Horizon Power

Esperance Power Station

Biological Survey

December 2018

Executive summary

Horizon Power is undertaking feasibility studies for a new 25 Megawatt (MW) power station located in Esperance, in south west Western Australia (the project). As part of feasibility studies, GHD Pty Ltd (GHD) was commissioned by Horizon Power to undertake a flora, vegetation and fauna survey of the proposed site.

The proposed power station will be located on Lot 502 Harbour Road in Esperance, which covers 3.12 hectares (ha). The purpose of the survey is to delineate key flora, vegetation and fauna values of the site. This report is subject to, and must be read in conjunction with, the limitations, assumptions and qualifications contained within the report.

Key findings

Flora and vegetation

- One vegetation type occurs within the project area, excluding cleared and highly degraded areas. The vegetation consists of a *Spyridium* shrubland on an undulating coastal dune system with grey sandy soil. The natural structure of the vegetation present has been altered and lacked floristic diversity, with introduced grasses and herbs dominating the lower layers
- The vegetation present within the project area broadly aligns with the vegetation mapped across the project area by Beard (1973)
- The areas containing remnant native vegetation ranged from Good to Degraded condition with disturbance to the site largely a result of adjacent clearing, fire, weed invasion and rabbits. Areas within the project area that have previously been cleared or are completely dominated by weeds (lacking a native upper and lower storey) were rated as Completely Degraded
- No Commonwealth or State listed Threatened Ecological Communities or Priority Ecological Communities were identified within the project area
- A total of 56 flora taxa representing 30 families and 50 genera was recorded from the project area
- A total of 18 introduced flora taxa were recorded in the project area. Of these, one species, Bridal Creeper (**Asparagus asparagoides*), is listed as a Declared Pest under the *Biosecurity and Management Act 2007* and as a Weed of National Significance
- No flora of conservation significance was recorded within the project area, and none are considered likely to occur

Fauna

- The project area comprised of two broad habitat types, Mixed Shrubland and cleared/highly disturbed areas. The shrubland habitat is dominated by an upper storey of *Spyridium globulosum, Acacia cochlearis, A. saligna, A. rostellifera, A. cyclops, Leucopogon parviflorus* and *Melaleuca pentagona* over a moderately open lower shrub layer and understorey of sedges and introduced grasses and herb species. The cleared/highly disturbed areas provide limited habitat value to fauna
- A total of 11 fauna species, including seven birds, three mammals and one reptile were recorded within the project area. Of these two species are introduced, the rabbit and domestic dog

- No fauna species of conservation significance or evidence of their occurrence was recorded in the project area during the survey
- No fauna species of conservation significance are likely to be solely dependent on the vegetation remaining within the project area

Table of contents

Table index

Appendices

1. Introduction

1.1 Background

Horizon Power Pty Ltd (Horizon Power) is proposing to construct and run a new 25 Megawatt (MW) power station located in Esperance, in south west Western Australia (WA) (the project). As part of feasibility studies, Horizon Power is seeking assistance to undertake relevant environmental studies. GHD (2018) previously completed an Environmental Impact Assessment and Approval pathway report for the project in May 2018.

1.2 Purpose of report

GHD Pty Ltd (GHD) was commissioned by Horizon Power to undertake a flora, vegetation and fauna survey of the project area. The purpose of the survey is to delineate key flora, vegetation and fauna values of the site. The outcome of the survey and information supplied in this biological survey report will be used to inform the environmental assessment and approvals process.

1.3 Project area

The proposed power station will be located on Lot 502 Harbour Road in Esperance (hereon referred to as the 'project area'). The Horizon Power Esperance Depot is currently located on the front part of Lot 502 with the remainder of the Lot comprising native vegetation. It is assumed the entirety of the project area will be cleared to support the proposed power station. The project area covers 3.12 hectares (ha) and is shown in Figure 1, Appendix A.

A study area was defined for the desktop based searches for the biological survey and includes a 5 km buffer of the project area.

1.4 Scope of works

The flora, vegetation and fauna assessment included both desktop and field assessment. The following actions were completed to fulfil the scope:

- A review of relevant databases including the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (PMST) and the Department of Biodiversity Conservation and Attractions (DBCA) NatureMap and FloraBase
- Development of base maps (aerial photography with cadastre, topography and land system mapping) for the field survey
- A single season biological survey (by an environmental specialist) was conducted in Spring to verify / ground truth the desktop assessment findings through a targeted and detailed flora and vegetation survey and a Level 1 fauna survey (reconnaissance survey)
- Ecological community mapping was undertaken according to National Vegetation Information System (NVIS) structural and floristics (Executive Steering Committee for Australian Vegetation Information (ESCAVI) 2003)
- The project area was assessed for plant species diversity, density, composition, structure and weed cover, recording the percentage of each in nominated quadrats
- An inventory of fauna from within the project area was recorded, undertaking opportunistic searches across habitat types for the presence or signs of fauna species

- A habitat assessment of the project area was completed, targeting known habitat preferences of conservation significant flora and fauna to determine the likelihood of occurrence of these species utilising the area

1.5 Relevant legislation, conservation codes and background information

In WA some ecological communities, flora and fauna are protected under both Federal and State Government legislation. In addition, regulatory authorities also provide a range of guidance and information on expected standards and protocols for environmental surveys.

An overview of key legislation and guidelines, conservation codes and background information relevant to this biological survey is provided in Appendix B.

1.6 Report limitations and assumptions

This report has been prepared by GHD for Horizon Power and may only be used and relied on by Horizon Power for the purpose agreed between GHD and the Horizon Power as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Horizon Power arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report (including species listings). GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Horizon Power and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of access tracks, operational works, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions may change after the date of this report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

This report has assessed the flora and fauna within the project area (Figure 1, Appendix A). Should the project area change or be refined, further assessment may be required.

