is an important area of intact remnant native bushland in the urban environment, particularly as surrounding areas become further developed. The study area provides a refuge for a variety of native flora and fauna species, and likely acts as an important corridor for fauna movement, linking up to other areas of remnant bushland.

Recommendations to conserve native flora, fungi and fauna populations and the environmental values of Whitfords Nodes Foreshore include:

- Weed control, particularly of weeds in high densities, along track edges and boundaries between remnant bushland, and cleared areas
- Establish a priority weed list for areas of coastal bushland or more specifically for Whitfords Nodes Foreshore. The current priority weed list contains some species that are not relevant to coastal areas and excludes some coastal weeds such as **Tetragonia decumbens*, **Asphodelus fistulosus* and **Cakile maritima*
- Consider revegetation, particularly around tracks and the middle of the northern section where grassy weeds and Rabbit activity are degrading vegetation in Good condition. Other areas in Good condition would benefit from revegetation
- Remove dumped asbestos and rubbish from the study area
- Upgrade sandy tracks to compacted crushed limestone to help reduce erosion and reduce risk of spread of disease / pathogens (this excludes sand paths that provide beach access)
- Conduct a bushfire assessment and develop a bushfire management plan
- Investigate installation of nest tubes suitable for black cockatoos in large Tuart trees in the southern section of the study area
- Control feral predators through targeted trapping and baiting by a licenced contractor. Due to the presence of Quenda in the study area, use of poison baits must be conducted with caution as some baits (e.g. pindone baits) are thought to be toxic to bandicoots. Investigate alternative methods for control of Rabbits, including warren fumigation, ripping, and rabbit-proof fencing. Due to the size of and the numerous tracks/roads and carparks in the study area, rabbit-proof fencing could be very costly and labour-intensive
- Remove European Honey Bee hives if recorded within the study area.

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Appendix A Framework for conservation significant flora and fauna ranking

Categories of threatened species under the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*

Threatened fauna and flora may be listed in any one of the following categories as defined in Section 179 of the EPBC Act:

| Category | Description |
|-------------------------------|--|
| Extinct | A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died. |
| Extinct in the wild | A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time: <ul style="list-style-type: none"> (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form. |
| Critically endangered | A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria. |
| Endangered | A native species is eligible to be included in the endangered category at a particular time if, at that time: <ul style="list-style-type: none"> (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria. |
| Vulnerable | A native species is eligible to be included in the vulnerable category at a particular time if, at that time: <ul style="list-style-type: none"> (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria. |
| Conservation dependent | A native species is eligible to be included in the conservation dependent category at a particular time if, at that time: <ul style="list-style-type: none"> (a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or (b) the following subparagraphs are satisfied: <ul style="list-style-type: none"> (i) the species is a species of fish*; (ii) the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised; |

| Category | Description |
|----------|--|
| | <p>(iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory;</p> <p>(iv) cessation of the plan of management would adversely affect the conservation status of the species.</p> <p>*fish includes all species of bony fish, sharks, rays, crustaceans, molluscs and other marine organisms, but does not include marine mammals or marine reptiles.</p> |

Species listed as 'conservation dependent' and 'extinct' are not Matters of National Environmental Significance and therefore do not trigger the EPBC Act.

Flora and fauna conservation codes under the State *Wildlife Conservation Act 1950 (WC Act)*

| Code | Conservation Status | Description |
|-----------|--|--|
| T | Threatened species* | <p>Listed as Specially Protected under the WC Act, published under Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).</p> <ul style="list-style-type: none"> Fauna that is rare or likely to become extinct are declared to be fauna that is in need of special protection Flora that are extant and considered likely to become extinct, or rare and therefore in need of special protection, are declared to be rare flora <p>Species which have been adequately searched for and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such. The assessment of the conservation status of these species is based on their national extent.</p> |
| X | Presumed extinct species | <p>Listed as Specially Protected under the WC Act, published under Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora (which may also be referred to as Declared Rare Flora).</p> <p>Species which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such.</p> |
| IA | Migratory birds protected under an international agreement | <p>Listed as Specially Protected under the WC Act, listed under Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice.</p> <p>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), relating to the protection of migratory birds.</p> |
| S | Other Specially Protected fauna | <p>Listed as Specially Protected under the WC Act. Fauna declared to be in need of special protection, otherwise than for the reasons mentioned for Schedules 1, 2 or 3, are published under Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice.</p> |

*Threatened Fauna and Flora are ranked according to their level of threat using IUCN Red List categories and criteria. For example: Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*) is listed as 'Specially Protected' under the WC Act, published under Schedule 1, and referred to as a 'Threatened' species with a ranking of 'Endangered':

- CR Critically Endangered** - considered to be facing an extremely high risk of extinction in the wild.
EN Endangered - considered to be facing a very high risk of extinction in the wild.
VU Vulnerable - considered to be facing a high risk of extinction in the wild.

Priority flora and fauna categories used by the Parks and Wildlife (2014).

Species that maybe threatened or near threatened but are data deficient, have not yet been adequately surveyed to be listed under the Schedules of the Wildlife Conservation (Specially Protected Fauna) Notice or the Wildlife Conservation (Rare Flora) Notice, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened list for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Conservation dependent species that are subject to a specific conservation program are placed in Priority 5.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

| Code | Conservation Status | Description |
|------|-----------------------------------|---|
| P1 | 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. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey. |
| P2 | 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. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey. |
| P3 | Priority 3: Poorly known species | Species that are known from several locations and does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey. |
| P4 | Priority 4: Rare, Near Threatened | (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently |

| Code | Conservation Status | Description |
|------|--|--|
| | and other species in need of monitoring | <p>threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.</p> <p>(b) Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.</p> <p>(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p> |
| P5 | Priority 5: Conservation Dependent species | Species that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years. |

Appendix B Likelihood of occurrence criteria for conservation significant flora and fauna

- Likelihood: No
 - Species not known to occur within the IBRA bioregion
 - Study area lacks important habitat for a species that has highly selective habitat requirements
 - Species has been historically recorded within study area or locally, however it is considered locally extinct due to significant habitat changes such as land clearing
- Likelihood: Unlikely
 - Species has been recorded locally through DEC database search, however, is unlikely to occur due to lack of critical habitat and/or the site being severely degraded
 - Species has been recorded locally through DEC database search, however, is unlikely to occur due to few historic record/s, no other current collections in the local area, and extensive on site searching has not detected species.
- Likelihood: Potential
 - Species has been recorded regionally, but has not been previously recorded in the study area; however, targeted surveys may locate the species based on records occurring in proximity to the study area and suitable habitat potentially occurring in the study area
 - Extensive survey efforts have not detected the species, however species is known to be cryptic and no effective standardised procedure is available, therefore occurrence should not be ruled out without further investigation
 - Species has been recorded in the study area by a previous consultant survey, however, doubt remains over taxonomic identification
 - Historical evidence of species occurrence within or outside of study area with coordinates doubtful
 - Historical evidence of species occurrence within project area, and while not considered as locally extinct, occasionally recorded locally based on available data
- Likelihood: Likely
 - Critical or core habitat in excellent condition and landform for the species occurs within the study area
 - Species has been recorded in proximity (<5 km) and in similar habitat to that which occurs within the area
- Likelihood: Yes
 - Species recorded during the survey, or previously recorded within study area from DEC database search results and the species has been confirmed through a current vouchered specimen at WA Herbarium
 - Recent evidence of species positively identified within project area such as fresh scats, foot prints or burrows, or foraging residues.

Appendix C Flora likelihood of occurrence

| Species | Conservation status* | | | Source [#] | Likelihood of occurrence | |
|---|----------------------|--------|--------------------|---------------------|--------------------------|-------------|
| | EPBC Act | WC Act | Parks and Wildlife | | Pre-survey | Post survey |
| <i>Caladenia huegelii</i> | EN | T | CR | PMST | Unlikely | Unlikely |
| <i>Diuris micrantha</i> | VU | T | VU | PMST | Unlikely | Unlikely |
| <i>Diuris purdiei</i> | EN | T | EN | PMST | Unlikely | Unlikely |
| <i>Drakaea elastica</i> | EN | T | CR | PMST | Unlikely | Unlikely |
| <i>Marianthus paralius</i> | | T | CR | NatureMap | Potential | Unlikely |
| <i>Baeckea</i> sp. Limestone (N. Gibson & M.N. Lyons 1425) | | | P1 | NatureMap | Potential | Unlikely |
| <i>Grevillea</i> sp. Ocean Reef (D. Pike Joon 4) | | | P1 | NatureMap | Potential | Unlikely |
| <i>Leucopogon maritimus</i> | | | P1 | NatureMap | Potential | Unlikely |
| <i>Acacia benthamii</i> | | | P2 | NatureMap | Potential | Unlikely |
| <i>Austrostipa mundula</i> | | | P2 | NatureMap | Unlikely | Unlikely |
| <i>Conostylis bracteata</i> | | | P3 | NatureMap | Unlikely | Unlikely |
| <i>Hibbertia spicata</i> subsp. <i>leptotheca</i> | | | P3 | NatureMap | Potential | Unlikely |
| <i>Pimelea calcicola</i> | | | P3 | NatureMap | Potential | Unlikely |

| Species | Conservation status* | | | Source [#] | Likelihood of occurrence | |
|---|----------------------|--------|--------------------|---------------------|--------------------------|-------------|
| | EPBC Act | WC Act | Parks and Wildlife | | Pre-survey | Post survey |
| <i>Sarcozona bicarinata</i> | | | P3 | NatureMap | Potential | Unlikely |
| <i>Stylidium paludicola</i> | | | P3 | NatureMap | Unlikely | Unlikely |
| <i>Jacksonia sericea</i> (<i>Waldjumi</i>) | | | P4 | NatureMap | Potential | Unlikely |

* CR = listed as Critically Endangered under the EPBC Act, WC Act and/or the IUCN red list.

EN = listed as Endangered under the EPBC Act, WC Act and/or the IUCN red list.

VU = listed as Vulnerable under the EPBC Act, WC Act and/or the IUCN red list.

T = Threatened flora

P1 = Priority 1: known from one or a few locations (generally five or less) which are potentially at risk and in urgent need of further survey.

P2 = known from one or a few locations, some of which are on lands managed primarily for nature conservation and in urgent need of further survey.

P3 = Priority 3: known from few specimens or records and need urgent survey and evaluation of conservation status.

P4 = Priority 4: not currently threatened but could if present circumstances change. Usually found on conservation lands.

[#]Source: NatureMap (Parks and Wildlife 2015c), PMST (DotE 2015b).

Appendix D Fauna likelihood of occurrence

| Scientific name | Common name | Conservation status* | | | Source [#] | Likelihood of occurrence assessment | |
|--|--------------------------|----------------------|--------|--------------------|---------------------|-------------------------------------|-------------|
| | | EPBC Act | WC Act | Parks and Wildlife | | Pre-survey | Post-survey |
| <i>Calyptorhynchus latirostris</i> | Carnaby's Black-Cockatoo | EN | S2 | EN | NatureMap | Likely | Likely |
| <i>Rostratula benghalensis</i> subsp. <i>australis</i> | Australian Painted Snipe | EN | S2 | EN | PMST | No | No |
| <i>Dasyurus geoffroii</i> | Chuditch | VU | S3 | VU | NatureMap PMST | Unlikely | No |
| <i>Pseudocheirus occidentalis</i> | Western Ringtail Possum | VU | S2 | EN | PMST | Unlikely | No |
| <i>Neelaps calonotus</i> | Black-striped Snake | - | - | P3 | NatureMap | Potential | Potential |
| <i>Synemon gratiosa</i> | Graceful Sun-moth | - | - | P4 | NatureMap | Potential | Likely |
| <i>Isodon obesulus</i> subsp. <i>fusciventer</i> | Quenda | - | - | P5 | NatureMap | Potential | Recorded |
| <i>Ardea modesta</i> | Eastern Great Egret | M | S5 | IA | NatureMap | Potential | Potential |
| <i>Apus pacificus</i> | Fork-tailed Swift | M | S5 | IA | PMST | Potential | Potential |
| <i>Ardea ibis</i> subsp. <i>coromanda</i> | Cattle Egret | M | S5 | IA | PMST | Potential | Potential |
| <i>Merops ornatus</i> | Rainbow Bee-eater | M | S5 | IA | NatureMap PMST | Likely | Recorded |
| <i>Motacilla cinerea</i> | Grey Wagtail | M | S5 | IA | PMST | No | No |
| <i>Pandion haliaetus</i> | Osprey | M | S5 | IA | NatureMap | Potential | Recorded |
| <i>Falco peregrinus</i> | Peregrine Falcon | - | S7 | S | NatureMap | Potential | Potential |

*EN = listed as Endangered under the EPBC Act, WC Act and/or the IUCN red list.

VU = listed as Vulnerable under the EPBC Act, WC Act and/or the IUCN red list.

M = listed as Migratory species under the EPBC Act.

S2 = Schedule 2: Fauna that is rare or likely to become extinct as endangered fauna (EN)

S3 = Schedule 3: Fauna that is rare or likely to become extinct as vulnerable fauna (VU)

S5 = Schedule 5: Migratory birds protected under an international agreement (IA)

S7 = Schedule 7: Other specially protected fauna (S).

IA = Migratory birds protected under an international agreement.

S = Other Specially Protected fauna.

P3 = Priority 3: known from few specimens or records and need urgent survey and evaluation of conservation status.

P4 = Priority 4: not currently threatened but could if present circumstances change. Usually found on conservation lands.

P5 = not considered threatened but subject to a specific conservation program.

#Source: NatureMap (Parks and Wildlife 2015c), PMST (DotE 2015b).

Appendix E Fungi species list

| Scientific Name | Common Name | Source |
|---|--------------------|--|
| <i>Agrocybe pediades</i> | Common Agrocybe | Natural Areas Consulting (2014) |
| <i>Aleurodiscus</i> sp. | | NatureMap |
| <i>Alternaria</i> sp. | | NatureMap |
| <i>Amanita</i> sp. | | NatureMap |
| <i>Asterostroma persimile</i> | Rosy Skin Fungus | NatureMap |
| <i>Battarrea stevenii</i> | Tall Stiltball | NatureMap |
| <i>Bolbitius vitellinus</i> | Egg Yolk Fungus | Natural Areas Consulting (2014) |
| <i>Boletellus obscurecoccineus</i> | Rhubarb Bolete | Natural Areas Consulting (2014) |
| <i>Boletus prolinus</i> | Red-capped Boletus | NatureMap |
| <i>Byssomerulius corium</i> | Bysso Skin Fungus | Natural Areas Consulting (2014) |
| <i>Calocera guepinoides</i> | Scotsman's Beard | Natural Areas Consulting (2014) NatureMap |
| <i>Calvatia</i> sp. | | NatureMap |
| <i>Clavulina</i> sp. | | NatureMap |
| <i>Clitocybe semiocculata</i> | Shy Funnel Cap | Natural Areas Consulting (2014) |
| <i>Clitocybe</i> sp. | | Natural Areas Consulting (2014) NatureMap |
| <i>Clitopilus</i> sp. | | Natural Areas Consulting (2014) |
| <i>Colus pusillus</i> | Red Fingers | Natural Areas Consulting (2014) |
| <i>Coprinus</i> cf. <i>Picaceus</i> group | WA Magpie Fungus | Natural Areas Consulting (2014) |
| <i>Coprinus</i> sp. | | Natural Areas Consulting (2014) |
| <i>Cochliobolus</i> sp. | | NatureMap |
| <i>Coleosporium</i> sp. | | NatureMap |
| <i>Colletotrichum acutatum</i> | | NatureMap |
| <i>Colletotrichum simmondsii</i> | | NatureMap |
| <i>Colletotrichum</i> sp. | | NatureMap |
| <i>Coltriciella dependens</i> | | NatureMap |
| <i>Coprinus</i> sp. | | NatureMap |