2. Methodology

2.1 Desktop assessment

Prior to the commencement of the field survey, a desktop assessment was undertaken to identity relevant environmental information pertaining to the project area and to assist in survey design. This included a review of the desktop information presented in GHD (2018) and an updated search of the following:

- The Department of the Environment and the Energy (DotEE) PMST to identify species and communities listed under the EPBC Act potentially occurring within the project area (DotEE 2018b) (Appendix C)
- The DBCA Threatened Ecological Community (TEC) and Priority Ecological Community (PEC) database to determine the potential for TECs or PECs to be present within the project area (DBCA 2018)
- The DBCA NatureMap database for flora and fauna species previously recorded within the project area (DBCA 2007–2018) (Appendix C)
- The DBCA Threatened (Declared Rare) and Priority Flora (TPFL) database and the WA Herbarium (WAHerb) database for Threatened flora species listed under the *Wildlife Conservation Act 1950* (WC Act) and listed as Priority by DBCA, previously recorded within the survey area (DBCA 2018b)
- Existing datasets including previous vegetation mapping of the study area (Beard 1973), historical aerial photography, and hydrology information to provide background information on the variability of the environment, likely vegetation units and fauna habitats

2.2 Field survey

2.2.1 Vegetation and flora

GHD ecologist Erin Lynch (flora license no. SL012374) completed a single season, detailed vegetation and flora assessment of the project area on 1 October 2018. The field survey was undertaken to identify and describe the dominant vegetation types, assess vegetation condition, and identify and record vascular flora taxa present at the time of survey. Targeted searches for conservation significant or other significant ecological communities and flora taxa were also undertaken during the field survey.

The survey methodology employed by GHD was undertaken in accordance with the Environmental Protection Authority (EPA) *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016a).

Data collection

Field survey methods involved a combination of sampling quadrats and traversing the project area by foot. Three non-permanent quadrats were described throughout the project area.

Quadrats measuring 10 m x 10 m (area of 100 m^2) were located within the remnant native vegetation. Quadrats were not established in vegetation types that had been significantly altered by clearing and weeds. Field data at each quadrat was recorded on a pro-forma data sheet and included the parameters detailed in Table 1.

A flora inventory was compiled from taxa listed in described quadrats and from opportunistic floristic records throughout the project area.

Table 1 Data collected during the field survey

Aspect	Measurement
Collection attributes	Personnel/recorder; date, quadrat dimensions, photograph of the quadrat.
Physical features	Aspect, soil attributes, ground surface cover, leaf and wood litter.
Location	Coordinates recorded in GDA94 datum using a hand-held Global Positioning System (GPS) tool to accuracy approximately ± 5 m.
Vegetation condition	Vegetation condition was assessed using the condition rating scale adapted by EPA (2016a) for the South West Botanical Province.
Disturbance	Level and nature of disturbances (e.g. weed presence, fire and time since last fire, impacts from grazing, exploration activities).
Flora	List of dominant flora from each structural layer. List of all species within the quadrat including average height and cover using NVIS.

Vegetation types

Vegetation types were identified and boundaries delineated using a combination of aerial photography, topographical features, previous mapping (Beard 1973) and field data.

Vegetation types were described based on structure, dominant taxa and cover characteristics as defined by quadrat results and field observations. Vegetation type description follows the National Vegetation Information System (NVIS) and are consistent with NVIS Level V (Association). At Level V up to three taxa per stratum are used to describe the association (ESCAVI 2003).

Vegetation condition

The vegetation condition was assessed and mapped in accordance with the vegetation condition rating scale for the South West and Interzone Botanical Provinces (devised by Keighery (1994) and adapted by EPA (2016a)). The scale recognises the intactness of vegetation and consists of six rating levels. The vegetation condition rating scale is outlined in Appendix B.

Flora identification and nomenclature

Species well known to the survey botanist were identified in the field; all other species were collected and assigned a unique collection number to facilitate tracking. Plant species were identified with the use of local and regional flora keys and by comparison with the named species held at the WA Herbarium.

The conservation status of all recorded flora was compared against the current lists available on *FloraBase* (WA Herbarium 1998–2018) and the EPBC Act Threatened species database provided by DotEE (2018b). Nomenclature used in this report follows that used by the WA Herbarium as reported on *FloraBase* (WA Herbarium 1998–2018).

2.2.2 Fauna

GHD ecologist Erin Lynch undertook a Level 1 fauna survey (reconnaissance survey) of the project area in conjunction with the vegetation and flora assessment. The project area was traversed on foot over the course of the survey to identify and describe the dominant fauna habitat types present and their condition, assess habitat connectivity, and identify and record fauna species within the project area. An assessment of the likelihood of conservation significant fauna and their habitats occurring within the project area was also undertaken.

The survey methodology employed by GHD was undertaken in accordance with the EPA *Technical Guidance – Sampling methods for terrestrial vertebrate fauna* (EPA 2016b) and *Technical Guidance – Terrestrial Fauna Surveys* (EPA 2016c).

Habitat assessment

The project area was assessed for habitat type, structural complexity, connectivity, disturbance, type and extent of resource availability and value for fauna. Specifically, the assessment included:

- Habitat structure (e.g. vegetation type, presence/absence of overstorey, midstorey, understorey, and ground cover)
- Presence/absence of refuge including: fallen timber (coarse woody debris), hollow-bearing trees and stags and rocks/breakaways, and the type and extent of each refuge
- Location of the habitat within the project area in comparison to the habitat within the surrounding landscape
- Habitat connectivity and identification of wildlife corridors within and immediately adjacent to the project area
- Identification and evaluation of key habitat features and types identified during the desktop assessment relevant to fauna of conservation significance
- Evaluation of the likelihood of occurrence of conservation significant fauna within the habitat (based on presence of suitable habitat)
- A representative photograph of each habitat type

Opportunistic observations

Opportunistic fauna searches were conducted throughout the project area and focussed on the following:

- Searching the project area for tracks, scats, pellets, bones, diggings, feathers, nests and feeding areas indicating the current or recent presence of native and feral fauna
- Searching through microhabitats within the project area
- Opportunistic observations of species in the project area, including visual and aural sightings
- Observed fauna were recorded and where conservation significant fauna were identified, photographs, GPS points and habitat data were recorded

Fauna species identification

Identification of fauna species was made in the field using available field guides and electronic guides (e.g. Morcombe 2014). Where identification was not possible, photographs of specimens were collected to be later identified.

Fauna nomenclature

Nomenclature used in this report follows that used by the WA Museum and the DBCA NatureMap database (DBCA 2007–2018) with the exception of birds, where Christidis & Boles (2008) was used.

2.3 Limitations

2.3.1 Desktop limitations

Desktop investigations use a variety of online resources such as the WA Museum and DBCA *NatureMap* database and the EPBC Act PMST. The responsibility for the accuracy of such data remains with the issuing authority, not with GHD.

2.3.2 Field survey limitations

The EPA (2016a) Technical Guide states flora and fauna survey reports for environmental impact assessment in WA should contain a section describing the limitations of the survey methods used. The limitations and constraints associated with this field survey are discussed in Table 2. Based on this assessment, the present survey effort has not been subject to any constraints which affect the thoroughness of the assessment and the conclusions which have been formed.

Table 2 Field survey limitations

Aspect	Constraint	Comment
Sources of information and availability of contextual information	Nil	Adequate information is available for the project area, this includes broad scale (1:250,000) mapping by Beard (1973) and digitised by Shepherd et al. (2002). Regional biogeography (Comer et al. 2002). Database searches provide adequate information about Threatened and Priority flora and fauna, TECs and PECs.
Scope (what life forms were sampled etc.)	Nil	Vascular flora and terrestrial vertebrate fauna were sampled during the survey. Non-vascular flora, invertebrate and aquatic fauna were not surveyed.
Proportion of flora collected and identified (based on sampling, timing and intensity) Proportion of fauna identified, recorded and/or collected	Nil	The detailed vegetation and flora survey was undertaken in spring 2018 which is the recommended timing for flora surveys in the region. The flora recorded from the field survey is detailed in section 5.1.4 and a full flora species list is provided in Appendix E. This timing is considered adequate due to the highly disturbed nature of the project area and the high proportion of species able to be identified at the time of the survey. The reconnaissance fauna survey was also undertaken in spring 2018. The fauna assessment sampled those species that can be easily seen, heard or have distinctive signs, such as tracks, scats, diggings, etc. Many cryptic species would not have been identified during a reconnaissance survey and seasonal variation within species often requires targeted surveys at a particular time of the year. Of the fauna species recorded during the survey, all were identified to species level. The fauna assessment was aimed at identifying habitat types and terrestrial vertebrate fauna utilising the project area. No sampling for invertebrates or aquatic species occurred. The information available on the identification, distribution and conservation status of invertebrates is generally less extensive than vertebrate species.
Flora determination	Minor	Flora determination was undertaken by the GHD ecologist in the field and at the WA Herbarium. Two taxa were only able to be identified to genus level, the remaining 54 taxa were identified to species level. Some species, particularly grasses, sedges and herbs, may have been overlooked due to lack of material. The taxonomy and conservation status of the WA flora is dynamic. This report was prepared with reliance on taxonomy and conservation status current at the time report development, but it should be noted this may change in response to ongoing research and review of International Union for Conservation Nature criteria.
Completeness and further work which might be needed (e.g. was the relevant area fully surveyed)	Nil	Access to the project area was made by foot, with parking a short walk from the site. The project area was traversed extensively on foot.

Aspect	Constraint	Comment
Mapping reliability	Minor	The vegetation was mapped using high-resolution ESRI aerial imagery obtained from Landgate, topographical features, previous broad scale mapping (Beard 1973) and field data. Data was recorded in the field using hand-held GPS tools (e.g. Samsung tablet and Garmin GPS). Certain atmospheric factors and other sources of error can affect the accuracy of GPS receivers. The Garmin GPS units used for this survey are accurate to within ±5 metres on average. Therefore the data points consisting of coordinates recorded from the GPS may contain minor inaccuracies.
Timing/weather/ season/cycle	Minor	The field surveys were conducted during spring on 1 October 2018. The closest weather recording station to the project area is in Esperance (No. 009789). In the months prior to the survey (July-September), the Esperance weather recording station recorded a total of 261.4 mm of rainfall (Bureau of Meteorology (BoM) 2018). This total is slightly higher than the long-term average for the same period (July-September; 241.7 mm) (BoM 2018). The weather conditions during the spring field survey included: • Temperature ranged from a minimum 16 °C to a maximum of 20.4 °C • Rainfall: 20.4 mm. The weather conditions recorded during the survey are considered unlikely to have impacted upon the vegetation and flora survey. The cooler day temperature and thunderstorms/rain experienced during the survey would have impacted on fauna activity in the project area, in particular reptiles. The timing of the survey (spring) is considered adequate.
Disturbances (e.g. fire, flood, accidental human intervention)	Nil	Sections of the project area have been subjected to historical disturbance events (e.g. clearing and fire); however, these disturbances did not impact the survey.
Intensity (in retrospect, was the intensity adequate)	Nil	The vascular flora of the project area was sampled in accordance with EPA (2016a). The terrestrial fauna sampled in accordance to EPA (2016b). The project area was sufficiently covered by the GHD ecologist during the survey.
Resources	Nil	Adequate resources were employed during the field survey. One person day was spent undertaking the survey using an experienced ecologist.
Access restrictions	Nil	No access problems were encountered during the survey.
Experience levels	Nil	The ecologist who executed the survey is a practitioner suitably qualified and experienced in their respective fields. GHD ecologist Erin Lynch has over 10 years' experience undertaking flora and fauna surveys within WA.

3. Desktop assessment

3.1 Vegetation and Flora

3.1.1 Broad vegetation mapping and extents

Broad scale pre-European vegetation mapping of the area was completed by Beard (1973) at an association level. The mapping indicates that one vegetation association is present within the project footprint:

- Shrublands; mallee and acacia scrub on south coastal dunes (vegetation association 42).

The pre-European mapping has been adapted and digitised by Shepherd et al. (2002). The extent of vegetation associations have been determined by the state-wide vegetation remaining extent calculations maintained by DBCA (latest update December 2017 – GoWA 2018). As shown in Table 3, the current extent remaining of vegetation association 42 is greater than 94 % at all scales (State, IBRA bioregion, IBRA subregion and Local Government Area (LGA)).

Table 3 Extent of pre-European vegetation associations mapped within the project area (Beard 1973, GoWA 2018).

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	% Current extent in all DBCA managed land (proportion of current extent)
42	State: WA	310,084.50	297,963.21	96.09	46.12
	IBRA Bioregion: Esperance Plains	135,419.99	128,052.58	94.56	56.82
	IBRA Subregion: Recherche	108,885.37	104,049.03	95.56	67.45
	LGA: Shire of Esperance	105,345.32	99,941.71	94.87	68.22

3.1.2 Conservation significant ecological communities

The EPBC Act PMST and DBCA TEC/PEC databases identified one TEC/PEC within 5 km of the project footprint, the Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia TEC. This community is listed as Endangered under the EPBC Act and listed as a Priority 3 PEC by DBCA.