| Scientific Name | Common Name | Source |
|--|---------------------|---------------------------------|
| <i>Cortinarius radicans</i> | Dumpy Webcap | NatureMap |
| <i>Cortinarius</i> sp. | | NatureMap |
| <i>Crepidotus eucalpytorum</i> | Eucalypt Crepidotus | Natural Areas Consulting (2014) |
| <i>Crepidotus prostratus</i> | | Natural Areas Consulting (2014) |
| <i>Dermocybe clelandii</i> | | NatureMap |
| <i>Entoloma</i> sp. | | NatureMap |
| <i>Exidia</i> sp. | | Natural Areas Consulting (2014) |
| <i>Flavoparmelia</i> sp. | | NatureMap |
| <i>Fusarium</i> sp. | | NatureMap |
| <i>Galerina</i> sp. | | Natural Areas Consulting (2014) |
| <i>Geastrum</i> sp. | | NatureMap |
| <i>Gnomonia</i> sp. | | NatureMap |
| <i>Gymnomyces costatisporus</i> | | NatureMap |
| <i>Gymnopilus allantopus</i> | Golden Wood Fungus | Natural Areas Consulting (2014) |
| <i>Gymnopilus purpuratus</i> | | NatureMap |
| <i>Gyrodontium sacchari</i> | | Natural Areas Consulting (2014) |
| <i>Harknessia uromycoides</i> | Tuart Nut Fungus | Natural Areas Consulting (2014) |
| <i>Hexagonia vesparia</i> | Wasp Nest Polypore | Natural Areas Consulting (2014) |
| <i>Hohenbuehelia bingarra</i> | | Natural Areas Consulting (2014) |
| <i>Hymenochaete</i> sp. | | NatureMap |
| <i>Hypocrea</i> sp. | | NatureMap |
| <i>Inocybe</i> sp. | | Natural Areas Consulting (2014) |
| <i>Inocybe curvipes</i> Y | | NatureMap |
| <i>Laccaria canaliculata</i> | | NatureMap |
| <i>Lecania turicensis</i> var. <i>turicensis</i> * | | NatureMap |
| <i>Leucocoprinus birnbaumii</i> | Flowerpot Parasol | NatureMap |
| <i>Leucoagaricus naucinus</i> | Smooth Parasol | Natural Areas Consulting (2014) |
| <i>Macrophomina</i> sp. | | NatureMap |
| <i>Melanoleuca fusca</i> | Dark Melanoleuca | NatureMap |

| Scientific Name | Common Name | Source |
|--------------------------------|------------------------|--|
| <i>Melanoleuca</i> sp. | | Natural Areas Consulting (2014) |
| <i>Mycena clarkeana</i> | Clarke's Pixie Cap | NatureMap |
| <i>Mycena subgalericulata</i> | Grey Pixie Cap | Natural Areas Consulting (2014) |
| <i>Mycena</i> sp. | | Natural Areas Consulting (2014) NatureMap |
| <i>Mycoacia subceracea</i> | Golden Splash Tooth | Natural Areas Consulting (2014) |
| <i>Myxomycete</i> sp. | Slime Mould | Natural Areas Consulting (2014) |
| <i>Panus fasciatus</i> | Hairy Panus | NatureMap |
| <i>Passalora</i> sp. Y | | NatureMap |
| <i>Peronospora</i> sp. | | NatureMap |
| <i>Phaeomarasmius</i> sp. | | NatureMap |
| <i>Phallus hadriani</i> | Hadrian's Stinkhorn | NatureMap |
| <i>Phanerochaete</i> sp. | | NatureMap |
| <i>Phlebia subceracea</i> | Golden Splash Tooth | Natural Areas Consulting (2014) |
| <i>Phytophthora nicotianae</i> | Black Shank | NatureMap |
| <i>Phytophthora</i> sp. | | NatureMap |
| <i>Pisolithus</i> sp. | Dog Poo Fungus | Natural Areas Consulting (2014) |
| <i>Plicaria</i> sp. | | Natural Areas Consulting (2014) |
| <i>Polyporus badius</i> | Black-footed Polypore | Natural Areas Consulting (2014) |
| <i>Poria</i> sp. | | Natural Areas Consulting (2014) |
| <i>Poronia</i> sp. | | NatureMap |
| <i>Psathyrella</i> sp. | | Natural Areas Consulting (2014) |
| <i>Psilocybe coprophila</i> | Dung Cap Psilocybe | NatureMap |
| <i>Puccinia</i> sp. | | NatureMap |
| <i>Pucciniastrum</i> sp. | | NatureMap |
| <i>Pycnoporus coccineus</i> | Scarlet Bracket Fungus | NatureMap |
| <i>Resupinatus</i> sp. | | NatureMap |
| <i>Rhizoctonia</i> sp. | | NatureMap |
| <i>Royoporus badius</i> | | NatureMap |
| <i>Rhodocollybia</i> sp. | | Natural Areas Consulting (2014) |

| Scientific Name | Common Name | Source |
|-----------------------------------|-------------------------|---------------------------------|
| <i>Schizophyllum commune</i> | Split Gill Fungus | Natural Areas Consulting (2014) |
| <i>Schizopora paradoxa</i> | | NatureMap |
| <i>Scleroderma cepa</i> | Earthballs | Natural Areas Consulting (2014) |
| <i>Scleroderma</i> sp. | Earthballs | Natural Areas Consulting (2014) |
| <i>Sclerotinia</i> sp. | | NatureMap |
| <i>Scutellinia scutellata</i> | Eyelash Cup Fungus | NatureMap |
| <i>Setosphaeria</i> sp. Y | | NatureMap |
| <i>Sphaerobolus stellatus</i> | Cannonball Fungus | NatureMap |
| <i>Sporisorium</i> sp. | | NatureMap |
| <i>Stereum hirsutum</i> | Hairy Stereum | NatureMap |
| <i>Tomentella pilosa</i> | | NatureMap |
| <i>Torrendia</i> sp. | | NatureMap |
| <i>Trametes lilacinogilva</i> | | NatureMap |
| <i>Trametes versicolour</i> | Rainbow Bracket Fungi | Natural Areas Consulting (2014) |
| <i>Tremella mesenterica</i> group | Yellow Brain Fungus | Natural Areas Consulting (2014) |
| <i>Tricholoma</i> sp. | | NatureMap |
| <i>Tubaria serrulata</i> | | NatureMap |
| <i>Tubaria</i> sp. | | Natural Areas Consulting (2014) |
| <i>Tubifera ferruginosa</i> | Strawberry Slime Mould | Natural Areas Consulting (2014) |
| <i>Tyromyces</i> sp. | | NatureMap |
| <i>Uromycladium</i> sp. | | NatureMap |
| <i>Uromycladium tepperianum</i> | | NatureMap |
| <i>Ustilago</i> sp. | | NatureMap |
| <i>Verticillium</i> sp. | | NatureMap |
| <i>Volvariella speciosa</i> | Common Rosegill | Natural Areas Consulting (2014) |
| <i>Xanthoria</i> sp. | | NatureMap |
| <i>Xeromphalina</i> sp. | | Natural Areas Consulting (2014) |
| <i>Xerula mundroola</i> | Mundroola Rooting Shank | NatureMap |
| <i>Xerula</i> sp. | | NatureMap |

* Species listed as Priority 2 by Parks and Wildlife

Appendix F Fauna trap configuration

| Traps Transect | Trap ID number | Way point coordinates | | Sample methods | | | | |
|-------------------|-------------------|-----------------------|----------|----------------|--------|----------|---------------|----------------|
| | | Easting | Northing | | | | | |
| 1 | 1 | 6478886 | 380782 | pit-fall | funnel | Elliot A | Cage trap | Bird census |
| | 2 | 6478899 | 380767 | pit-fall | funnel | | | |
| | 3 | 6478912 | 380759 | pit-fall | funnel | | | |
| | 4 | 6478928 | 380753 | pit-fall | funnel | | | |
| | 5 | 6478935 | 380743 | pit-fall | funnel | Elliot A | Motion camera | |
| 2 | 6 | 6479403 | 380453 | pit-fall | funnel | Elliot A | Cage trap | Bird census |
| | 7 | 6479397 | 380441 | pit-fall | funnel | | | |
| | 8 | 6479386 | 380436 | pit-fall | funnel | | | |
| | 9 | 6479368 | 380438 | pit-fall | funnel | | | |
| | 10 | 6479356 | 380442 | pit-fall | funnel | Elliot A | Motion camera | |
| 3 | 11 | 6480254 | 379782 | pit-fall | funnel | Elliot A | Cage trap | Bird census |
| | 12 | 6480268 | 379769 | pit-fall | funnel | | | |
| | 13 | 6480284 | 379764 | pit-fall | funnel | | | |
| | 14 | 6480299 | 379767 | pit-fall | funnel | | | |
| | 15 | 6480303 | 379781 | pit-fall | funnel | Elliot A | Motion camera | |
| 4 | 16 | 6480852 | 379983 | pit-fall | funnel | Elliot A | Cage trap | Bird census |
| | 17 | 6480863 | 379970 | pit-fall | funnel | | | |
| | 18 | 6480877 | 379967 | pit-fall | funnel | | | |
| | 19 | 6480886 | 379975 | pit-fall | funnel | | | |
| | 20 | 6480902 | 379976 | pit-fall | funnel | Elliot A | Motion camera | |
| 5 | 21 | 6481788 | 380094 | pit-fall | funnel | Elliot A | Cage trap | Bird census |
| | 22 | 6481794 | 380106 | pit-fall | funnel | | | |
| | 23 | 6481800 | 380116 | pit-fall | funnel | | | |
| | 24 | 6481811 | 380122 | pit-fall | funnel | | | |
| | 25 | 6481818 | 380135 | pit-fall | funnel | Elliot A | Motion camera | |
| 6 | 26 | 6482134 | 380235 | pit-fall | funnel | Elliot A | Cage trap | Bird census |
| | 27 | 6482128 | 380226 | pit-fall | funnel | | | |
| | 28 | 6482113 | 380216 | pit-fall | funnel | | | |
| | 29 | 6482104 | 380211 | pit-fall | funnel | | | |
| | 30 | 6482098 | 380204 | pit-fall | funnel | Elliot A | Motion camera | |

Appendix G Flora species recorded

| Family | Species |
|----------------|--|
| Aizoaceae | * <i>Tetragonia decumbens</i> |
| Aizoaceae | <i>Carpobrotus virescens</i> |
| Apiaceae | <i>Daucus glochidiatus</i> |
| Asparagaceae | * <i>Agave americana</i> |
| Asparagaceae | <i>Acanthocarpus preissii</i> |
| Asparagaceae | <i>Lomandra maritima</i> |
| Asphodelaceae | * <i>Asphodelus fistulosus</i> |
| Asteraceae | * <i>Arctotheca calendula</i> |
| Asteraceae | * <i>Gazania linearis</i> |
| Asteraceae | * <i>Lactuca serriola</i> |
| Asteraceae | * <i>Sonchus oleraceus</i> |
| Asteraceae | <i>Olearia axillaris</i> |
| Asteraceae | <i>Pithocarpa cordata</i> |
| Asteraceae | <i>Senecio pinnatifolius</i> |
| Brassicaceae | * <i>Brassica tournefortii</i> |
| Brassicaceae | * <i>Cakile maritima</i> |
| Casuarinaceae | <i>Allocasuarina lehmanniana</i> subsp. <i>lehmanniana</i> |
| Chenopodiaceae | <i>Rhagodia baccata</i> subsp. <i>baccata</i> |
| Chenopodiaceae | <i>Threlkeldia diffusa</i> |
| Convolvulaceae | * <i>Cuscuta epithymum</i> |
| Crassulaceae | * <i>Crassula glomerata</i> |
| Cupressaceae | <i>Callitris preissii</i> |
| Cyperaceae | * <i>Cyperus tenellus</i> |
| Cyperaceae | <i>Ficinia nodosa</i> |
| Cyperaceae | <i>Lepidosperma gladiatum</i> |
| Cyperaceae | <i>Lepidosperma squamatum</i> |
| Cyperaceae | <i>Schoenus clandestinus</i> |
| Cyperaceae | <i>Schoenus grandiflorus</i> |
| Dilleniaceae | <i>Hibbertia subvaginata</i> |
| Ericaceae | <i>Leucopogon parviflorus</i> |
| Ericaceae | <i>Leucopogon</i> sp. |

| Family | Species |
|-------------------|---|
| Euphorbiaceae | * <i>Euphorbia paralias</i> |
| Euphorbiaceae | * <i>Euphorbia terracina</i> |
| Fabaceae | * <i>Medicago littoralis</i> |
| Fabaceae | <i>Acacia cochlearis</i> |
| Fabaceae | <i>Acacia cyclops</i> |
| Fabaceae | <i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i> |
| Fabaceae | <i>Acacia rostelifera</i> |
| Fabaceae | <i>Acacia saligna</i> subsp. <i>saligna</i> |
| Fabaceae | <i>Acacia truncata</i> |
| Fabaceae | <i>Gastrolobium capitatum</i> |
| Fabaceae | <i>Hardenbergia comptoniana</i> |
| Fabaceae | <i>Templetonia retusa</i> |
| Geraniaceae | * <i>Pelargonium capitatum</i> |
| Goodeniaceae | <i>Scaevola crassifolia</i> |
| Gyrostemonaceae | <i>Tersonia cyathiflora</i> |
| Haemodoraceae | <i>Conostylis candidans</i> |
| Hemerocallidaceae | <i>Dianella revoluta</i> |
| Lamiaceae | <i>Hemiantra glabra</i> |
| Lauraceae | <i>Cassytha flava</i> |
| Myrtaceae | <i>Agonis flexuosa</i> |
| Myrtaceae | <i>Eucalyptus gomphocephala</i> |
| Myrtaceae | <i>Eucalyptus utilis</i> |
| Myrtaceae | <i>Melaleuca lanceolata</i> |
| Myrtaceae | <i>Melaleuca systema</i> |
| Onagraceae | * <i>Oenothera drummondii</i> |
| Papaveraceae | * <i>Fumaria capreolata</i> |
| Poaceae | * <i>Avena barbata</i> |
| Poaceae | * <i>Briza maxima</i> |
| Poaceae | * <i>Bromus diandrus</i> |
| Poaceae | * <i>Ehrharta longiflora</i> |
| Poaceae | * <i>Lagurus ovatus</i> |
| Poaceae | * <i>Lolium perenne</i> |
| Poaceae | <i>Austrostipa flavescens</i> |

| Family | Species |
|------------------|--|
| Poaceae | <i>Poa poiformis</i> |
| Poaceae | <i>Spinifex hirsutus</i> |
| Portulacaceae | <i>Calandrinia calyptata</i> |
| Primulaceae | * <i>Lysimachia arvensis</i> |
| Ranunculaceae | <i>Clematis pubescens</i> |
| Rhamnaceae | <i>Spyridium globulosum</i> |
| Rubiaceae | * <i>Galium murale</i> |
| Rubiaceae | <i>Opercularia vaginata</i> |
| Santalaceae | <i>Exocarpos sparteus</i> |
| Santalaceae | <i>Santalum acuminatum</i> |
| Scrophulariaceae | <i>Myoporum insulare</i> |
| Solanaceae | * <i>Solanum nigrum</i> |
| Thymelaeaceae | <i>Pimelea ferruginea</i> |
| Urticaceae | <i>Parietaria cardiostegia</i> |
| Verbenaceae | * <i>Verbena rigida</i> var. <i>rigida</i> |

Appendix H Flora species matrix

| Species | WN_2 | WN_4 | WN_6 | WN_8 | WN_10 | WN_12 | WN_14 | WN_16 |
|---|------|------|------|------|-------|-------|-------|-------|
| * <i>Asphodelus fistulosus</i> | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |
| * <i>Brassica tournefortii</i> | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 |
| * <i>Bromus diandrus</i> | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| * <i>Crassula glomerata</i> | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| * <i>Cuscuta epithymum</i> | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| * <i>Cyperus tenellus</i> | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| * <i>Ehrharta longiflora</i> | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| * <i>Euphorbia terracina</i> | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| * <i>Lagurus ovatus</i> | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| * <i>Lolium perenne</i> | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| * <i>Lysimachia arvensis</i> | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 |
| * <i>Pelargonium capitatum</i> | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| * <i>Romulea rosea</i> | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| * <i>Sonchus oleraceus</i> | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| * <i>Tetragonia decumbens</i> | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| * <i>Verbena rigida</i> var. <i>rigida</i> | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| <i>Acacia cyclops</i> | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| <i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i> | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 |
| <i>Acacia rostellifera</i> | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| <i>Acacia saligna</i> | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| <i>Acacia truncata</i> | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| <i>Acanthocarpus preissii</i> | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| <i>Austrostipa flavescens</i> | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| <i>Calandrinia calyptrata</i> | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| <i>Carpobrotus virescens</i> | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| <i>Cassutha flava</i> | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| <i>Clematis pubescens</i> | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| <i>Conostylis candicans</i> | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| <i>Daucus glochidiatus</i> | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| <i>Desmocladius asper</i> | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| <i>Gastrolobium capitatum</i> | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| <i>Gompholobium tomentosum</i> | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| <i>Hardenbergia comptoniana</i> | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| <i>Hemiandra glabra</i> | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| <i>Hemiandra pungens</i> | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| <i>Hibbertia subvaginata</i> | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |
| <i>Lepidosperma gladiatum</i> | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| <i>Lepidosperma squamatum</i> | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |

| Species | WN_2 | WN_4 | WN_6 | WN_8 | WN_10 | WN_12 | WN_14 | WN_16 |
|---|------|------|------|------|-------|-------|-------|-------|
| <i>Leucopogon parviflorus</i> | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| <i>Leucopogon</i> sp. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| <i>Lomandra maritima</i> | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| <i>Melaleuca systema</i> | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 |
| <i>Myoporum insulare</i> | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| <i>Olearia axillaris</i> | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| <i>Parietaria cardiostegia</i> | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| <i>Phyllanthus calycinus</i> | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| <i>Pimelea ferruginea</i> | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| <i>Pithocarpa cordata</i> | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| <i>Poa poiformis</i> | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| <i>Rhagodia baccata</i> subsp. <i>baccata</i> | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| <i>Santalum acuminatum</i> | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| <i>Scaevola crassifolia</i> | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| <i>Schoenus clandestinus</i> | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| <i>Senecio pinnatifolius</i> | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| <i>Spinifex hirsutus</i> | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| <i>Spyridium globulosum</i> | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| <i>Templetonia retusa</i> | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| <i>Tersonia cyathiflora</i> | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| <i>Threlkeldia diffusa</i> | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |

Appendix I Flora species list

| Family | Scientific name | Common name | Conservation status* | | Source# | | This survey | Previous surveys | |
|---------------|---|--------------------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscape survey | COJ (2009, 2012) |
| Acrotyleaceae | <i>Clavicleonium ovatum</i> | | | | | + | | | |
| | <i>Hennedya crista</i> | | | | | + | | | |
| Aizoaceae | <i>Carpobrotus virescens</i> | Coastal Pigface, Kolboko | | | | + | + | + | + |
| | <i>Tetragonia</i> sp. | | | | | + | | | |
| | <i>Tetragonia tetragonioides</i> | New Zealand Spinach | | | | + | | | |
| | * <i>Tetragonia decumbens</i> | | | | | | + | | |
| Amaranthaceae | <i>Ptilotus drummondii</i> | Narrowleaf Mulla Mulla | | | | + | | | |
| | <i>Ptilotus drummondii</i> var. <i>drummondii</i> | Pussytail | | | | + | | | |
| | <i>Ptilotus polystachyus</i> | Prince of Wales Feather | | | | + | | | |
| | <i>Ptilotus stirlingii</i> subsp. <i>stirlingii</i> | | | | | + | | | |
| Apiaceae | <i>Apium annuum</i> | | | | | + | | | |
| | <i>Daucus glochidiatus</i> | | | | | | + | | |
| | <i>Eryngium pinnatifidum</i> | Blue Devils | | | | + | | | |
| | <i>Xanthosia huegelii</i> | | | | | + | | | |

| Family | Scientific name | Common name | Conservation status* | | Source# | | This survey | Previous surveys | |
|-----------------|-----------------------------------|-----------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscape survey | COJ (2009, 2012) |
| Araliaceae | <i>Trachymene pilosa</i> | Native Parsnip | | | | + | | | |
| Areschougiaceae | <i>Areschougia ligulata</i> | | | | | + | | | |
| | <i>Betaphycus speciosum</i> | | | | | + | | | |
| | <i>Callophycus costatus</i> | | | | | + | | | |
| | <i>Callophycus dorsifer</i> | | | | | + | | | |
| | <i>Callophycus oppositifolius</i> | | | | | + | | | |
| | <i>Erythroclonium muelleri</i> | | | | | + | | | |
| | <i>Erythroclonium sonderi</i> | | | | | + | | | |
| | <i>Gigartina disticha</i> | | | | | + | | | |
| | <i>Solieria robusta</i> | | | | | + | | | |
| | <i>Dichopogon capillipes</i> | | | | | + | | | |
| Asparagaceae | <i>Acanthocarpus preissii</i> | | | | | + | + | + | |
| | * <i>Agave americana</i> | | | | | | + | | |
| | <i>Lomandra caespitosa</i> | Tufted Mat Rush | | | | + | | | |

| Family | Scientific name | Common name | Conservation status* | | Source# | | This survey | Previous surveys | |
|---------------|---------------------------------|------------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscape survey | COJ (2009, 2012) |
| | <i>Lomandra hermaphrodita</i> | | | | | + | | | |
| | <i>Lomandra maritima</i> | | | | | + | + | + | + |
| | <i>Lomandra preissii</i> | | | | | + | | | |
| | <i>Lomandra</i> sp. | | | | | + | | | |
| | <i>Lomandra suaveolens</i> | | | | | + | | | |
| | <i>Sowerbaea laxiflora</i> | Purple Tassels | | | | + | | | |
| | <i>Thysanotus arenarius</i> | | | | | + | | | |
| | <i>Thysanotus patersonii</i> | | | | | + | | | |
| | <i>Thysanotus sparteus</i> | | | | | + | | | |
| Asphodelaceae | * <i>Asphodelus fistulosus</i> | | | | | | + | | |
| | <i>Trachyandra divaricata</i> | | | | | | | + | |
| Asteraceae | * <i>Arctotheca calendula</i> | | | | | | + | | |
| | <i>Angianthus cunninghamii</i> | Coast Angianthus | | | | + | | | |
| | <i>Brachyscome iberidifolia</i> | | | | | + | | | |

| Family | Scientific name | Common name | Conservation status* | | Source# | | This survey | Previous surveys | |
|--------|--|-------------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscope survey | COJ (2009, 2012) |
| | <i>*Gazania linearis</i> | | | | | | + | | |
| | <i>Hypochaeris</i> sp. | | | | | + | | | |
| | <i>*Lactuca serriola</i> | | | | | | + | | |
| | <i>Millotia myosotidifolia</i> | | | | | + | | | |
| | <i>Olearia axillaris</i> | Coastal Daisybush | | | | + | + | | + |
| | <i>Pithocarpa cordata</i> | | | | | + | + | | |
| | <i>Podolepis nutans</i> | Nodding Podolepis | | | | + | | | |
| | <i>Podotheca angustifolia</i> | Sticky Longheads | | | | + | | | |
| | <i>Podotheca chrysantha</i> | Yellow Podotheca | | | | + | | | |
| | <i>Rhodanthe manglesii</i> | | | | | + | | | |
| | <i>Senecio pinnatifolius</i> | | | | | | + | | |
| | <i>Senecio pinnatifolius</i> var. <i>latilobus</i> | | | | | + | | | |
| | <i>Sonchus hydrophilus</i> | Native Sowthistle | | | | + | | | |
| | <i>*Sonchus oleraceus</i> | | | | | | + | | |

| Family | Scientific name | Common name | Conservation status* | | Source# | | This survey | Previous surveys | |
|-------------------|--|------------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscape survey | COJ (2009, 2012) |
| | <i>Sonchus</i> sp. | | | | | + | | | |
| | <i>Waitzia suaveolens</i> | Fragrant Waitzia | | | | + | | | |
| | <i>Waitzia suaveolens</i> var. <i>flava</i> | | | | | + | | | |
| Bonnemaisoniaceae | <i>Asparagopsis armata</i> | | | | | + | | | |
| Brassicaceae | * <i>Brassica tournefortii</i> | | | | | | + | | |
| | * <i>Cakile maritima</i> | | | | | | + | | |
| Bryaceae | <i>Rosulabryum billardieri</i> | | | | | + | | | |
| Bryopsidaceae | <i>Bryopsis australis</i> | | | | | + | | | |
| | <i>Bryopsis foliosa</i> | | | | | + | | | |
| Campanulaceae | <i>Lobelia anceps</i> | Angled Lobelia | | | | + | | | |
| | <i>Lobelia gibbosa</i> | Tall Lobelia | | | | + | | | |
| Casuarinaceae | <i>Allocasuarina lehmanniana</i> subsp. <i>lehmanniana</i> | | | | | + | + | + | |
| Caulerpaceae | <i>Caulerpa cactoides</i> | | | | | + | | | |
| | <i>Caulerpa distichophylla</i> | | | | | + | | | |

| Family | Scientific name | Common name | Conservation status* | | Source# | | This survey | Previous surveys | |
|------------------|--|-------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscope survey | COJ (2009, 2012) |
| | <i>Caulerpa fergusonii</i> | | | | | + | | | |
| | <i>Caulerpa flexilis</i> | | | | | + | | | |
| | <i>Caulerpa longifolia</i> forma <i>crispata</i> | | | | | + | | | |
| | <i>Caulerpa obscura</i> | | | | | + | | | |
| | <i>Caulerpa racemosa</i> | | | | | + | | | |
| | <i>Caulerpa scalpelliformis</i> | | | | | + | | | |
| | <i>Caulerpa sedoides</i> forma <i>geminata</i> | | | | | + | | | |
| | <i>Caulerpa trifaria</i> | | | | | + | | | |
| Centrolepidaceae | <i>Centrolepis drummondiana</i> | | | | | + | | | |
| Ceramiaceae | <i>Acrothamnion preissii</i> | | | | | + | | | + |
| | <i>Antithamnion armatum</i> | | | | | + | | | |
| | <i>Antithamnion hanovioides</i> | | | | | + | | | |
| | <i>Bornetia binderiana</i> | | | | | + | | | |
| | <i>Centroceras clavulatum</i> | | | | | + | | | |

| Family | Scientific name | Common name | Conservation status* | | Source# | | This survey | Previous surveys | |
|----------------|---|----------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscope survey | COJ (2009, 2012) |
| | <i>Ceramium filicula</i> | | | | | + | | | |
| | <i>Ceramium rubrum</i> | | | | | + | | | |
| | <i>Dasyphila preissii</i> | | | | | + | | | |
| | <i>Euptilota articulata</i> | | | | | + | | | |
| | <i>Griffithsia monilis</i> | | | | | + | | | |
| | <i>Griffithsia teges</i> | | | | | + | | | |
| | <i>Haloplegma preissii</i> | | | | | + | | | |
| | <i>Spongoclonium conspicuum</i> | | | | | + | | | |
| | <i>Wrangelia plumosa</i> | | | | | + | | | |
| | <i>Champia stipitata</i> | | | | | + | | | |
| | <i>Champia zostericola</i> | | | | | + | | | |
| Chenopodiaceae | <i>Rhagodia baccata</i> | Berry Saltbush | | | | + | | | + |
| | <i>Rhagodia baccata</i> subsp. <i>baccata</i> | | | | | + | + | | |
| | <i>Rhagodia baccata</i> subsp. <i>dioica</i> | | | | | | | + | |

| Family | Scientific name | Common name | Conservation status* | | Source# | | This survey | Previous surveys | |
|----------------|-------------------------------|-------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscape survey | COJ (2009, 2012) |
| | <i>Salsola australis</i> | | | | | + | | | |
| | <i>Sarcocornia blackiana</i> | | | | | + | | | |
| | <i>Threlkeldia diffusa</i> | | | | | | + | + | + |
| Cladophoraceae | <i>Apjohnia laetevirens</i> | | | | | + | | | |
| | <i>Cladophora albida</i> | | | | | + | | | |
| | <i>Cladophora lehmanniana</i> | | | | | + | | | |
| | <i>Cladophora valonioides</i> | | | | | + | | | |
| Codiaceae | <i>Codium duthieae</i> | | | | | + | | | |
| | <i>Codium galeatum</i> | | | | | + | | | |
| | <i>Codium laminarioides</i> | | | | | + | | | |
| | <i>Codium muelleri</i> | | | | | + | | | |
| | <i>Codium spinescens</i> | | | | | + | | | |
| Colchicaceae | <i>Burchardia congesta</i> | | | | | + | | | |
| | <i>Wurmbea monantha</i> | | | | | + | | | |

| Family | Scientific name | Common name | Conservation status* | | Source# | | This survey | Previous surveys | |
|----------------|--|-----------------------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscope survey | COJ (2009, 2012) |
| Convolvulaceae | <i>*Cuscuta epithymum</i> | | | | | | + | | |
| Corallinaceae | <i>Amphiroa anceps</i> | | | | | + | | | |
| | <i>Amphiroa gracilis</i> | | | | | + | | | |
| | <i>Haliptilon roseum</i> | | | | | + | | | |
| | <i>Metagoniolithon chara</i> | | | | | + | | | |
| | <i>Metagoniolithon stelliferum</i> | | | | | + | | | |
| | <i>Metamastophora flabellata</i> | | | | | + | | | |
| Crassulaceae | <i>Crassula colorata</i> | Dense Stonecrop | | | | + | | | |
| | <i>Crassula colorata</i> var. <i>acuminata</i> | | | | | + | | | |
| | <i>Crassula glomerata</i> | | | | | | + | | + |
| Cupressaceae | <i>Callitris preissii</i> | Rottneest Island Pine, Maro | | | | + | + | | |
| Cymodoceaceae | <i>Amphibolis antarctica</i> | Sea Nymph | | | | + | | | |
| | <i>Amphibolis griffithii</i> | | | | | + | | | |
| | <i>Cymodocea</i> sp. | | | | | + | | | |

| Family | Scientific name | Common name | Conservation status* | | Source# | | This survey | Previous surveys | |
|------------|------------------------------------|---------------------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscope survey | COJ (2009, 2012) |
| | <i>Thalassodendron pachyrhizum</i> | | | | | + | | | |
| Cyperaceae | * <i>Cyperus tenellus</i> | | | | | | + | | |
| | <i>Baumea juncea</i> | Bare Twigrush | | | | + | | | |
| | <i>Ficinia nodosa</i> | Knotted Club Rush | | | | + | + | | + |
| | <i>Isolepis marginata</i> | Coarse Club-rush | | | | + | | | |
| | <i>Isolepis nodosa</i> | | | | | | | + | |
| | <i>Lepidosperma calcicola</i> | | | | | + | | | |
| | <i>Lepidosperma gladiatum</i> | Coast Sword-sedge, Kerbin | | | | + | + | + | + |
| | <i>Lepidosperma pubisquameum</i> | | | | | + | | | |
| | <i>Lepidosperma scabrum</i> | | | | | + | | | |
| | <i>Lepidosperma squamatum</i> | | | | | | + | + | |
| | <i>Mesomelaena pseudostygia</i> | | | | | + | | | + |
| | <i>Schoenoplectus lateriflorus</i> | | | | | + | | | |
| | <i>Schoenus clandestinus</i> | | | | | + | + | | |

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| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscope survey | COJ (2009, 2012) |
| | <i>Schoenus curvifolius</i> | | | | | + | | | |
| | <i>Schoenus grandiflorus</i> | Large Flowered Bogrush | | | | + | + | | |
| | <i>Tetralia octandra</i> | | | | | + | | | |
| Cystocloniaceae | <i>Craspedocarpus venosus</i> | | | | | + | | | |
| | <i>Rhodophyllis volans</i> | | | | | + | | | |
| | <i>Stictosporum nitophylloides</i> | | | | | + | | | |
| Dasyaceae | <i>Dasya elongata</i> | | | | | + | | | |
| | <i>Heterosiphonia crassipes</i> | | | | | + | | | |
| | <i>Heterosiphonia muelleri</i> | | | | | + | | | |
| | <i>Thuretia quercifolia</i> | | | | | + | | | |
| Delesseriaceae | <i>Chauviniella coriifolia</i> | | | | | + | | | |
| | <i>Haraldiophyllum erosum</i> | | | | | + | | | |
| | <i>Heterodoxia denticulata</i> | | | | | + | | | |
| | <i>Martensia elegans</i> | | | | | + | | | |

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| Dicranemataceae | <i>Dicranema revolutum</i> | | | | | + | | | |
| | <i>Tylotus obtusatus</i> | | | | | + | | | |
| Dilleniaceae | <i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i> | | | | | + | | | |
| | <i>Hibbertia racemosa</i> | Stalked Guinea Flower | | | | + | | | |
| | <i>Hibbertia spicata</i> | | | | | | | | + |
| | <i>Hibbertia subvaginata</i> | | | | | | + | | + |
| Droseraceae | <i>Drosera erythrorhiza</i> | Red Ink Sundew | | | | + | | | |
| | <i>Drosera macrantha</i> | Bridal Rainbow | | | | + | | | |
| | <i>Drosera</i> sp. (climbing) | | | | | | | + | |
| Ericaceae | <i>Acrotriche cordata</i> | | | | | | | | + |
| | <i>Astroloma ciliatum</i> | Candle Cranberry | | | | + | | | |
| | <i>Astroloma microcalyx</i> | Native Cranberry | | | | + | | | |
| | <i>Astroloma pallidum</i> | Kick Bush | | | | + | | | |
| | <i>Conostephium pendulum</i> | Pearl Flower | | | | + | | | |