The ecological community is described as a kwongkan shrubland, ranging from sparse to dense, thicket-forming, where Proteaceous species form a significant component. It is confined to the southeast botanical province of WA and primarily occurs on sandplains and marine plains and lower to upper slopes and ridges, as well as uplands across this region (Department of the Environment (DoE) 2014). Typically for this ecological community, plants from the family Proteaceae make up a large component of the flora, including plants from the genera *Adenanthos, Banksia, Grevillea, Hakea, Isopogon* and *Lambertia*. The actual Proteaceae species present in the ecological community is variable across its range (DoE 2014).

Vegetation association 42 is considered to closely correspond with the Proteaceae Dominated Kwongkan Shrubland ecological community (DoE 2014).

3.1.3 Flora diversity

The *NatureMap* database identified 555 flora taxa, representing 99 families and 297 genera previously recorded within 5 km of the project area (Appendix C). This total comprised 477 native taxa and 78 naturalised (introduced) taxa. Dominant families recorded included Myrtaceae (80 taxa), Fabaceae (62 taxa) and Proteaceae (34 taxa).

3.1.4 Conservation significant flora

The EPBC Act PMST, *NatureMap* database and DBCA TPFL and WAHERB databases identified the presence/potential presence of 15 conservation significance flora taxa within the study area. The desktop searches recorded:

- Four taxa listed under the EPBC Act and/or WC Act
- Two Priority 1 taxa
- One Priority 2 taxon
- Four Priority 3 taxa
- Four Priority 4 taxa.

GHD (2018) undertook a likelihood of occurrence assessment of all conservation significant flora species identified in the desktop assessment. This assessment took into account previous records and habitat requirements through desktop assessment only. The likelihood of occurrence assessment concluded two taxa are likely to occur, six taxa may possibly occur, and seven taxa are unlikely/highly unlikely to occur in the project area (Appendix D). Conservation significant flora identified as likely or possible to occur within the project area are listed in Table 4.

Table 4 Conservation significant flora considered likely to or possible to occur within the project area

Taxon	Status	Likelihood of occurrence
Cyathostemon sp. Esperance (A. Fairall 2431)	Priority 1	Possible
Hibbertia carinata	Priority 1	Likely
Leucopogon corymbiformis	Priority 2	Likely
Lepidium fasciculatum	Priority 3	Possible
Pityrodia chrysocalyx	Priority 3	Possible
Thomasia quercifolia	Priority 4	Possible
Eucalyptus x missilis	Priority 4	Possible
Grevillea baxteri	Priority 4	Possible

Taxa of conservation significance previously recorded within 5 km of the project area are shown in Figure 1, Appendix A.

3.2 Fauna

3.2.1 Fauna diversity

The *NatureMap* database identified 209 vertebrate fauna species previously recorded within 5 km of the project area (Appendix C). This total comprised 164 birds, 25 reptiles, 17 mammals

and three amphibians. Of the 209 fauna species previously recorded 203 were native species and six were naturalised (introduced) species.

3.2.2 Conservation significant fauna

The EPBC Act PMST and NatureMap database identified the presence/potential presence of 35 conservation significance fauna within the study area. This total does not include those species exclusively marine as no marine habitat is present within the project footprint or indirectly impacted by the project. The desktop searches recorded:

- 13 species listed as Threatened under the EPBC Act and/or as Schedule 1-4 (Threatened) under the WC Act
- 20 species listed as migratory under the EPBC Act and/or as Schedule 5 (Migratory birds protected under an international agreement) under the WC Act
- Two species listed as Priority by DBCA.

GHD (2018) undertook a likelihood of occurrence assessment of all conservation significant fauna species identified in the desktop assessment. This assessment took into account previous records, species biology and habitat requirements through desktop assessment only. The likelihood of occurrence assessment concluded that four species are likely to occur and the remaining 31 species are unlikely or highly unlikely to occur within the project footprint (Appendix D).

The assessment identified the following species as likely to occur within the project area based on their known presence in the region and likely presence of suitable habitat:

- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) – Endangered (EPBC Act and WC Act)
- Western Brush Wallaby (*Notamacropus Irma*) – Priority 4 (DBCA listed)
- Southern Death Adder (*Acanthophis antarcticus*) – Priority 3 (DBCA listed)
- Chuditch, Western Quoll (*Dasyurus geoffroii*) – Vulnerable (EPBC Act and WC Act)

4. Survey results

4.1 Flora and vegetation

4.1.1 Vegetation types

One vegetation type was recorded within the project area, excluding cleared and highly degraded areas. This vegetation type consists of a *Spyridium globulosum* shrubland on an undulating coastal dune system with grey sandy soil. A more detailed description of this vegetation type is as follows:

Spyridium globulosum, *Acacia* cochlearis and *Leucopogon parviflorus* tall shrubland over *Templetonia retusa, Phyllanthus calycinus* and *Rhagodia baccata* low open shrubland over **Ehrharta* spp., **Lagurus* ovatus and **Eragrostis curvula* tussock grassland over *Lepidosperma squamatum* and *Tetraria* sp. Mt Madden open sedgeland over *Desmocladus flexuosus, *Asparagus asparagoides* and**Euphorbia terracina* herbland.

The natural structure of the vegetation present has been altered and lacked floristic diversity, with introduced grasses and herbs dominating the lower layers. Half of the project area, the front part of Lot 502, has previously been cleared for the Horizon Power depot and is fenced around the entire boundary. There is a small number of planted trees and shrubs present within the depot site, including Eucalypt species and Pine trees.

The vegetation present within the project area broadly aligns with the vegetation mapped by Beard (1973).

Plate 1 Site photographs of the *Spyridium globulosum* shrubland occurring within the project area.

The native vegetation present within the project area has been mapped in Figure 2, Appendix A.

4.1.2 Vegetation condition

The areas containing remnant native vegetation ranged from Good to Degraded condition with disturbance to the site largely a result of adjacent clearing, fire, weed invasion and rabbits. The ground cover throughout the site was dominated by introduced grasses and herbaceous species. It was also observed that a line of shrubs had been damaged and appeared to have been pushed over/slashed. Areas within the project area that have previously been cleared or are completely dominated by weeds (lacking a native upper and lower storey) were rated as Completely Degraded.