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| | <i>Conostephium preissii</i> | | | | | + | | | |
| | <i>Leucopogon insularis</i> | | | | | + | | | |
| | <i>Leucopogon maritimus</i> | | | P1 | | + | | | |
| | <i>Leucopogon parviflorus</i> | Coast Beard-heath | | | | + | + | | |
| | <i>Leucopogon polymorphus</i> | | | | | + | | | |
| | <i>Leucopogon propinquus</i> | | | | | + | | | |
| | <i>Leucopogon</i> sp. | | | | | | + | | |
| | <i>Lysinema pentapetalum</i> | | | | | + | | | |
| Euphorbiaceae | <i>Adriana quadripartita</i> | Bitter Bush | | | | + | | | |
| | * <i>Euphorbia paralias</i> | | | | | | + | | |
| | * <i>Euphorbia terracina</i> | | | | | | + | | |
| | <i>Ricinocarpos undulatus</i> | | | | | + | | | |
| Fabaceae | * <i>Medicago littoralis</i> | | | | | | + | | |
| | <i>Acacia ?rostellifera</i> | | | | | | | + | |

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| | <i>Acacia benthamii</i> | | | P2 | | + | | | |
| | <i>Acacia cochlearis</i> | Rigid Wattle | | | | + | + | + | |
| | <i>Acacia cyclops</i> | Coastal Wattle | | | | + | + | + | + |
| | <i>Acacia lasiocarpa</i> | | | | | | | | + |
| | <i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i> | | | | | + | + | + | |
| | <i>Acacia pulchella</i> var. <i>glaberrima</i> | | | | | + | | + | |
| | <i>Acacia rostellifera</i> | Summer-scented Wattle | | | | + | + | | + |
| | <i>Acacia saligna</i> | | | | | | | + | + |
| | <i>Acacia saligna</i> subsp. <i>saligna</i> | | | | | + | + | | |
| | <i>Acacia</i> sp? | | | | | | | | + |
| | <i>Acacia truncata</i> | | | | | + | + | + | + |
| | <i>Acacia willdenowiana</i> | Grass Wattle | | | | + | | | |
| | <i>Acacia xanthina</i> | White-stemmed Wattle | | | | + | | | |
| | <i>Bossiaea eriocarpa</i> | Common Brown Pea | | | | + | | + | |

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| | <i>Daviesia divaricata</i> | Marno | | | | + | | | |
| | <i>Daviesia divaricata</i> subsp. <i>divaricata</i> | | | | | + | | | |
| | <i>Daviesia nudiflora</i> | | | | | + | | | |
| | <i>Daviesia triflora</i> | | | | | + | | | |
| | <i>Euchilopsis linearis</i> | Swamp Pea | | | | + | | | |
| | <i>Gastrolobium capitatum</i> | | | | | + | + | | |
| | <i>Gastrolobium linearifolium</i> | | | | | + | | | |
| | <i>Gastrolobium nervosum</i> | | | | | + | | + | + |
| | <i>Gompholobium tomentosum</i> | Hairy Yellow Pea | | | | + | | + | |
| | <i>Hardenbergia comptoniana</i> | Native Wisteria | | | | + | + | + | + |
| | <i>Hovea pungens</i> | Devil's Pins, Puyenak | | | | + | | | |
| | <i>Hovea trisperma</i> | Common Hovea | | | | + | | + | |
| | <i>Jacksonia calcicola</i> | | | | | + | | | |
| | <i>Jacksonia furcellata</i> | Grey Stinkwood | | | | + | | | |

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| | <i>Jacksonia sericea</i> | Waldjumi | | P4 | | + | | | |
| | <i>Jacksonia sternbergiana</i> | Stinkwood, Kapur | | | | + | | | |
| | <i>Kennedia prostrata</i> | Scarlet Runner | | | | + | | | |
| | <i>Sphaerolobium medium</i> | | | | | + | | | |
| | <i>Templetonia retusa</i> | Cockies Tongues | | | | + | + | + | + |
| Faucheaceae | <i>Webervanbossea splachnoides</i> | | | | | + | | | |
| Galaxauraceae | <i>Dichotomaria obtusata</i> | | | | | + | | | |
| Gelidiaceae | <i>Pterocladia lucida</i> | | | | | + | | | |
| | <i>Pteroclatiella capillacea</i> | | | | | + | | | |
| | <i>Ptilophora prolifera</i> | | | | | + | | | |
| Geraniaceae | * <i>Pelargonium capitatum</i> | | | | | | + | | |
| Goodeniaceae | <i>Lechenaultia linarioides</i> | Yellow Leschenaultia | | | | + | | | |
| | <i>Scaevola anchusifolia</i> | | | | | + | | | |
| | <i>Scaevola canescens</i> | Grey Scaevola | | | | + | | | |

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| | <i>Scaevola crassifolia</i> | Thick-leaved Fan-flower | | | | + | + | | + |
| | <i>Scaevola globulifera</i> | | | | | + | | | |
| | <i>Scaevola nitida</i> | Shining Fanflower | | | | + | | | + |
| | <i>Scaevola repens</i> var. <i>angustifolia</i> | | | | | + | | | |
| | <i>Scaevola repens</i> var. <i>repens</i> | | | | | + | | | |
| | <i>Scaevola thesioides</i> subsp. <i>thesioides</i> | | | | | + | | | |
| | <i>Curdiea obesa</i> | | | | | + | | | |
| | <i>Gracilaria flagelliformis</i> | | | | | + | | | |
| Gyrostemonaceae | <i>Tersonia cyathiflora</i> | Button Creeper | | | | + | + | | |
| Haemodoraceae | <i>Anigozanthos humilis</i> | Catspaw | | | | + | | | |
| | <i>Anigozanthos humilis</i> subsp. <i>humilis</i> | | | | | + | | | |
| | <i>Anigozanthos manglesii</i> | Mangles Kangaroo Paw, Kurulbrang | | | | + | | | |
| | <i>Conostylis aculeata</i> | Prickly Conostylis | | | | + | | | |
| | <i>Conostylis aculeata</i> subsp. <i>aculeata</i> | | | | | | | + | |

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| | <i>Conostylis aculeata</i> subsp. <i>cygnorum</i> | | | | | + | | | |
| | <i>Conostylis aculeate</i> | | | | | | | | + |
| | <i>Conostylis bracteata</i> | | | P3 | | + | | | |
| | <i>Conostylis candicans</i> | Grey Cottonhead | | | | + | + | | |
| | <i>Conostylis candicans</i> subsp. <i>candicans</i> | | | | | + | | | |
| | <i>Haemodorum paniculatum</i> | Mardja | | | | + | | | |
| | <i>Haemodorum spicatum</i> | Mardja | | | | + | | | |
| Halimedaceae | <i>Halimeda cuneata</i> | | | | | + | | | |
| Haloragaceae | <i>Gonocarpus</i> sp. | | | | | + | | | |
| Halymeniaceae | <i>Cryptonemia kallymenioides</i> | | | | | + | | | |
| | <i>Gelinaria ulvoidea</i> | | | | | + | | | |
| | <i>Halymenia floresii</i> | | | | | + | | | |
| | <i>Halymenia floresii</i> subsp. <i>harveyana</i> | | | | | + | | | |
| | <i>Pachymenia orbicularis</i> | | | | | + | | | |

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| Hemerocallidaceae | <i>Caesia occidentalis</i> | | | | | + | | | |
| | <i>Corynotheca micrantha</i> var. <i>micrantha</i> | | | | | + | | | |
| | <i>Tricoryne elatior</i> | Yellow Autumn Lily | | | | + | | | |
| | <i>Dianella revoluta</i> | | | | | | + | | |
| | <i>Dianella revoluta</i> var. <i>divaricata</i> | | | | | + | | + | |
| | <i>Tricoryne</i> sp. | | | | | + | | | |
| Hydrocharitaceae | <i>Halophila ovalis</i> | Sea Wrack | | | | + | | | |
| | <i>Halophila</i> sp. | | | | | + | | | |
| Hypneaceae | <i>Hypnea musciformis</i> | | | | | + | | | |
| | <i>Hypnea ramentacea</i> | | | | | + | | | |
| Juncaceae | <i>Luzula meridionalis</i> | Field Woodrush | | | | + | | | |
| Kallymeniaceae | <i>Glaphyrymenia pustulosa</i> | | | | | + | | | |
| | <i>Kallymenia cribrosa</i> | | | | | + | | | |
| Lamiaceae | <i>Hemiandra glabra</i> | | | | | + | + | | |

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| | <i>Hemiandra pungens</i> | Snakebush | | | | + | | | |
| | <i>Hemiandra</i> sp. | | | | | + | | | |
| | <i>Hemiandra</i> sp. Jurien (B.J. Conn & M.E. Tozer BJC 3885) | | | | | + | | | |
| Lauraceae | <i>Cassytha flava</i> | Dodder Laurel | | | | + | + | | |
| | <i>Cassytha racemosa</i> | | | | | | | + | |
| Loganiaceae | <i>Logania vaginalis</i> | White Spray | | | | + | | | |
| Mychodeaceae | <i>Mychodea aciculare</i> | | | | | + | | | |
| | <i>Mychodea gracilaria</i> | | | | | + | | | |
| | <i>Baeckea</i> sp. Limestone (N. Gibson & M.N. Lyons 1425) | | | P1 | | + | | | |
| Myrtaceae | <i>Agonis flexuosa</i> | | | | | | + | | |
| | <i>Calothamnus quadrifidus</i> | | | | | | | + | |
| | <i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i> | | | | | + | | | |
| | <i>Calothamnus sanguineus</i> | Silky-leaved Blood flower Pindak | | | | + | | | |

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| | <i>Eucalyptus decipiens</i> | Limestone Marlock, Moit | | | | + | | | |
| | <i>Eucalyptus foecunda</i> | Narrow-leaved Red Mallee | | | | + | | | |
| | <i>Eucalyptus gomphocephala</i> | Tuart | | | | + | + | | |
| | <i>Eucalyptus marginata</i> subsp. <i>marginata</i> | Jarrah | | | | + | | | |
| | <i>Eucalyptus petrensis</i> | | | | | + | | | |
| | <i>Eucalyptus utilis</i> | | | | | + | + | | |
| | <i>Kunzea glabrescens</i> | Spearwood | | | | + | | | |
| | <i>Melaleuca cardiophylla</i> | Tangling Melaleuca | | | | + | | | |
| | <i>Melaleuca huegelii</i> subsp. <i>huegelii</i> | | | | | + | | | |
| | <i>Melaleuca lanceolata</i> | | | | | | + | | + |
| | <i>Melaleuca</i> sp. | | | | | + | | | |
| | <i>Melaleuca systema</i> | | | | | + | + | | + |
| | <i>Verticordia densiflora</i> var. <i>densiflora</i> | | | | | + | | | |
| Nizymeniaceae | <i>Nizymenia conferta</i> | | | | | + | | | |

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| Onagraceae | <i>*Oenothera drummondii</i> | Beach Evening Primrose | | | | | + | | |
| Orchidaceae | <i>Caladenia arenicola</i> | | | | | + | | | |
| | <i>Eriochilus dilatatus</i> subsp. <i>dilatatus</i> | | | | | + | | | |
| | <i>Thelymitra crinita</i> | Blue Lady Orchid | | | | + | | | |
| Papaveraceae | <i>*Fumaria capreolata</i> | | | | | | + | | |
| Phacelocarpaceae | <i>Phacelocarpus labillardieri</i> | | | | | + | | | |
| | <i>Phacelocarpus peperocarpus</i> | | | | | + | | | |
| | <i>Phacelocarpus sessilis</i> | | | | | + | | | |
| Phyllanthaceae | <i>Phyllanthus calycinus</i> | False Boronia | | | | + | | | |
| Pittosporaceae | <i>Billardiera fraseri</i> | Elegant Pronaya | | | | + | | | |
| Plocamiaceae | <i>Plocamium cartilagineum</i> | | | | | + | | | |
| | <i>Plocamium mertensii</i> | | | | | + | | | |
| | <i>Plocamium preissianum</i> | | | | | + | | | |
| | ? <i>Austrostipa</i> sp. | | | | | | | + | |

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| Poaceae | <i>*Avena barbata</i> | | | | | | + | | |
| | <i>*Briza maxima</i> | | | | | | + | | |
| | <i>*Bromus diandrus</i> | | | | | | + | | |
| | <i>*Ehrharta longiflora</i> | | | | | | + | | |
| | <i>*Lagurus ovatus</i> | | | | | | + | | |
| | <i>*Lolium perenne</i> | | | | | | + | | |
| | <i>Austrostipa compressa</i> | | | | | + | | | |
| | <i>Austrostipa flavescens</i> | | | | | + | + | | + |
| | <i>Austrostipa hemipogon</i> | | | | | + | | | |
| | <i>Bromus arenarius</i> | Sand Brome | | | | + | | | |
| | <i>Hemarthria uncinata</i> | Matgrass | | | | + | | | |
| | <i>Poa poiformis</i> | Coastal Poa | | | | + | + | | + |
| | <i>Poa</i> sp. | | | | | | | + | |
| | <i>Spinifex hirsutus</i> | Hairy Spinifex | | | | + | + | | |

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| | <i>Spinifex longifolius</i> | | | | | | | + | + |
| Polygalaceae | <i>Comesperma integerrimum</i> | | | | | | | | + |
| Polydaceae | <i>Rhodopeltis australis</i> | | | | | + | | | |
| Portulacaceae | <i>Calandrinia calyptrata</i> | | | | | | + | | |
| | <i>Calandrinia corrigioloides</i> | Strap Purslane | | | | | + | | |
| | <i>Calandrinia eremaea</i> | | | | | | + | | |
| | <i>Calandrinia granulifera</i> | Pygmy Purslane | | | | | + | | |
| Posidoniaceae | <i>Posidonia angustifolia</i> | | | | | | + | | |
| | <i>Posidonia australis</i> | Fibreball Weed | | | | | + | | |
| | <i>Posidonia coriacea</i> | | | | | | + | | |
| | <i>Posidonia denhartogii</i> | | | | | | + | | |
| | <i>Posidonia ostenfeldii</i> | | | | | | + | | |
| | <i>Posidonia sinuosa</i> | | | | | | + | | |
| | <i>Posidonia</i> sp. | | | | | | + | | |

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| Potamogetonaceae | <i>Potamogeton drummondii</i> | | | | | + | | | |
| Pottiaceae | <i>Barbula calycina</i> | | | | | + | | | |
| | <i>Tortula muralis</i> | | | | | + | | | |
| Primulaceae | * <i>Lysimachia arvensis</i> | | | | | | + | | |
| | <i>Samolus repens</i> | Creeping Brookweed | | | | + | | | |
| Proteaceae | <i>Banksia dallaneyi</i> var. <i>dallaneyi</i> (previously <i>Dryandra lindleyana</i> var. <i>lindleyana</i>) | | | | | | | + | |
| | <i>Banksia sessilis</i> var. <i>cygnorum</i> | | | | | + | | + | |
| | <i>Grevillea preissii</i> subsp. <i>preissii</i> | | | | | + | | + | |
| | <i>Grevillea</i> sp. | | | | | + | | | |
| | <i>Hakea lissocarpha</i> | Honey Bush | | | | + | | + | |
| | <i>Hakea prostrata</i> | Harsh Hakea | | | | + | | + | |
| | <i>Hakea ruscifolia</i> | Candle Hakea | | | | + | | | |
| | <i>Hakea trifurcata</i> | | | | | | | + | |
| | <i>Persoonia saccata</i> | Snottygobble | | | | + | | | |