The vegetation condition of the project area has been mapped in Figure 3, Appendix A.

4.1.3 Conservation significant ecological communities

No Commonwealth or State listed Threatened Ecological Communities or Priority Ecological Communities were identified within the project area.

The vegetation survey confirmed that the Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia TEC does not occur within or immediately surrounding the project area. This TEC is characterised by Proteaceae species having 30% or greater cover of Proteaceae species across all layers where these shrubs occur (DoE 2014). The vegetation within the project area lacked Proteaceae taxa.

4.1.4 Flora diversity

A total of 56 flora taxa representing 30 families and 50 genera was recorded from the project area. This total comprised of 36 native taxa and 20 introduced (or planted) taxa. The dominant families included Poaceae (8 taxa), Fabaceae (5 taxa) and Cyperaceae (5 taxa).

The full list of flora identified within the project area compiled by site matrix is provided in Appendix E.

4.1.5 Introduced flora

A total of 18 introduced flora taxa were recorded in the project area. Of these, one species, Bridal Creeper (**Asparagus asparagoides*), is listed as a Declared Pest under the *Biosecurity and Management Act 2007* and as a Weed of National Significance (WONS).

4.1.6 Conservation significant flora

No flora of conservation significance was recorded within the project area. None of the conservation significant flora identified in the desktop searches are considered likely to occur given the lack of suitable habitat, disturbed nature of the project area. The project area was adequately searched during the survey.

4.2 Fauna

4.2.1 Fauna habitat

The project area comprised of two broad habitat types, Mixed Shrubland and cleared/highly disturbed areas. The shrubland habitat is dominated by an upper storey of *Spyridium globulosum, Acacia cochlearis, A. saligna, A rostellifera, A. cyclops, Leucopogon parviflorus* and *Melaleuca pentagona* over an moderately open lower shrub layer and understorey of sedges and introduced grasses and herb species. The mixed shrubland provides shelter and food resources for native fauna. The sandy soils provide good habitat for burrowing reptiles and mammals however overall there is very little structural diversity present within the project area.

This habitat type is considered to be well represented in the local area, as well as in the broader region. The habitat remaining within the project area has been subject to a number of disturbances including adjacent clearing, fire and invasive species including weeds and rabbits.

The cleared/highly disturbed areas provide limited habitat value to fauna. Planted trees and shrubs as well as introduced grasslands provide some habitat value to fauna species such as foraging and refuge for birds.

4.2.2 Habitat corridors and linkages

The habitat present in the project area is currently bounded by a railway to the west, road and clearing/industrial development to the north, Harbour Road to the east and south and the Horizon Power depot along the southern boundary. Remnant native vegetation continues west of the railway and east of Harbour Road towards the coastline, however it is mostly cleared and developed to the north and south of the project area. Clearing of the project area will reduce the connectivity of remnant vegetation in the east-west direction.

4.2.3 Fauna diversity

A total of 11 fauna species, including seven birds, three mammals and one reptile were recorded within the project area. Of these two species are introduced, the rabbit and domestic dog. All fauna species recorded during the survey are generally common and are known to occur in the area.

A full list of fauna recorded during the survey is provided in Appendix E.

4.2.4 Conservation significant fauna

No fauna species of conservation significance or evidence of their occurrence was recorded in the project area during the survey. The desktop assessment identified the likelihood of four fauna species of conservation significance occurring within the project area. Details on the significance of the habitat present for these species is detailed below. No species of conservation significance are likely to be solely dependent on the vegetation remaining within the project area.

Carnaby's Black Cockatoo

The mixed shrubland habitat does not provide suitable foraging, roosting or breeding habitat for the Carnaby's Black Cockatoo. However, the planted Pinus spp., and two tuart trees which have been planted within the project area provide suitable foraging habitat. No evidence of foraging or roosting was observed during the survey. Neither of the trees contained hollows as determined from a ground-level visual inspection. The project area is not located within the known breeding range for the Carnaby's Black Cockatoo (DSEWPaC 2012).

Western Brush Wallaby

The Western Brush Wallaby is likely to utilise the project area. The project area contains suitable habitat for the Western Brush Wallaby and may be used opportunistically for foraging and as a linkage between adjacent areas of native vegetation. There are two historical records of this species occurring within 5 km of the project area (1954 and 1966).

Southern Death Adder

The project area provides suitable habitat for this species. There is only one known record of this species occurring within 5 km of the project area which was recorded in 1965 (DBCA 2007-2018). The Southern Death Adder may occur within the project area.

Chuditch / Western Quoll

The closest known records of Chuditch is over 50 km from the project area. This species has not been previously recorded in Esperance town. The project area is not considered significant habitat for the species. This species requires habitats that are of a suitable size and not excessively fragmented. It is unlikely the Chuditch would occur within the project area.