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|---------------|--|-----------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscape survey | COJ (2009, 2012) |
| | <i>Petrophile axillaris</i> | | | | | + | | | |
| | <i>Petrophile brevifolia</i> | | | | | + | | | |
| | <i>Petrophile linearis</i> | Pixie Mops | | | | + | | | |
| | <i>Petrophile serruriae</i> | | | | | | | + | |
| | <i>Synaphea spinulosa</i> | | | | | + | | | |
| Ranunculaceae | <i>Clematis linearifolia</i> | | | | | | | + | |
| | <i>Clematis linearifolia</i> | | | | | | | | + |
| | <i>Clematis pubescens</i> | Common Clematis | | | | + | + | | |
| Restionaceae | <i>Desmocladius asper</i> | | | | | + | | | |
| | <i>Desmocladius flexuosus</i> | | | | | | | + | + |
| Rhamnaceae | <i>Cryptandra scoparia</i> | | | | | + | | | |
| | <i>Spyridia filamentosa</i> | | | | | + | | | |
| | <i>Spyridium globulosum</i> | Basket Bush | | | | + | + | | + |
| | <i>Stenanthemum notiale</i> subsp. <i>chamelum</i> | | | | | + | | | |

| Family | Scientific name | Common name | Conservation status* | | Source# | | This survey | Previous surveys | |
|---------------|--|-------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscope survey | COJ (2009, 2012) |
| | <i>Trymalium ledifolium</i> var. <i>ledifolium</i> | | | | | + | | | |
| Rhodomelaceae | <i>Amansia serrata</i> | | | | | + | | | |
| | <i>Chondria curdieana</i> | | | | | + | | | |
| | <i>Cladurus elatus</i> | | | | | + | | | |
| | <i>Coeloclonium tasmanicum</i> | | | | | + | | | |
| | <i>Coeloclonium verticillatum</i> | | | | | + | | | |
| | <i>Dasyclonium flaccidum</i> | | | | | + | | | |
| | <i>Dasyclonium incisum</i> | | | | | + | | | |
| | <i>Dictyomenia sonderi</i> | | | | | + | | | |
| | <i>Dictyomenia tridens</i> | | | | | + | | | |
| | <i>Echinothamnion hystrix</i> | | | | | + | | | |
| | <i>Gloiosaccion brownii</i> | | | | | + | | | |
| | <i>Herposiphonia rostrata</i> | | | | | + | | | |
| | <i>Heterocladia caudata</i> | | | | | + | | | |

| Family | Scientific name | Common name | Conservation status* | | Source# | | This survey | Previous surveys | |
|--------|--------------------------------|-------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscope survey | COJ (2009, 2012) |
| | <i>Kuetzingia canaliculata</i> | | | | | + | | | |
| | <i>Laurencia brongniartii</i> | | | | | + | | | |
| | <i>Laurencia elata</i> | | | | | + | | | |
| | <i>Laurencia filiformis</i> | | | | | + | | | |
| | <i>Laurencia shepherdii</i> | | | | | + | | | |
| | <i>Lenormandia latifolia</i> | | | | | + | | | |
| | <i>Lenormandia pardalis</i> | | | | | + | | | |
| | <i>Lenormandia spectabilis</i> | | | | | + | | | |
| | <i>Neurymenia fraxinifolia</i> | | | | | + | | | |
| | <i>Osmundaria prolifera</i> | | | | | + | | | |
| | <i>Pollexfenia lobata</i> | | | | | + | | | |
| | <i>Pollexfenia pedicellata</i> | | | | | + | | | |
| | <i>Polysiphonia decipiens</i> | | | | | + | | | |
| | <i>Polysiphonia infestans</i> | | | | | + | | | |

| Family | Scientific name | Common name | Conservation status* | | Source# | | This survey | Previous surveys | |
|----------------|--|------------------------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscope survey | COJ (2009, 2012) |
| | <i>Protokuetingia australasica</i> | | | | | + | | | |
| | <i>Vidalia spiralis</i> | | | | | + | | | |
| Rhodymeniaceae | <i>Leptosomia rosea</i> | | | | | + | | | |
| | <i>Rhodymenia sonderi</i> | | | | | + | | | |
| Rubiaceae | * <i>Galium murale</i> | | | | | | + | | |
| | <i>Opercularia</i> sp. | | | | | + | | | |
| | <i>Opercularia vaginata</i> | Dog Weed | | | | + | + | | + |
| Santalaceae | <i>Exocarpos sparteus</i> | Broom Ballart, Djuk | | | | + | + | + | + |
| | <i>Leptomeria empetriformis</i> | | | | | + | | | |
| | <i>Leptomeria pauciflora</i> | Sparse-flowered Currant Bush | | | | + | | | |
| | <i>Santalum acuminatum</i> | Quandong, Sandalwood | | | | + | + | + | + |
| Sapindaceae | <i>Diplopeltis huegelii</i> subsp. <i>huegelii</i> | | | | | + | | | |
| | <i>Diplopeltis petiolaris</i> | | | | | + | | | |
| Sarcomeniaceae | <i>Sarcomenia delesserioides</i> | | | | | + | | | |

| Family | Scientific name | Common name | Conservation status* | | Source# | | This survey | Previous surveys | |
|------------------|---|---------------------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscape survey | COJ (2009, 2012) |
| Scrophulariaceae | <i>Eremophila glabra</i> | | | | | | | | + |
| | <i>Eremophila glabra</i> subsp. <i>albicans</i> | | | | | + | | | |
| | <i>Myoporum caprarioides</i> | Slender Myoporum | | | | + | | | |
| | <i>Myoporum insulare</i> | Blueberry Tree, Boobialla | | | | + | + | | + |
| Sebdeniaceae | <i>Sebdenia flabellata</i> | | | | | + | | | |
| Siphonocladaceae | <i>Struvea plumosa</i> | | | | | + | | | |
| Solanaceae | * <i>Solanum nigrum</i> | | | | | | + | | |
| | <i>Anthocercis littorea</i> | Yellow Tailflower | | | | + | | | |
| Stylidiaceae | <i>Stylidium androsaceum</i> | | | | | + | | | |
| | <i>Stylidium hesperium</i> | | | | | + | | | |
| | <i>Stylidium maritimum</i> | | | P3 | | + | | | |
| | <i>Stylidium repens</i> | Matted Triggerplant | | | | + | | | |
| Thymelaeaceae | <i>Pimelea calcicola</i> | | | P3 | | + | | | |
| | <i>Pimelea ferruginea</i> | | | | | + | + | | |

| Family | Scientific name | Common name | Conservation status* | | Source# | | This survey | Previous surveys | |
|-------------|--|----------------|----------------------|----------------------------------|---------|-----------|-------------|--------------------|---------------------|
| | | | EPBC Act | WC Act/ Parks and Wildlife | PMST | NatureMap | ELA 2015 | Ecoscape survey | COJ (2009, 2012) |
| | <i>Pimelea rosea</i> subsp. <i>rosea</i> | | | | | + | | | |
| | <i>Pimelea sulphurea</i> | Yellow Banjine | | | | + | | | |
| Ulvaceae | <i>Ulva fasciata</i> | | | | | + | | | |
| | <i>Ulva lactuca</i> | | | | | + | | | |
| Urticaceae | <i>Parietaria cardiostegia</i> | | | | | | + | | |
| Verbenaceae | * <i>Verbena rigida</i> var. <i>rigida</i> | | | | | | + | | |
| Violaceae | <i>Hybanthus calycinus</i> | Wild Violet | | | | + | | | |
| Zosteraceae | <i>Heterozostera nigricaulis</i> | | | | | + | | | |

*EN = listed as Endangered under the EPBC Act, WC Act and/or the IUCN red list.

VU = listed as Vulnerable under the EPBC Act, WC Act and/or the IUCN red list.

M = listed as Migratory species under the EPBC Act.

P3 = Priority 3: known from few specimens or records and need urgent survey and evaluation of conservation status.

P4 = Priority 4: not currently threatened but could if present circumstances change. Usually found on conservation lands.

P5 = not considered threatened but subject to a specific conservation program.

S1 = Schedule 1: Fauna that is rare or likely to become extinct as critically endangered fauna (CR)

S2 = Schedule 2: Fauna that is rare or likely to become extinct as endangered fauna (EN)

S3 = Schedule 3: Fauna that is rare or likely to become extinct as vulnerable fauna (VU)

S4 = Schedule 4: Fauna that is presumed to be extinct (EX)

S5 = Schedule 5: Migratory birds protected under an international agreement (IA)

S6 = Schedule 6: Fauna that is of special conservation need as conservation dependent fauna (CD)

S7 = Schedule 7: Other specially protected fauna (OS).

#Source: NatureMap (Parks and Wildlife 2015c), PMST (DotE 2015b).

Appendix J Quadrat data

| Site number | Date | Site type | Observer |
|-----------------|-------------|------------------------|--------------|
| WN_Q2 | 01/10/2015 | Quadrat 10x10 m | Joel Collins |
| Landform | Soils | Easting | Northing |
| Quindalup Dunes | Sand | 380703 | 6478986 |
| Condition | Disturbance | Fire | Geology |
| Excellent | Weeds | Moderate (10-20 years) | Sand |



| Species | Cover (%) | Stratum* | Sub-Stratum |
|---|-----------|----------|------------------|
| <i>Acacia rostellifera</i> | 10 | M | Shrubs over 2 m |
| <i>Spyridium globulosum</i> | 15 | M | Shrubs 1 - 2 m |
| <i>Leucopogon parviflorus</i> | 0.1 | L | Shrubs 1 - 2 m |
| <i>Pithocarpa cordata</i> | 0.1 | L | Shrubs 1 - 2 m |
| <i>Rhagodia baccata</i> subsp. <i>baccata</i> | 1 | L | Shrubs under 1 m |
| <i>Melaleuca systema</i> | 0.75 | L | Shrubs under 1 m |
| <i>Olearia axillaris</i> | 0.1 | L | Shrubs under 1 m |
| * <i>Ehrharta longiflora</i> | 0.1 | L | Grasses |
| * <i>Lolium perenne</i> | 0.1 | L | Grasses |
| <i>Lepidosperma gladiatum</i> | 20 | L | Herbs |
| <i>Acanthocarpus preissii</i> | 3 | L | Herbs |
| * <i>Euphorbia terracina</i> | 0.1 | L | Herbs |
| * <i>Lysimachia arvensis</i> | 0.1 | L | Herbs |
| <i>Hardenbergia comptoniana</i> | 0.1 | L | Herbs |

* Stratum in which species is present: U – Upper storey, M = Midstorey, L = Lower storey

| Site number | Date | Site type | Observer |
|-----------------|-------------|------------------------|--------------|
| WN_Q4 | 01/10/2015 | Quadrat 10x10 m | Joel Collins |
| Landform | Soils | Easting | Northing |
| Quindalup Dunes | Sand | 380585 | 6479142 |
| Condition | Disturbance | Fire | Geology |
| Excellent | Weeds | Moderate (10-20 years) | Sand |



| Species | Cover (%) | Stratum* | Sub-Stratum |
|---|-----------|----------|------------------|
| <i>Acacia rostellifera</i> | 2 | M | Shrubs 1 - 2 m |
| <i>Olearia axillaris</i> | 1 | L | Shrubs 1 - 2 m |
| <i>Leucopogon parviflorus</i> | 0.1 | L | Shrubs 1 - 2 m |
| <i>Pithocarpa cordata</i> | 0.1 | L | Shrubs 1 - 2 m |
| <i>Templetonia retusa</i> | 0.1 | L | Shrubs 1 - 2 m |
| <i>Melaleuca systema</i> | 10 | L | Shrubs under 1 m |
| <i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i> | 0.75 | L | Shrubs under 1 m |
| <i>Spyridium globulosum</i> | 0.5 | L | Shrubs under 1 m |
| <i>Hemiandra glabra</i> | 0.1 | L | Shrubs under 1 m |
| <i>Hibbertia subvaginata</i> | 0.1 | L | Shrubs under 1 m |
| <i>Rhagodia baccata</i> subsp. <i>baccata</i> | 0.1 | L | Shrubs under 1 m |
| * <i>Pelargonium capitatum</i> | 1 | L | Grasses |
| * <i>Bromus diandrus</i> | 0.1 | L | Grasses |
| * <i>Ehrharta longiflora</i> | 0.1 | L | Grasses |
| <i>Austrostipa flavescens</i> | 0.1 | L | Grasses |
| * <i>Euphorbia terracina</i> | 1 | L | Herbs |
| <i>Acanthocarpus preissii</i> | 1 | L | Herbs |
| <i>Scaevola crassifolia</i> | 1 | L | Herbs |
| <i>Acacia truncata</i> | 0.75 | L | Herbs |

| <i>*Brassica tournefortii</i> | 0.1 | L | Herbs |
|---|-----------|---------|-------------|
| Species | Cover (%) | Stratum | Sub-Stratum |
| <i>*Sonchus oleraceus</i> | 0.1 | L | Herbs |
| <i>*Verbena rigida</i> var. <i>rigida</i> | 0.1 | L | Herbs |
| <i>Calandrinia calyptata</i> | 0.1 | L | Herbs |
| <i>Cassytha flava</i> | 0.1 | L | Herbs |
| <i>Clematis pubescens</i> | 0.1 | L | Herbs |
| <i>Crassula glomerata</i> | 0.1 | L | Herbs |
| <i>Hardenbergia comptoniana</i> | 0.1 | L | Herbs |
| <i>Lepidosperma gladiatum</i> | 0.1 | L | Herbs |
| <i>Senecio pinnatifolius</i> | 0.1 | L | Herbs |
| <i>Threlkeldia diffusa</i> | 0.1 | L | Herbs |

* Stratum in which species is present: U – Upper storey, M = Midstorey, L = Lower storey

| Site number | Date | Site type | Observer |
|-----------------|-------------|------------------------|--------------|
| WN_Q6 | 01/10/2015 | Quadrat 10x10 m | Joel Collins |
| Landform | Soils | Easting | Northing |
| Quindalup Dunes | Sand | 379793 | 6480328 |
| Condition | Disturbance | Fire | Geology |
| Very Good | Weeds | Moderate (10-20 years) | Sand |



| Species | Cover (%) | Stratum* | Sub-Stratum |
|---|-----------|----------|------------------|
| <i>Acacia cyclops</i> | 5 | M | Shrubs over 2 m |
| <i>Spyridium globulosum</i> | 2 | M | Shrubs 1 - 2 m |
| <i>Melaleuca systema</i> | 5 | L | Shrubs under 1 m |
| <i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i> | 2 | L | Shrubs under 1 m |
| <i>Rhagodia baccata</i> subsp. <i>baccata</i> | 1 | L | Shrubs under 1 m |
| <i>Acacia truncata</i> | 0.1 | L | Shrubs under 1 m |
| * <i>Pelargonium capitatum</i> | 4 | L | Grasses |
| * <i>Bromus diandrus</i> | 0.1 | L | Grasses |
| * <i>Ehrharta longiflora</i> | 0.1 | L | Grasses |
| <i>Acanthocarpus preissii</i> | 2 | L | Herbs |
| <i>Lepidosperma gladiatum</i> | 1 | L | Herbs |
| * <i>Euphorbia terracina</i> | 0.75 | L | Herbs |
| * <i>Asphodelus fistulosus</i> | 0.75 | L | Herbs |
| * <i>Brassica tournefortii</i> | 0.1 | L | Herbs |
| * <i>Sonchus oleraceus</i> | 0.1 | L | Herbs |
| <i>Cassytha flava</i> | 0.1 | L | Herbs |
| <i>Clematis pubescens</i> | 0.1 | L | Herbs |
| <i>Hardenbergia comptoniana</i> | 0.1 | L | Herbs |
| * <i>Lysimachia arvensis</i> | 0.1 | L | Herbs |

| <i>*Verbena rigida</i> var. <i>rigida</i> | 0.1 | L | Herbs |
|---|-----------|---------|-------------|
| Species | Cover (%) | Stratum | Sub-Stratum |
| <i>Calandrinia calyptrata</i> | 0.1 | L | Herbs |
| <i>Crassula glomerata</i> | 0.1 | L | Herbs |
| <i>Conostylis candidans</i> | 0.1 | L | Herbs |
| <i>Threlkeldia diffusa</i> | 0.1 | L | Herbs |

* Stratum in which species is present: U – Upper storey, M = Midstorey, L = Lower storey

| Site number | Date | Site type | Observer |
|-----------------|-------------|-----------------|--------------|
| WN_Q8 | 01/10/2015 | Quadrat 10x10 m | Joel Collins |
| Landform | Soils | Easting | Northing |
| Quindalup Dunes | Sand | 379815 | 6480869 |
| Condition | Disturbance | Fire | Geology |
| Good | Weeds | Old (>20 years) | Sand |



| Species | Cover (%) | Stratum* | Sub-Stratum |
|---|-----------|----------|------------------|
| <i>Olearia axillaris</i> | 15 | M | Shrubs under 1 m |
| <i>Rhagodia baccata</i> subsp. <i>baccata</i> | 0.1 | L | Shrubs under 1 m |
| <i>Spinifex hirsutus</i> | 2 | L | Grasses |
| * <i>Ehrharta longiflora</i> | 0.1 | L | Grasses |
| <i>Poa poiformis</i> | 0.1 | L | Grasses |
| * <i>Asphodelus fistulosus</i> | 2 | L | Herbs |
| * <i>Tetragonia decumbens</i> | 0.75 | L | Herbs |
| <i>Acanthocarpus preissii</i> | 0.75 | L | Herbs |
| * <i>Pelargonium capitatum</i> | 0.5 | L | Herbs |
| <i>Carpobrotus virescens</i> | 0.1 | L | Herbs |
| <i>Daucus glochidiatus</i> | 0.1 | L | Herbs |
| <i>Schoenus clandestinus</i> | 0.1 | L | Herbs |

* Stratum in which species is present: U – Upper storey, M = Midstorey, L = Lower storey

| Site number | Date | Site type | Observer |
|-----------------|-------------|------------------------|--------------|
| WN_Q10 | 02/10/2015 | Quadrat 10x10 m | Joel Collins |
| Landform | Soils | Easting | Northing |
| Quindalup Dunes | Sand | 380245 | 6479491 |
| Condition | Disturbance | Fire | Geology |
| Good | Weeds | Moderate (10-20 years) | Sand |



| Species | Cover (%) | Stratum* | Sub-Stratum |
|---|-----------|----------|------------------|
| <i>Acacia rostellifera</i> | 2 | M | Shrubs over 2 m |
| <i>Spyridium globulosum</i> | 15 | M | Shrubs 1 - 2 m |
| <i>Olearia axillaris</i> | 1 | L | Shrubs under 1 m |
| <i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i> | 0.1 | L | Shrubs under 1 m |
| <i>Melaleuca systema</i> | 0.1 | L | Shrubs under 1 m |
| <i>Tersonia cyathiflora</i> | 0.1 | L | Shrubs under 1 m |
| <i>Leucopogon parviflorus</i> | 0.1 | L | Shrubs under 1 m |
| <i>Rhagodia baccata</i> subsp. <i>baccata</i> | 0.1 | L | Shrubs under 1 m |
| * <i>Bromus diandrus</i> | 1 | L | Grasses |
| * <i>Pelargonium capitatum</i> | 0.75 | L | Grasses |
| * <i>Ehrharta longiflora</i> | 0.1 | L | Grasses |
| * <i>Lolium perenne</i> | 0.1 | L | Grasses |
| <i>Austrostipa flavescens</i> | 0.1 | L | Grasses |
| <i>Acanthocarpus preissii</i> | 4 | L | Herbs |
| <i>Scaevola crassifolia</i> | 4 | L | Herbs |
| * <i>Euphorbia terracina</i> | 1 | L | Herbs |
| * <i>Sonchus oleraceus</i> | 1 | L | Herbs |
| * <i>Brassica tournefortii</i> | 0.1 | L | Herbs |
| * <i>Tetragonia decumbens</i> | 0.1 | L | Herbs |

| <i>Clematis pubescens</i> | 0.1 | L | Herbs |
|---------------------------------|-----------|---------|-------------|
| Species | Cover (%) | Stratum | Sub-Stratum |
| <i>Ficinia nodosa</i> | 0.1 | L | Herbs |
| <i>Hardenbergia comptoniana</i> | 0.1 | L | Herbs |
| <i>Calandrinia calyptata</i> | 0.1 | L | Herbs |
| <i>Threlkeldia diffusa</i> | 0.1 | L | Herbs |
| * <i>Asphodelus fistulosus</i> | 0.1 | L | Herbs |
| <i>Conostylis candicans</i> | 0.1 | L | Herbs |
| * <i>Lysimachia arvensis</i> | 0.1 | L | Herbs |
| <i>Lepidosperma squamatum</i> | 0.1 | L | Herbs |
| <i>Crassula glomerata</i> | 0.1 | L | Herbs |
| <i>Parietaria cardiostegia</i> | 0.1 | L | Herbs |
| * <i>Cuscuta epithymum</i> | 0.1 | L | Herbs |
| * <i>Cyperus tenellus</i> | 0.1 | L | Herbs |
| <i>Daucus glochidiatus</i> | 0.1 | L | Herbs |

* Stratum in which species is present: U – Upper storey, M = Midstorey, L = Lower storey

| Site number | Date | Site type | Observer |
|-----------------|----------------|------------------------|--------------|
| WN_Q12 | 02/10/2015 | Quadrat 10x10 m | Joel Collins |
| Landform | Soils | Easting | Northing |
| Quindalup Dunes | Sand | 380103 | 6479538 |
| Condition | Disturbance | Fire | Geology |
| Very Good | Weeds, rabbits | Moderate (10-20 years) | Sand |



| Species | Cover (%) | Stratum* | Sub-Stratum |
|---|-----------|----------|------------------|
| <i>Spyridium globulosum</i> | 5 | M | Shrubs 1 - 2 m |
| <i>Myoporum insulare</i> | 4 | L | Shrubs 1 - 2 m |
| <i>Acacia truncata</i> | 2 | L | Shrubs under 1 m |
| <i>Olearia axillaris</i> | 0.1 | L | Shrubs under 1 m |
| <i>Leucopogon parviflorus</i> | 0.1 | L | Shrubs under 1 m |
| <i>Rhagodia baccata</i> subsp. <i>baccata</i> | 0.1 | L | Shrubs under 1 m |
| <i>Pithocarpa cordata</i> | 0.1 | L | Shrubs under 1 m |
| <i>Hemiandra glabra</i> | 0.1 | L | Shrubs under 1 m |
| * <i>Ehrharta longiflora</i> | 0.1 | L | Grasses |
| <i>Poa poiiformis</i> | 0.1 | L | Grasses |
| <i>Acanthocarpus preissii</i> | 5 | L | Herbs |
| <i>Lepidosperma gladiatum</i> | 3 | L | Herbs |
| * <i>Brassica tournefortii</i> | 0.1 | L | Herbs |
| * <i>Euphorbia terracina</i> | 0.1 | L | Herbs |
| * <i>Pelargonium capitatum</i> | 0.1 | L | Herbs |
| * <i>Sonchus oleraceus</i> | 0.1 | L | Herbs |
| <i>Clematis pubescens</i> | 0.1 | L | Herbs |
| <i>Hardenbergia comptoniana</i> | 0.1 | L | Herbs |
| <i>Conostylis candicans</i> | 0.1 | L | Herbs |

| <i>*Lysimachia arvensis</i> | 0.1 | L | Herbs |
|-------------------------------|-----------|---------|-------------|
| Species | Cover (%) | Stratum | Sub-Stratum |
| <i>Crassula glomerata</i> | 0.1 | L | Herbs |
| <i>Threlkeldia diffusa</i> | 0.1 | L | Herbs |
| <i>*Asphodelus fistulosus</i> | 0.1 | L | Herbs |
| <i>*Cuscuta epithimum</i> | 0.1 | L | Herbs |
| <i>Calandrinia calyptata</i> | 0.1 | L | Herbs |

* Stratum in which species is present: U – Upper storey, M = Midstorey, L = Lower storey

| Site number | Date | Site type | Observer |
|-----------------|-------------|------------------------|--------------|
| WN_Q14 | 02/10/2015 | Quadrat 10x10 m | Joel Collins |
| Landform | Soils | Easting | Northing |
| Quindalup Dunes | Sand | 380213 | 6481893 |
| Condition | Disturbance | Fire | Geology |
| Excellent | Few weeds | Moderate (10-20 years) | Sand |



| Species | Cover (%) | Stratum* | Sub-Stratum |
|---|-----------|----------|------------------|
| <i>Spyridium globulosum</i> | 3 | M | Shrubs 1 - 2 m |
| <i>Olearia axillaris</i> | 2 | M | Shrubs 1 - 2 m |
| <i>Acanthocarpus preissii</i> | 4 | L | Shrubs under 1 m |
| <i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i> | 2 | L | Shrubs under 1 m |
| <i>Lomandra maritima</i> | 10 | L | Herbs |
| <i>Melaleuca systema</i> | 1 | L | Shrubs under 1 m |
| <i>Hardenbergia comptoniana</i> | 0.1 | L | Herbs |
| <i>Gompholobium tomentosum</i> | 1 | L | Shrubs under 1 m |
| * <i>Pelargonium capitatum</i> | 0.75 | L | Herbs |
| * <i>Lagurus ovatus</i> | 0.1 | L | Grasses |
| <i>Austrostipa flavescens</i> | 0.1 | L | Grasses |
| <i>Conostylis candicans</i> | 0.1 | L | Herbs |
| <i>Lepidosperma squamatum</i> | 0.1 | L | Herbs |
| <i>Hibbertia subvaginata</i> | 1 | L | Shrubs under 1 m |
| <i>Tersonia cyathiflora</i> | 0.1 | L | Herbs |

| Species | Cover (%) | Stratum | Sub-Stratum |
|---|-----------|---------|------------------|
| <i>*Brassica tournefortii</i> | 0.1 | L | Herbs |
| <i>*Romulea rosea</i> | 0.1 | L | Herbs |
| <i>Rhagodia baccata</i> subsp. <i>baccata</i> | 0.75 | L | Shrubs under 1 m |
| <i>Hemiandra pungens</i> | 0.5 | L | Shrubs under 1 m |
| <i>Poa poiformis</i> | 0.1 | L | Grasses |
| <i>Leucopogon parviflorus</i> | 0.1 | L | Shrubs under 1 m |
| <i>Cassytha flava</i> | 0.1 | L | Herbs |
| <i>Santalum acuminatum</i> | 0.1 | L | Shrubs under 1 m |
| <i>Desmocladius asper</i> | 0.1 | L | Herbs |
| <i>Acacia cochlearis</i> | 0.75 | L | Shrubs under 1 m |
| <i>Gastrolobium capitatum</i> | 0.5 | L | Shrubs under 1 m |
| <i>Pimelea ferruginea</i> | 0.1 | L | Shrubs under 1 m |

* Stratum in which species is present: U – Upper storey, M = Midstorey, L = Lower storey

| Site number | Date | Site type | Observer |
|-----------------|-------------|------------------------|--------------|
| WN_Q16 | 02/10/2015 | Quadrat 10x10 m | Joel Collins |
| Landform | Soils | Easting | Northing |
| Quindalup Dunes | Sand | 380200 | 6482166 |
| Condition | Disturbance | Fire | Geology |
| Excellent | Weeds | Moderate (10-20 years) | Sand |



| Species | Cover (%) | Stratum* | Sub-Stratum |
|---|-----------|----------|------------------|
| <i>Spyridium globulosum</i> | 15 | M | Shrubs 1 - 2 m |
| <i>Olearia axillaris</i> | 2 | M | Shrubs 1 - 2 m |
| <i>Acanthocarpus preissii</i> | 0.1 | L | Shrubs under 1 m |
| <i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i> | 1 | L | Shrubs under 1 m |
| <i>Lomandra maritima</i> | 15 | L | Herbs |
| <i>Melaleuca systema</i> | 4 | L | Shrubs under 1 m |
| <i>Hardenbergia comptoniana</i> | 0.1 | L | Herbs |
| <i>Gompholobium tomentosum</i> | 0.1 | L | Shrubs under 1 m |
| * <i>Pelargonium capitatum</i> | 0.1 | L | Herbs |
| * <i>Lagurus ovatus</i> | 0.1 | L | Grasses |
| <i>Gastrolobium capitatum</i> | 0.1 | L | Shrubs under 1 m |
| <i>Leucopogon parviflorus</i> | 0.75 | L | Shrubs under 1 m |
| <i>Lepidosperma squamatum</i> | 0.1 | L | Herbs |
| * <i>Lysimachia arvensis</i> | 0.1 | L | Herbs |
| <i>Conostylis candicans</i> | 0.1 | L | Herbs |

| Species | Cover (%) | Stratum | Sub-stratum |
|---|-----------|---------|------------------|
| <i>Hibbertia subvaginata</i> | 0.1 | L | Shrubs under 1 m |
| <i>Poa poiformis</i> | 0.1 | L | Grasses |
| <i>Acacia cyclops</i> | 1 | M | Shrubs 1 - 2 m |
| <i>Crassula glomerata</i> | 0.1 | L | Herbs |
| <i>Rhagodia baccata</i> subsp. <i>baccata</i> | 0.5 | M | Shrubs 1 - 2 m |
| <i>Acacia saligna</i> | 0.1 | M | Shrubs 1 - 2 m |
| * <i>Euphorbia terracina</i> | 0.1 | L | Herbs |
| <i>Leucopogon</i> sp. | 0.1 | L | Shrubs under 1 m |
| <i>Phyllanthus calycinus</i> | 0.1 | L | Shrubs under 1 m |
| <i>Clematis pubescens</i> | 0.1 | L | Herbs |
| <i>Santalum acuminatum</i> | 0.1 | M | Shrubs 1 - 2 m |

* Stratum in which species is present: U – Upper storey, M = Midstorey, L = Lower storey

Appendix K Introduced flora species list

| Family | Species |
|----------------|--|
| Aizoaceae | * <i>Tetragonia decumbens</i> |
| Asparagaceae | * <i>Agave americana</i> |
| Asphodelaceae | * <i>Asphodelus fistulosus</i> |
| Asteraceae | * <i>Arctotheca calendula</i> |
| Asteraceae | * <i>Gazania linearis</i> |
| Asteraceae | * <i>Lactuca serriola</i> |
| Asteraceae | * <i>Sonchus oleraceus</i> |
| Brassicaceae | * <i>Brassica tournefortii</i> |
| Brassicaceae | * <i>Cakile maritima</i> |
| Convolvulaceae | * <i>Cuscuta epithymum</i> |
| Crassulaceae | * <i>Crassula glomerata</i> |
| Cyperaceae | * <i>Cyperus tenellus</i> |
| Euphorbiaceae | * <i>Euphorbia paralias</i> |
| Euphorbiaceae | * <i>Euphorbia terracina</i> |
| Fabaceae | * <i>Medicago littoralis</i> |
| Geraniaceae | * <i>Pelargonium capitatum</i> |
| Onagraceae | * <i>Oenothera drummondii</i> |
| Papaveraceae | * <i>Fumaria capreolata</i> |
| Poaceae | * <i>Avena barbata</i> |
| Poaceae | * <i>Briza maxima</i> |
| Poaceae | * <i>Bromus diandrus</i> |
| Poaceae | * <i>Ehrharta longiflora</i> |
| Poaceae | * <i>Lagurus ovatus</i> |
| Poaceae | * <i>Lolium perenne</i> |
| Primulaceae | * <i>Lysimachia arvensis</i> |
| Rubiaceae | * <i>Galium murale</i> |
| Solanaceae | * <i>Solanum nigrum</i> |
| Verbenaceae | * <i>Verbena rigida</i> var. <i>rigida</i> |

Appendix L Introduced flora locations

This list contains point locations taken for opportunistic weeds observed in the study area. Additional weeds were recorded in quadrats or were recorded as polygons, and are not listed here. Refer to **Figure 4** for target weed species covers and distributions mapped across the study area.

| Weed Species | Location | | Population size (no. individuals) | % cover |
|-----------------------------------|----------|----------|--------------------------------------|---------|
| | Easting | Northing | | |
| * <i>Agave americana</i> | 380139 | 6479572 | 15 | |
| * <i>Anagallis arvensis</i> | 380726 | 6479038 | 20 | |
| * <i>Asphodelus fistulosus</i> | 380698 | 6478997 | | <5 |
| * <i>Avena barbata</i> | 380701 | 6478998 | | <5 |
| * <i>Avena barbata</i> | 380487 | 6479428 | | <5 |
| * <i>Bromus diandrus</i> | 380727 | 6478969 | | <5 |
| * <i>Ehrharta calycina</i> | 380673 | 6479084 | | <5 |
| * <i>Ehrharta longiflora</i> | 380727 | 6478993 | | <5 |
| * <i>Euphorbia terracina</i> | 379757 | 6480323 | | <5 |
| * <i>Euphorbia terracina</i> | 380590 | 6479133 | | 6-30 |
| * <i>Euphorbia terracina</i> | 380486 | 6478948 | | <5 |
| * <i>Euphorbia terracina</i> | 379734 | 6480401 | | 6-30 |
| * <i>Euphorbia terracina</i> | 379725 | 6480235 | | 6-30 |
| * <i>Euphorbia terracina</i> | 380239 | 6479490 | | <5 |
| * <i>Fumaria capreolata</i> | 380721 | 6478967 | | <5 |
| * <i>Fumaria capreolata</i> | 380343 | 6479402 | | <5 |
| * <i>Fumaria capreolata</i> | 380175 | 6479544 | | <5 |
| * <i>Gazania linearis</i> | 380179 | 6481759 | | <5 |
| * <i>Pelargonium capitatum</i> | 380697 | 6479005 | | <5 |
| * <i>Pelargonium capitatum</i> | 380248 | 6479344 | | <5 |
| * <i>Schinus terebinthifolius</i> | 379776 | 6480576 | 1 | |
| * <i>Sonchus oleraceus</i> | 380721 | 6478967 | | <5 |
| * <i>Sonchus oleraceus</i> | 380219 | 6479485 | | <5 |
| * <i>Tetragonia decumbens</i> | 380474 | 6478948 | | <5 |
| * <i>Tetragonia decumbens</i> | 380252 | 6479486 | 1 | |
| * <i>Tetragonia decumbens</i> | 380252 | 6479488 | | <5 |
| * <i>Tetragonia decumbens</i> | 380084 | 6479600 | | <5 |

| Weed Species | Location | | Population size (no. individuals) | % cover |
|------------------------------|----------|----------|--------------------------------------|---------|
| | Easting | Northing | | |
| <i>*Tetragonia decumbens</i> | 380536 | 6478838 | | <5 |
| <i>*Tetragonia decumbens</i> | 380085 | 6479516 | | <5 |