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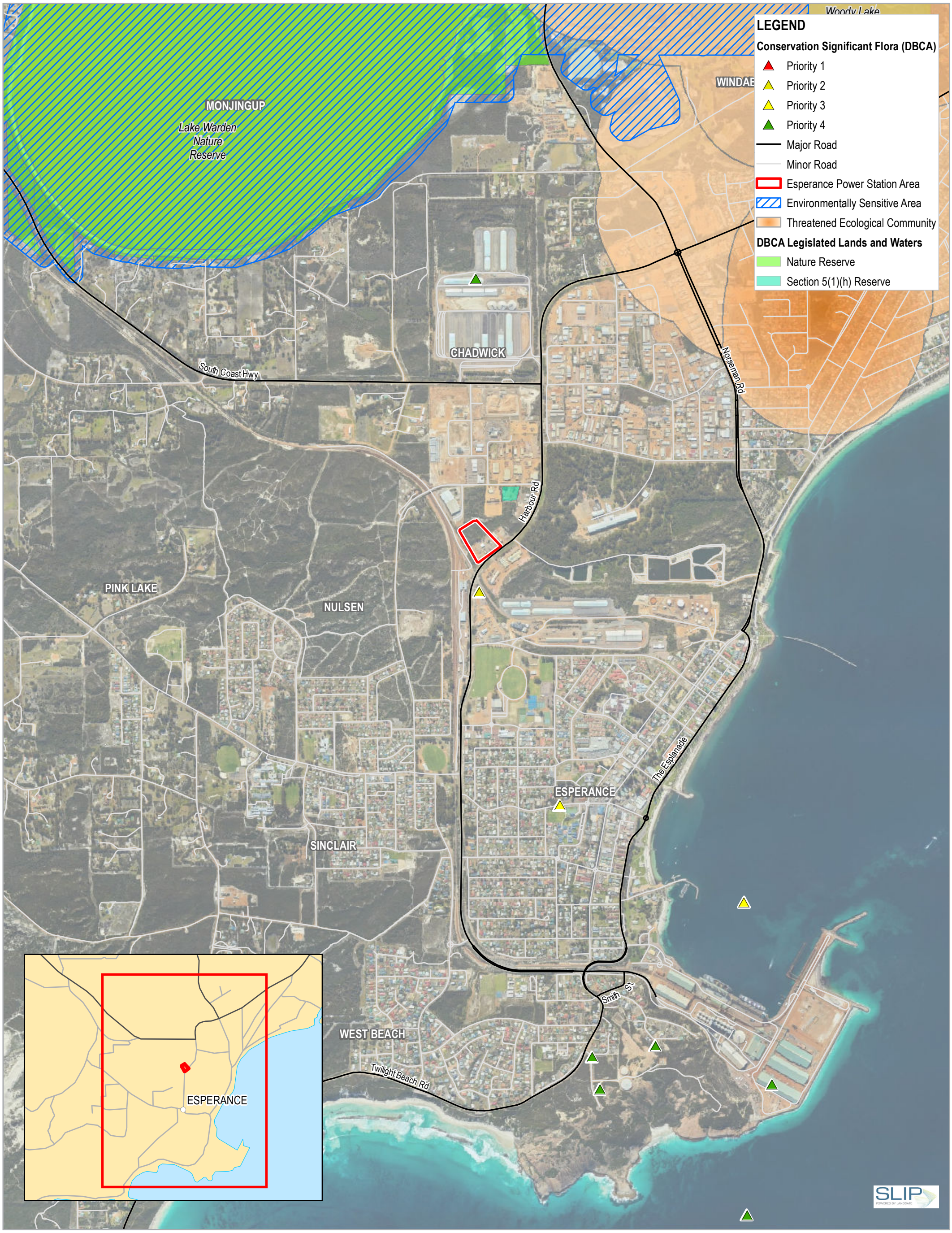
Appendices

Appendix A – Figures



Paper Size ISO A3

0 200 400 600 800 1,000 N

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

Horizon Power
Esperance PS Works Approval & Reports

Locality and Environmental Constraints

Project No. **61-3574951**
Revision No. **0**
Date **31/10/2018**

FIGURE 1

G:\61\3574951\GIS\Maps\Working\613574951_001_Fig1LocalityAndEnviroConstraints_Rev0.mxd
Print date: 12 Dec 2018 - 10:34

Data source: GHD: Quadrats, Esperance Power Station Area, Vegetation Condition - 20181031; Landgate: Imagery (April 2018), Roads, Cadastre - 20181105. Created by: bjones2

Paper Size ISO A3

0 10 20 30 40 50

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

Horizon Power
Esperance PS Works Approval & Reports

Vegetation Type

Project No. **61-3574951**
Revision No. **0**
Date **31/10/2018**

FIGURE 2

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Data source: GHD: Quadrats, Esperance Power Station Area, Vegetation Type - 20181031; Landgate: Imagery (April 2018), Roads, Cadastre - 20181105. Created by: bjones2

Paper Size ISO A3

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Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 51

Horizon Power
Esperance PS Works Approval & Reports

Vegetation Condition

Project No. **61-3574951**
Revision No. **0**
Date **31/10/2018**

FIGURE 3

G:\61\3574951\GIS\Maps\Working\613574951_003_Fig3VegCondition_Rev0.mxd
Print date: 12 Dec 2018 - 10:32

Data source: GHD: Quadrats, Esperance Power Station Area, Vegetation Condition - 20181031; Landgate: Imagery (April 2018), Roads, Cadastre - 20181105. Created by: bjones2

Appendix B – Relevant legislation, conservation codes and background information

Relevant legislation

Federal *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Federal Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as Matters of National Environmental Significance (MNES).

The biological aspects listed as MNES include:

- Nationally threatened flora and fauna species and ecological communities
- Migratory species

A person must not undertake an action that has, will have, or is likely to have a significant impact (direct or indirect) on MNES, without approval from the Federal Minister for the Environment.

The EPBC Act is administered by the Department of the Environment and Energy (DEE).

State *Environmental Protection Act 1986*

The *Environmental Protection Act 1986* (EP Act) is the primary legislative Act dealing with the protection of the environment in Western Australia. The Act allows the Environmental Protection Authority (EPA), to prevent, control and abate pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with the foregoing. Part IV of the EP Act is administered by the EPA and makes provisions for the EPA to undertake environmental impact assessment of significant proposals, strategic proposals and land use planning schemes.

The Department of Water and Environment Regulation (DWER) is responsible for administering the clearing provisions of the EP Act (Part V). Clearing of native vegetation in Western Australia requires a permit from the DWER, unless exemptions apply. Applications for clearing permits are assessed by the Department and decisions are made to grant or refuse the application in accordance with the Act. When making a decision the assessment considers clearing against the ten clearing principles as specified in Schedule 5 of the EP Act:

a) Native vegetation should not be cleared if it comprises a high level of biodiversity.

b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significance habitat for fauna indigenous to Western Australia.

c) Native vegetation should not be cleared if it includes, or is necessary, for the continued existence of rare flora.

d) Native vegetation should not be cleared if it comprises the whole or part of native vegetation in an area that has been extensively cleared.

e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

g) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

h) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.

Exemptions for clearing include clearing that is a requirement of a written law or authorised under certain statutory processes (listed in Schedule 6 of the EP Act) and exemptions for prescribed low impact day-to-day activities (prescribed in the Environmental Protection (Clearing of Native Vegetation) Regulations 2004); these exemptions do not apply in environmentally sensitive areas (ESAs).

State *Biodiversity and Conservation Act 2016*

The Biodiversity Conservation Bill 2015 was introduced to State Parliament in November 2015, and passed in September 2016. The Bill became the *Biodiversity Conservation Act 2016* (BC Act) upon receiving Assent on 21 September 2016. The BC Act will eventually fully replace both the *Wildlife Conservation Act 1950* (WC Act) and the *Sandalwood Act 1929* (Sandalwood Act).

Several parts of the BC Act were proclaimed by the State Governor in the Government Gazette and came into effect on 3 December 2016. However, provisions that replace those existing under the WC Act and Sandalwood Act (including threatened species listings and controls over the taking and keeping of native species) and their associated Regulations cannot be brought into effect until the necessary Biodiversity Conservation Regulations have been made.

State *Wildlife Conservation Act 1950*

The WC Act provides for the conservation and protection of wildlife. It is administered by the Department of Biodiversity, Conservation and Attractions (DBCA) and applies to both flora and fauna. Any person wanting to capture, collect, disturb or study fauna requires a permit to do so. A permit is required under the WC Act if removal of threatened species is required.

State *Biosecurity and Agriculture Management Act 2007*

The *Biosecurity and Agriculture Management Act 2007* (BAM Act) and associated regulations are administered by the Department of Primary Industries and Regional Development (DPIRD) and replace the repealed *Agriculture and Related Resources Protection Act 1976.* The main purposes of the BAM Act and its regulations are to:

- Prevent new animal and plant pests (vermin and weeds) and diseases from entering WA
- Manage the impact and spread of those pests already present in the state
- Safely manage the use of agricultural and veterinary chemicals
- Increased control over the sale of agricultural products that contain violative chemical residues

The Western Australian Organism List (WAOL) provides the status of organisms which have been categorised under the BAM Act. A Declared Pest is a prohibited organism or an organism for which a declaration under Section 22(2) of the Act is in force. Declared Pests may be assigned a control category including: C1 (exclusion), C2 (eradication) and C3 (management). The category may apply to the whole of the State, LGAs, districts, individual properties or even paddocks, and all landholders are obliged to comply with the specific category of control. Categories of control are defined below.

DPIRD Categories for Declared Pests under the BAM Act

Control class code	Description
C1 (Exclusion)	Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2 (Eradication)	Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3 (Management)	Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

Background information

Vegetation extent and status

The National Objectives and Targets for Biodiversity Conservation 2001–2005 (Commonwealth of Australia 2001) recognise that the retention of 30 percent or more of the pre-clearing extent of each ecological community is necessary if Australia's biological diversity is to be protected. This is the threshold level below which species loss appears to accelerate exponentially and loss below this level should not be permitted. This level of recognition is in keeping with the targets recommended in the review of the National Strategy for the Conservation of Australia's Biological Diversity (ANZECC 2000).

The extent of remnant native vegetation in WA has been assessed by Shepherd et al. (2002) and the GoWA (2018), based on broadscale vegetation association mapping by Beard (various publications). The GoWA produces Statewide Vegetation Statistics Reports that are used for a number of purposes including conservation planning, land use planning and when assessing development applications. The reports are updated at least every two years.

Vegetation condition

The vegetation condition can be assessed in accordance with the vegetation condition rating scale for the South West and Interzone Botanical Provinces (EPA 2016a). The scale recognises the intactness of vegetation and consists of six rating levels as outlined below.

Vegetation condition rating scale for the South West and Interzone Botanical Provinces

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

Conservation codes

Species of significant flora, fauna and communities are protected under both Federal and State Acts. The Federal EPBC Act provides a legal framework to protect and manage nationally important flora and communities. The State WC Act is the primary wildlife conservation legislation in Western Australia. Information on the conservation codes is summarised in the following sections.

Ecological communities

Conservation significant communities

Ecological communities are defined as naturally occurring biological assemblages that occur in a particular type of habitat (English and Blyth 1997). Federally listed Threatened Ecological Communities (TECs) are protected under the EPBC Act. The DBCA also maintains a list of TECs for Western Australia; some of which are also protected under the EPBC Act. TECs are ecological communities that have been assessed and assigned to one of four categories related to the status of the threat to the community, i.e. Presumed Totally Destroyed, Critically Endangered, Endangered and Vulnerable.

Possible TECs that do not meet survey criteria are added to the DBCA Priority Ecological Community (PEC) List under Priorities 1, 2 and 3. These are ecological communities that are adequately known; are rare but not threatened, or meet criteria for Near Threatened. PECs that have been recently removed from the threatened list are placed in Priority 4. These ecological communities require regular monitoring. Conservation dependent ecological communities are placed in Priority 5. PECs are not listed under any formal Federal or State legislation, however, may be listed as TECs under the EPBC Act.

Conservation codes and definitions for TECs listed under the EPBC Act or endorsed by the WA Minister for the Environment

Categories	Definition
Federal Government Conservation Categories (EPBC Act)	
Critically Endangered (CR)	An ecological community if, at that time, is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000)
Endangered (EN)	An ecological community if, at that time: A) is not critically endangered; and B) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000)
Vulnerable (VU)	An ecological community if, at that time: A) is not critically endangered or endangered; and B) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000)
Western Australia Conservation Categories	
Presumed Totally Destroyed (PD)	An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.

Categories	Definition
Critically Endangered (CR)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.
Endangered (EN)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.
Vulnerable (VU)	An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

Conservation categories and definitions for PECS as listed by the DBCA

Category	Description
Priority 1	Poorly known ecological communities. Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤100 ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
Priority 2	Poorly known ecological communities. Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200 ha). At least some occurrences are not believed to be under immediate threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
Priority 3	Poorly known ecological communities. (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; (iii) communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

Category	Description
Priority 4	Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring. (i) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands. (ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (iii) Ecological communities that have been removed from the list of threatened communities during the past five years.
Priority 5	Conservation Dependent ecological communities. Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Other significant vegetation

Vegetation may be significant for a range of reasons other than a statutory listing. The EPA (2016b) states that significant vegetation may include vegetation that includes the following:

- Restricted distribution
- Degree of historical impact from threatening processes
- Local endemism in restricted habitats
- Novel combinations of taxa
- A role as a refuge
- A role as a key habitat for Threatened species or large population representing a significant proportion of the local to regional total population of a species
- Being representative of a vegetation unit in ‘pristine’ condition in a highly cleared landscape, recently discovered range extensions, or isolated outliers of the main range)
- Being poorly reserved

This may apply at a number of levels, so the unit may be significant when considered at the fine-scale (intra-locality), intermediate-scale (locality or inter-locality) or broad-scale (local to region).