Appendix M Fauna species list

| Family | Scientific Name | Common Name | Conservation status | | | Database searches | | Source | | |
|------------------|---|-------------------------|---------------------|--------|--------------------|-------------------|-----------|-------------|---|--|
| | | | EPBC Act | WC Act | Parks and Wildlife | PMST | NatureMap | This survey | Previous surveys/Natural Area Field Assessments | |
| | | | | | | | | ELA 2015 | Natural Areas Consulting 2014 | Whitfords Nodes Foreshore (CoJ 2009, 2012) |
| MAMMALS | | | | | | | | | | |
| Canidae | <i>*Canis lupus</i> | Dog | | | | | | | | + |
| | <i>*Vulpes vulpes</i> | Red Fox | | X | | • | | + | | + |
| Dasyuridae | <i>Dasyurus geoffroii</i> | Chuditch | VU | S3 | VU | | • | | | |
| Felidae | <i>*Felis catus</i> | Cat | | X | | • | | + | | + |
| Leporidae | <i>*Oryctolagus cuniculus</i> | Rabbit | | X | | • | | + | | + |
| Muridae | <i>*Mus musculus</i> | House Mouse | | X | | | | + | + | |
| | <i>*Rattus rattus</i> | Black Rat | | X | | | • | + | | |
| Peramelidae | <i>Isoodon obesulus</i> subsp. <i>fusciventer</i> | Quenda | | | P5 | | • | + | | |
| Vespertilionidae | <i>Chalinolobus gouldii</i> | Gould's Wattled Bat | | | | | • | + | | |
| BIRDS | | | | | | | | | | |
| Acanthizidae | <i>Acanthiza apicalis</i> | Inland Thornbill | | | | | • | | | |
| | <i>Acanthiza inornata</i> | Western Thornbill | | | | | • | | | |
| | <i>Acanthiza chrysorrhoa</i> | Yellow-rumped Thornbill | | | | | • | | | |

| Family | Scientific Name | Common Name | Conservation status | | | | | Database searches | | Source | | |
|----------------|--------------------------------|-------------------------|---------------------|--------|--------------------|------|-----------|-------------------|---|--|--|--|
| | | | EPBC Act | WC Act | Parks and Wildlife | PMST | NatureMap | This survey | Previous surveys/Natural Area Field Assessments | | | |
| | | | | | | | | ELA 2015 | Natural Areas Consulting 2014 | Whitfords Nodes Foreshore (CoJ 2009, 2012) | | |
| | <i>Gerygone fusca</i> | Western Gerygone | | | | | • | | | | | |
| | <i>Sericornis frontalis</i> | White-browed Scrub Wren | | | | | • | + | | | | |
| | <i>Smicrornis brevirostris</i> | Weebill | | | | | • | | | | | |
| Accipitridae | <i>Accipiter fasciatus</i> | Brown Goshawk | | | | | • | | | | | |
| | <i>Accipiter cirrocephalus</i> | Collared Sparrowhawk | | | | | • | | | | | |
| | <i>Circus approximans</i> | Swamp Harrier | | | | | • | | | | | |
| | <i>Haliaeetus leucogaster</i> | White-bellied Sea Eagle | M | | | • | | | | | | |
| | <i>Pandion haliaetus</i> | Osprey | M | S5 | IA | • | | + | + | | | |
| Acrocephalidae | <i>Acrocephalus australis</i> | Australian Reed Warbler | | | | | • | | | | | |
| Anatidae | <i>Anas gracilis</i> | Grey Teal | | | | | • | | | | | |
| | <i>Anas platyrhynchos</i> | Mallard | | | | • | • | | | | | |
| | <i>Anas rhynchotis</i> | Australasian Shoveler | | | | | • | | | | | |
| | <i>Aythya australis</i> | Hardhead | | | | | • | | | | | |
| | <i>Anas superciliosa</i> | Pacific Black Duck | | | | | • | + | | | | |

| Family | Scientific Name | Common Name | Conservation status | | | Database searches | | Source | | |
|----------|---|----------------------|---------------------|--------|--------------------|-------------------|-----------|-------------|---|--|
| | | | EPBC Act | WC Act | Parks and Wildlife | PMST | NatureMap | This survey | Previous surveys/Natural Area Field Assessments | |
| | | | | | | | | ELA 2015 | Natural Areas Consulting 2014 | Whitfords Nodes Foreshore (CoJ 2009, 2012) |
| | <i>Biziura lobata</i> | Musk Duck | | | | | • | | | |
| | <i>Chenonetta jubata</i> | Australian Wood Duck | | | | | • | | | |
| | <i>Cygnus atratus</i> | Black Swan | | | | | • | | | |
| | <i>Malacorhynchus membranaceus</i> | Pink-eared Duck | | | | | • | | | |
| | <i>Oxyura australis</i> | Blue-billed Duck | | | | | • | | | |
| | <i>Stictonetta naevosa</i> | Freckled Duck | | | | | • | | | |
| | <i>Tadorna tadornoides</i> | Australian Shelduck | | | | | • | | | |
| Apodidae | <i>Apus pacificus</i> | Fork-tailed Swift | M | S5 | IA | • | | | | |
| Ardeidae | <i>Ardea alba</i> subsp. <i>modesta</i> | Eastern Great Egret | M | S5 | IA | | • | | | |
| | <i>Ardea ibis</i> | Cattle Egret | M | S5 | IA | • | • | | | |
| | <i>Ardea ibis</i> subsp. <i>coromanda</i> | Eastern Cattle Egret | M | S5 | IA | | • | | | |
| | <i>Ardea modesta</i> | Great Egret | M | S5 | IA | • | | | | |
| | <i>Ardea pacifica</i> | White-necked Heron | | | | | • | | | |

| Family | Scientific Name | Common Name | Conservation status | | | Database searches | | Source | | |
|---------------|------------------------------------|-----------------------------|---------------------|--------|--------------------|-------------------|-----------|-------------|---|--|
| | | | EPBC Act | WC Act | Parks and Wildlife | PMST | NatureMap | This survey | Previous surveys/Natural Area Field Assessments | |
| | | | | | | | | ELA 2015 | Natural Areas Consulting 2014 | Whitfords Nodes Foreshore (CoJ 2009, 2012) |
| | <i>Nycticorax caledonicus</i> | Nankeen Night Heron | | | | | • | | | |
| Artamidae | <i>Cracticus torquatus</i> | Grey Butcherbird | | | | | • | + | | |
| | <i>Cracticus tibicen</i> | Australian Magpie | | | | | • | + | | |
| Burhinidae | <i>Burhinus grallarius</i> | Bush Stone-curlew | | | | | • | | | |
| | <i>Calyptorhynchus latirostris</i> | Carnaby's Black-Cockatoo | EN | S2 | EN | • | • | | | |
| | <i>Cacatua galerita</i> | Sulphur-crested Cockatoo | | | | | • | | | |
| | <i>Cacatua pastinator</i> | Western Long-billed Corella | | | | | • | | | |
| | <i>Cacatua tenuirostris</i> | Eastern Long-billed Corella | | | | | • | | | |
| | <i>Cacatua sanguinea</i> | Little Corella | | | | | • | + | | |
| | <i>Eolophus roseicapillus</i> | Galah | | | | | | + | | |
| Campephagidae | <i>Coracina novaehollandiae</i> | Black-faced Cuckoo-shrike | | | | | • | + | | |
| | <i>Lalage tricolor</i> | White-winged Triller | | | | | • | | | |
| | <i>Vanellus tricolor</i> | Banded Lapwing | | | | | • | | | |
| Columbidae | * <i>Columba livia</i> | Domestic Pigeon | | X | | • | • | + | | |

| Family | Scientific Name | Common Name | Conservation status | | | Database searches | | Source | | |
|--------------|------------------------------------|----------------------------|---------------------|--------|--------------------|-------------------|-----------|-------------|---|--|
| | | | EPBC Act | WC Act | Parks and Wildlife | PMST | NatureMap | This survey | Previous surveys/Natural Area Field Assessments | |
| | | | | | | | | ELA 2015 | Natural Areas Consulting 2014 | Whitfords Nodes Foreshore (CoJ 2009, 2012) |
| | <i>Ocyphaps lophotes</i> | Crested Pigeon | | | | | • | | | |
| | * <i>Streptopelia chinensis</i> | Spotted Turtle-Dove | | X | | | • | • | + | + |
| | * <i>Streptopelia senegalensis</i> | Laughing Turtle-Dove | | X | | | • | • | + | + |
| Corvidae | <i>Corvus bennetti</i> | Little Crow | | | | | • | | | |
| | <i>Corvus coronoides</i> | Australian Raven | | | | | • | + | | |
| Cuculidae | <i>Cacomantis flabelliformis</i> | Fan-tailed Cuckoo | | | | | • | | | |
| Dicruridae | <i>Grallina cyanoleuca</i> | Magpie-lark | | | | | • | + | | |
| Estrildidae | <i>Lonchura castaneothorax</i> | Chestnut-breasted Mannikin | | | | | • | | | |
| Falconidae | <i>Falco berigora</i> | Brown Falcon | | | | | | | | |
| | <i>Falco cenchroides</i> | Nankeen Kestrel | | | | | • | + | + | |
| | <i>Falco longipennis</i> | Australian Hobby | | | | | • | | | |
| | <i>Falco peregrinus</i> | Peregrine Falcon | | | | | | | | |
| Fringillidae | <i>Carduelis carduelis</i> | European Goldfinch | | | | | • | • | | |
| Halcyonidae | * <i>Dacelo novaeguineae</i> | Laughing Kookaburra | | X | | | • | + | | |

| Family | Scientific Name | Common Name | Conservation status | | | Database searches | | Source | | |
|---------------|--------------------------------------|------------------------|---------------------|--------|--------------------|-------------------|-----------|-------------|---|--|
| | | | EPBC Act | WC Act | Parks and Wildlife | PMST | NatureMap | This survey | Previous surveys/Natural Area Field Assessments | |
| | | | | | | | | ELA 2015 | Natural Areas Consulting 2014 | Whitfords Nodes Foreshore (CoJ 2009, 2012) |
| | <i>Todiramphus sanctus</i> | Sacred Kingfisher | | | | | • | | | |
| Hirundinidae | <i>Hirundo neoxena</i> | Welcome Swallow | | | | | • | + | | |
| | <i>Petrochelidon nigricans</i> | Tree Martin | | | | | | + | | |
| Laridae | <i>Larus novaehollandiae</i> | Silver Gull | | | | | | + | + | |
| | <i>Larus pacificus</i> | Pacific Gull | | | | | | | + | |
| Locustellidae | <i>Megalurus gramineus</i> | Little Grassbird | | | | | • | | | |
| Maluridae | <i>Malurus splendens</i> | Splendid Fairy Wren | | | | | • | + | | |
| | <i>Malurus lamberti</i> | Variiegated Fairy-wren | | | | | • | | | |
| Megapodiidae | <i>Leipoa ocellata</i> | Malleefowl | VU | S3 | VU | • | | | | |
| Meliphagidae | <i>Anthochaera lunulata</i> | Western Wattlebird | | | | | • | | | |
| | <i>Anthochaera carunculata</i> | Red Wattlebird | | | | | • | + | | |
| | <i>Acanthorhynchus superciliosus</i> | Western Spinebill | | | | | • | | | |
| | <i>Epthianura albifrons</i> | White-fronted Chat | | | | | • | | | |
| | <i>Lichenostomus virescens</i> | Singing Honeyeater | | | | | • | + | + | |

| Family | Scientific Name | Common Name | Conservation status | | | Database searches | | Source | | |
|-----------------|-------------------------------------|-------------------------|---------------------|--------|--------------------|-------------------|-----------|-------------|---|--|
| | | | EPBC Act | WC Act | Parks and Wildlife | PMST | NatureMap | This survey | Previous surveys/Natural Area Field Assessments | |
| | | | | | | | | ELA 2015 | Natural Areas Consulting 2014 | Whitfords Nodes Foreshore (CoJ 2009, 2012) |
| | <i>Lichmera indistincta</i> | Brown Honeyeater | | | | | • | + | | |
| | <i>Manorina flavigula</i> | Yellow-throated Miner | | | | | • | | | |
| | <i>Phylidonyris novaehollandiae</i> | New Holland Honeyeater | | | | | • | + | | |
| Meropidae | <i>Merops ornatus</i> | Rainbow Bee-eater | M | S5 | IA | • | • | + | | |
| Neosittidae | <i>Daphoenositta chrysoptera</i> | Varied Sittella | | | | | • | | | |
| Pachycephalidae | <i>Pachycephala rufiventris</i> | Rufous Whistler | | | | | | | | |
| Pardalotidae | <i>Pardalotus striatus</i> | Striated Pardalote | | | | | • | | | |
| | <i>Acanthiza chrysorrhoa</i> | Yellow-rumped Thornbill | | | | | | | | |
| | <i>Acanthiza inornata</i> | Western Thornbill | | | | | | | | |
| | <i>Gerygone fusca</i> | Western Gerygone | | | | | | + | | |
| | <i>Pardalotus striatus</i> | Striated Pardalote | | | | | | | | |
| | <i>Smicrornis brevirostris</i> | Weebill | | | | | | + | | |
| Passeridae | * <i>Passer domesticus</i> | House Sparrow | | | | • | | | | |

| Family | Scientific Name | Common Name | Conservation status | | | | | Database searches | | Source | | |
|-------------------|-------------------------------------|---------------------------|---------------------|--------|--------------------|------|-----------|-------------------|---|--|--|--|
| | | | EPBC Act | WC Act | Parks and Wildlife | PMST | NatureMap | This survey | Previous surveys/Natural Area Field Assessments | | | |
| | | | | | | | | ELA 2015 | Natural Areas Consulting 2014 | Whitfords Nodes Foreshore (CoJ 2009, 2012) | | |
| | <i>*Passer montanus</i> | Eurasian Tree Sparrow | | | | • | | | | | | |
| Pelecanidae | <i>Pelecanus conspicillatus</i> | Australian Pelican | | | | | • | | | | | |
| Phalacrocoracidae | <i>Phalacrocorax carbo</i> | Great Cormorant | | | | | • | | | | | |
| | <i>Phalacrocorax fuscescens</i> | Black-faced Cormorant | | | | | | | + | | | |
| | <i>Phalacrocorax sulcirostris</i> | Little Black Cormorant | | | | | • | | + | | | |
| | <i>Phalacrocorax varius</i> | Australian Pied Cormorant | | | | | • | | | | | |
| Podargidae | <i>Podargus strigoides</i> | Tawny Frogmouth | | | | | • | | | | | |
| Podicipedidae | <i>Podiceps cristatus</i> | Great Crested Grebe | | | | | • | | | | | |
| | <i>Tachybaptus novaehollandiae</i> | Australasian Grebe | | | | | • | | | | | |
| | <i>Poliiocephalus poliocephalus</i> | Hoary-headed Grebe | | | | | • | | | | | |
| Psittacidae | <i>Barnardius zonarius</i> | Australian Ringneck | | | | | | | | | | |
| | <i>Platycercus icterotis</i> | Western Rosella | | | | | • | | | | | |
| | <i>Platycercus zonarius</i> | Twenty-eight Parrot | | | | | | | | | | |
| | <i>Polytelis swainsonii</i> | Superb Parrot | | | | | | | | | | |

| Family | Scientific Name | Common Name | Conservation status | | | Database searches | | Source | | |
|------------------|--|--------------------------|---------------------|--------|--------------------|-------------------|-----------|-------------|---|--|
| | | | EPBC Act | WC Act | Parks and Wildlife | PMST | NatureMap | This survey | Previous surveys/Natural Area Field Assessments | |
| | | | | | | | | ELA 2015 | Natural Areas Consulting 2014 | Whitfords Nodes Foreshore (CoJ 2009, 2012) |
| | <i>Trichoglossus haematodus</i> | Rainbow Lorikeet | | | | | • | + | | |
| | <i>Purpureicephalus spurius</i> | Red-capped Parrot | | | | | | | | |
| Rallidae | <i>Fulica atra</i> | Eurasian Coot | | | | | • | | | |
| | <i>Gallirallus philippensis</i> | Buff-banded Rail | | | | | • | | | |
| | <i>Gallinula tenebrosa</i> | Dusky Moorhen | | | | | • | | | |
| | <i>Porphyrio porphyrio</i> | Purple Swamphen | | | | | • | | | |
| | <i>Porzana tabuensis</i> | Spotless Crake | | | | | • | | | |
| Recurvirostridae | <i>Cladorhynchus leucocephalus</i> | Banded Stilt | | | | | • | | | |
| | <i>Himantopus himantopus</i> | Black-winged Stilt | | | | | • | | | |
| Rhipiduridae | <i>Rhipidura leucophrys</i> | Willie Wagtail | | | | | • | + | | |
| | <i>Rhipidura fuliginosa</i> | Grey Fantail | | | | | | + | | |
| Rostratulidae | <i>Rostratula australis</i> | Painted Snipe | M | S2 | EN | • | | | | |
| | <i>Rostratula benghalensis</i> subsp. <i>australis</i> | Australian Painted Snipe | M | S2 | EN | • | | | | |
| | <i>Tringa nebularia</i> | Common Greenshank | M | S5 | IA | | • | | | |

| Family | Scientific Name | Common Name | Conservation status | | | Database searches | | Source | | |
|-------------------|---|--------------------------|---------------------|--------|--------------------|-------------------|-----------|-------------|---|--|
| | | | EPBC Act | WC Act | Parks and Wildlife | PMST | NatureMap | This survey | Previous surveys/Natural Area Field Assessments | |
| | | | | | | | | ELA 2015 | Natural Areas Consulting 2014 | Whitfords Nodes Foreshore (CoJ 2009, 2012) |
| Strigidae | <i>Ninox novaeseelandiae</i> | Southern Boobook Owl | | | | | | | | |
| Sturnidae | <i>Sterna bergii</i> | Crested Tern | | | | | | | + | |
| | <i>Acridotheres tristis</i> | Common Myna, Indian Myna | | | | • | | | | |
| | <i>Sturnus vulgaris</i> | Common Starling | | | | • | | | | |
| Threskiornithidae | <i>Platalea flavipes</i> | Yellow-billed Spoonbill | | | | | • | | | |
| | <i>Platalea regia</i> | Royal Spoonbill | | | | | • | | | |
| | <i>Plegadis falcinellus</i> | Glossy Ibis | M | S5 | IA | | • | | | |
| | <i>Threskiornis molucca</i> | Australian White Ibis | | | | | • | | | |
| | <i>Threskiornis spinicollis</i> | Straw-necked Ibis | | | | | • | | | |
| Turnicidae | <i>Turnix velox</i> | Little Buttonquail | | | | | | | | |
| Zosteropidae | <i>Zosterops lateralis</i> | Silvereye | | | | | • | + | | |
| REPTILES | | | | | | | | | | |
| Agamidae | <i>Pogona minor</i> subsp. <i>minor</i> | Western Bearded Dragon | | | | | • | + | | |
| Chelidae | <i>Chelodina oblonga</i> | Oblong Turtle | | | | | • | | | |

| Family | Scientific Name | Common Name | Conservation status | | | Database searches | | Source | | |
|-------------|---|----------------------------------|---------------------|--------|--------------------|-------------------|-----------|-------------|---|--|
| | | | EPBC Act | WC Act | Parks and Wildlife | PMST | NatureMap | This survey | Previous surveys/Natural Area Field Assessments | |
| | | | | | | | | ELA 2015 | Natural Areas Consulting 2014 | Whitfords Nodes Foreshore (CoJ 2009, 2012) |
| Elapidae | <i>Brachyuropsis semifasciatus</i> | Southern Shovel-nosed Snake | | | | | • | | | |
| | <i>Neelaps bimaculatus</i> | Black-naped Snake | | | | | • | | | |
| | <i>Neelaps calonotus</i> | Black-striped Snake | | | P3 | | • | | | |
| | <i>Notechis scutatus</i> | Western Tiger Snake | | | | | • | | | |
| | <i>Parasuta gouldii</i> | Black-headed Snake | | | | | • | | | |
| | <i>Pseudechis australis</i> | Mulga Snake | | | | | • | | | |
| | <i>Pseudonaja affinis</i> subsp. <i>affinis</i> | Dugite | | | | | • | + | | |
| | <i>Simoselaps bertholdi</i> | Jan's Banded Snake | | | | | • | + | | |
| Gekkonidae | <i>Christinus marmoratus</i> | Marbled Gecko | | | | | • | + | | |
| | <i>Diplodactylus polyophthalmus</i> | Speckled Stone Gecko | | | | | • | | | |
| | <i>Strophurus spinigerus</i> | South-western Spiny-tailed Gecko | | | | | | + | | |
| Pygopodidae | <i>Aprasia repens</i> | Sand-Plain Worm-Lizard | | | | | • | + | | |
| | <i>Lialis burtonis</i> | Burtons Legless Lizard | | | | | • | + | | |
| Boidae | <i>Morelia spilota</i> subsp. <i>imbricata</i> | South-west Carpet Python | | | | | • | | | |

| Family | Scientific Name | Common Name | Conservation status | | | Database searches | | Source | | |
|-----------|-----------------------------------|---------------------------------|---------------------|--------|--------------------|-------------------|-----------|-------------|---|--|
| | | | EPBC Act | WC Act | Parks and Wildlife | PMST | NatureMap | This survey | Previous surveys/Natural Area Field Assessments | |
| | | | | | | | | ELA 2015 | Natural Areas Consulting 2014 | Whitfords Nodes Foreshore (CoJ 2009, 2012) |
| Scincidae | <i>Acritoscincus trilineatum</i> | South-western Cool Skink | | | | | • | | | |
| | <i>Cryptoblepharus buchananii</i> | Snake-eyed Skink; Fence Skink | | | | | • | | | |
| | <i>Ctenotus australis</i> | Western Limestone Ctenotus | | | | | • | | + | |
| | <i>Ctenotus fallens</i> | West-coast Striped Skink | | | | | • | + | + | |
| | <i>Cyclodomorphus celatus</i> | Western Slender bluetongue | | | | | | + | + | |
| | <i>Egernia kingii</i> | King's Skink | | | | | | + | + | |
| | <i>Hemiergis quadrilineata</i> | Two-toed Earless Skink | | | | | • | + | | |
| | <i>Lerista elegans</i> | Elegant Burrowing Skink | | | | | • | + | + | |
| | <i>Lerista lineopunctulata</i> | West Coast Line-spotted Lerista | | | | | • | + | | |
| | <i>Lerista praepedita</i> | Worm Lerista | | | | | • | | | |
| | <i>Menetia greyii</i> | Common Dwarf Skink | | | | | • | + | | |
| | <i>Morethia lineoocellata</i> | Western Pale-flecked Morethia | | | | | | | | |
| | <i>Morethia obscura</i> | Shrubland Morethia Skink | | | | | • | | | |
| | <i>Tiliqua occipitalis</i> | Western Bluetongue | | | | | • | + | | |

| Family | Scientific Name | Common Name | Conservation status | | | | | Database searches | | Source | | |
|----------------|--|--------------------------|---------------------|--------|--------------------|------|-----------|-------------------|---|--|--|--|
| | | | EPBC Act | WC Act | Parks and Wildlife | PMST | NatureMap | This survey | Previous surveys/Natural Area Field Assessments | | | |
| | | | | | | | | ELA 2015 | Natural Areas Consulting 2014 | Whitfords Nodes Foreshore (CoJ 2009, 2012) | | |
| | <i>Tiliqua rugosa</i> subsp. <i>rugosa</i> | Bobtail | | | | | | + | | | | |
| Typhlopidae | <i>Ramphotyphlops australis</i> | Southern Blind Snake | | | | | • | | | | | |
| Varanidae | <i>Varanus gouldii</i> | Gould's Sand Goanna | | | | | • | | | | | |
| | <i>Varanus tristis</i> | Black-tailed Tree Goanna | | | | | • | | | | | |
| AMPHIBIANS | | | | | | | | | | | | |
| Hylidae | <i>Litoria adelaidensis</i> | Slender Tree Frog | | | | | • | | | | | |
| | <i>Litoria moorei</i> | Motorbike Frog | | | | | • | | | | | |
| Myobatrachidae | <i>Crinia insignifera</i> | Squelching Froglet | | | | | • | | | | | |
| | <i>Crinia glauerti</i> | Clicking Frog | | | | | • | | | | | |
| | <i>Heleioporus eyrei</i> | Moaning Frog | | | | | • | | | | | |
| | <i>Limnodynastes dorsalis</i> | Western Banjo Frog | | | | | • | | | | | |
| | <i>Myobatrachus gouldii</i> | Turtle Frog | | | | | • | | | | | |

Appendix N Fauna species photos



Quenda (*Isoodon obesulus* subsp. *fusciventer* [P5])



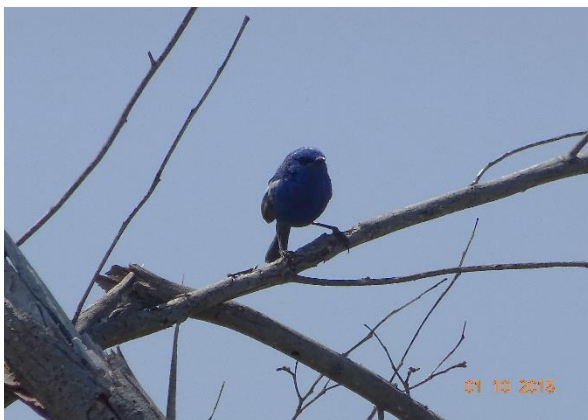
Domestic Cat (**Felis catus*)



Osprey (*Pandion haliaetus* [Migratory; S5])



Laughing Turtle-dove (**Streptopelia senegalensis*)



Splendid Fairy-wren (*Malurus splendens*)



Magpie-lark (*Grallina cyanoleuca*)



Silvereye (*Zosterops lateralis*)



King's Skink (*Egernia kingii*)



West Coast Ctenotus (*Ctenotus fallens*)



Western Slender Blue-tongue (*Cyclodomorphus celatus*)



Bobtail, Shingleback (*Tiliqua rugosa* subsp. *rugosa*)



West Coast Line-spotted Lerista (*Lerista lineopunctulata*)



Burton's Legless Lizard (*Lialis burtonis*)



Jan's Banded Snake (*Simoselaps bertholdi*)



South-western Sandplain Worm Lizard (*Aprasia repens*)



Western Bearded Dragon (*Pogona minor minor*)



South-western Spiny-tailed Gecko (*Strophurus spinigerus*)



West Coast Four-toed Lerista (*Lerista elegans*)

Appendix O Invertebrates recorded opportunistically

| Order | Species* | Status |
|-------------|------------------------------------|--------|
| Araneae | Spider sp.1 (golden orb weaver) | Native |
| | Spider sp.2 (Lycosid) | Native |
| | Spider sp.3 (Lycosid) | Native |
| | Spider sp.4 (Huntsman) | Native |
| | Spider p.5 web spinner | Native |
| | Spider sp.6 (jumping) | Native |
| | Spider (<i>Badumna insignis</i>) | Native |
| Blattodea | Cockroach sp.1 | Native |
| | Cockroach sp.2 | Native |
| | Cockroach sp.3 | Native |
| Coleoptera | Beetle sp.1 | Native |
| | Beetle sp.2 | Native |
| | Beetle sp.3 (long feelers) | Native |
| | Beetle sp.4 (pie-dish1) | Native |
| | Beetle sp.5 (pie-dish2) | Native |
| | Beetle sp.6 (scarab) | Native |
| | Ladybug | Native |
| Dermaptera | Earwig | Native |
| Diptera | Fly sp.1 | Native |
| | Fly sp.2 | Native |
| | Fly sp.3 (Robber Fly: Asilidae) | Native |
| | Mosquito | Native |
| Hymenoptera | Ant sp.1 | Native |
| | Ant sp.2 | Native |

| Order | Species* | Status |
|-------------------|---|------------|
| | Ant sp.3 | Native |
| | Ant sp.4 | Native |
| | Bee (* <i>Apis mellifera</i>) | Introduced |
| | Wasp sp.1 (paper wasp) | Native |
| | Wasp sp.2 (mud wasp) | Native |
| | Wasp sp.3 (big black) | Native |
| Hemiptera | Bug sp.1 (like assassin bug) | Native |
| | Bug sp.2 (like assassin bug) | Native |
| | Bug sp.3 (like assassin bug) | Native |
| | Bug sp.4 (stink bug) | Native |
| | Bug sp.5 | Native |
| | Cicada sp.1 | Native |
| | Cicada sp.2 | Native |
| Isopoda | Isopod sp.1 | Native |
| | Isopod sp.2 | Native |
| Julida | Millipede (* <i>Ommatoiulus moreletii</i>) | Introduced |
| Lepidoptera | Moth sp.1 | Native |
| | Moth sp.2 | Native |
| | Moth sp.3 | Native |
| Neuroptera | Lacewing (antlion) | Native |
| Odonata | Dragonfly sp.1 | Native |
| | Dragonfly sp.2 | Native |
| Orthoptera | Grasshopper | Native |
| | Katydid | Native |
| | Mole cricket | Native |
| Parasitiformes | Tick (parasitic - on Bobtail) | Native |
| Scolopendromorpha | Centipede | Native |

| Order | Species* | Status |
|------------|---|--------|
| Scorpiones | Scorpion (Marbled Scorpion <i>Urodacus</i>) | Native |
| Thysanura | Silverfish | Native |

*Most invertebrates were identified to order only, however this list represents the individual species recorded during the survey.

Appendix P Fauna locations

| Fauna locations | Easting | Northing |
|---|---------|----------|
| Conservation significant fauna locations | | |
| Quenda | 380743 | 6478935 |
| Rainbow Bee-eater | 380436 | 6479385 |
| Osprey / Osprey nest | 380323 | 6479267 |
| Black cockatoo potential breeding roosting trees (DBH [cm]) | | |
| Tuart (70 cm) | 6479246 | 380531 |
| Tuart (50 cm) | 6479241 | 380532 |
| Tuart (60 cm) | 6479240 | 380534 |
| Tuart (60 cm) | 6479246 | 380502 |
| Tuart (90 cm) | 6479198 | 380534 |
| Tuart (65 cm) | 6479190 | 380485 |
| Introduced fauna locations | | |
| Black Rat observed (motion camera) | 6478935 | 380742 |
| Black Rat observed (motion camera) | 6479356 | 380441 |
| Black Rat observed (motion camera) | 6480901 | 379975 |
| Cat observed (motion camera) | 6480656 | 379944 |
| Cat observed (motion camera) | 6480901 | 379975 |
| House Mouse trapped | 6480253 | 379782 |
| House Mouse trapped | 6480298 | 379766 |
| Rabbit activity | 6480652 | 379891 |
| Rabbit activity | 6482180 | 380264 |
| Rabbit activity | 6482067 | 380249 |
| Rabbit observed (motion camera) | 6478935 | 380742 |
| Rabbit observed (motion camera) | 6480656 | 379944 |
| Rabbit observed (motion camera) | 6480901 | 379975 |

| Fauna locations | Easting | Northing |
|--|---------|----------|
| Rabbit warren | 6482083 | 380154 |
| Rabbit warren | 6481928 | 380115 |
| Rabbit warren | 6480471 | 379899 |
| Rabbit warren | 6480675 | 379905 |
| Rabbit warren | 6480652 | 379857 |
| Red Fox warren | 6480378 | 379867 |
| Other threats to fauna /fauna habitats | | |
| Asbestos | 6480816 | 379916 |
| Kids' cubby house | 6480753 | 379868 |
| Kids' cubby house | 6480366 | 379904 |
| Dumped rubbish | 6479060 | 380552 |
| Dumped rubbish | 6479289 | 380611 |

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