Flora and fauna

Conservation significant flora and fauna

Species of significant flora are protected under both Federal and State legislation. Any activities that are deemed to have a significant impact on species that are recognised by the EPBC Act, and/or the WC Act can warrant referral to the DEE and/or the EPA.

The Federal conservation level of flora and fauna species and their significance status is assessed under the EPBC Act. The significance levels for fauna used in the EPBC Act are those recommended by the International Union for Conservation of Nature (IUCN).

The EPBC Act also protects land and migratory species that are listed under International Agreements. The list of migratory species established under section 209 of the EPBC Act comprises:

- Migratory species which are native to Australia and are included in the appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals Appendices I and II)
- Migratory species included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China–Australia Migratory Bird Agreement (CAMBA)
- Native, migratory species identified in a list established under, or an instrument made under, an international agreement approved by the Minister, such as the republic of Korea–Australia Migratory Bird Agreement (ROKAMBA)

The State conservation level of Threatened flora and fauna has been published as Specially Protected under the WC Act, and listed under Schedules 1 to 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2015 for Threatened Fauna and under Schedules 1 to 4 of the Wildlife Conservation (Rare Flora) Notice 2015 for Threatened (Declared Rare) Flora. The schedules align with the categories of the EPBC Act Threatened Fauna and Threatened Flora Lists. Threatened species are those are species which have been adequately searched for and are deemed to be, in the wild, either rare, under identifiable threat of extinction, or otherwise in need of special protection, and have been gazetted as such.

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation 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 species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

For the purposes of this assessment, all species listed under the EPBC Act, WC Act and DBCA Priority species are considered conservation significant.

Conservation categories and definitions for EPBC Act listed flora and fauna species

Conservation category	Definition
Extinct	There is no reasonable doubt that the last member of the species has died.
Extinct in the Wild	A) A species known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or B) A species that 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 species facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000).
Endangered	A) A species not critically endangered; and B) A species facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.

Conservation category	Definition
Vulnerable	A) A species not critically endangered or endangered; and B) A species facing a high risk of extinction in the wild in the medium-term, as determined in accordance with the prescribed criteria.
Conservation Dependent	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: (i) the species is a species of fish; (ii) the species is the focus of a plan of management that Section 180 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; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; (iv) cessation of the plan of management would adversely affect the conservation status of the species.

Conservation codes and descriptions for WC Act listed flora and fauna species

Conservation category	Schedule and definition
Threatened species (T)	Published as Specially Protected under the WC Act, and listed under Schedules 1 to 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora. **Threatened fauna** is that subset of 'Specially Protected Fauna' declared to be 'likely to become extinct' pursuant to section 14(4) of the WC Act. **Threatened flora** is flora that has been declared to be 'likely to become extinct or is rare, or otherwise in need of special protection', pursuant to section 23F(2) of the WC Act.
Critically Endangered (CR)	Schedule 1: Threatened species considered to be facing an extremely high risk of extinction in the wild.
Endangered (EN)	Schedule 2: Threatened species considered to be facing a very high risk of extinction in the wild.
Vulnerable (VU)	Schedule 3: Threatened species considered to be facing a high risk of extinction in the wild.
Presumed Extinct (EX)	Schedule 4: Species which have been adequately searched for and there is no reasonable doubt that the last individual has died.
International Agreement (IA)	Schedule 5: Migratory birds protected under an international agreement
Conservation Dependent (CD)	Schedule 6: Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
Other Specially Protected (OS)	Schedule 7: Fauna otherwise in need of special protection to ensure their conservation.

Conservation codes for DBCA listed Priority flora and fauna

Priority category	Definition
Priority 1	Poorly-known taxa 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.
Priority 2	Poorly-known taxa 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.
Priority 3	Poorly-known taxa Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
Priority 4	Rare, Near Threatened and other taxa in need of monitoring A. Rare: Taxa that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands. B. Near Threatened. Taxa that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. C. Taxa that have been removed from the list of threatened taxa during the past five years for reasons other than taxonomy.

Other significant flora

Flora species, subspecies, varieties, hybrids and ecotypes may be significant for a range of reasons, other than a statutory listing. The EPA (2016b) states that significant flora may include taxa that have:

- A keystone role in a particular habitat for threatened or Priority flora or fauna species, or large populations representing a considerable proportion of the local or regional total population of a species
- Relictual status, being representation of taxonomic or physiognomic groups that no longer occur widely in the broader landscape
- Anomalous features that indicate a potential new discovery
- Being representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)

- The presence of restricted subspecies, varieties, or naturally occurring hybrids
- Local endemism (a restricted distribution) or association with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems)
- Being poorly reserved

Other significant fauna

Fauna species may be significant for a range of reasons other than those protected by international agreement or treaty, Specially Protected or Priority Fauna. Significant fauna may include short-range endemic species, species that have declining populations or declining distributions, species at the extremes of their range, or isolated outlying populations, or species which may be undescribed (EPA 2010).

Introduced plants (weeds)

Declared Pests

Information on species considered to be Declared Pests is provided under *State Biosecurity and Agriculture Management Act 2007.*

Weeds of National Significance

The spread of weeds across a range of land uses or ecosystems is important in the context of socio-economic and environmental values. The assessment of Weeds of National Significance (WoNS) is based on four major criteria:

- Invasiveness
- Impacts
- Potential for spread
- Socio-economic and environmental values

Australian state and territory governments have identified thirty-two Weeds of National Significance (WoNS); a list of 20 WoNS was endorsed in 1999 and a further 12 were added in 2012.

References

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EPA 2010, *Technical Guide – Terrestrial Fauna Surveys*, EPA, Perth, WA.

EPA 2016a, *Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment*, EPA, Perth, WA.

EPA 2016b, *Environmental Factor Guideline - Flora and Vegetation*, EPA, Perth, WA.

GoWA 2018, *Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full report)*, Current as of December 2017, Perth Western Australia, Department of Environment and Conservation, retrieved November 2018 from https://www2.landgate.wa.gov.au/web/guest/downloader.

Shepherd, DP, Beeston, GR & Hopkins, AJM 2002, *Native Vegetation in Western Australia – Extent, Type and Status, Resource Management Technical Report 249*, Perth, Department of Agriculture.

Appendix C – Database Searches Results

EPBC Act Protected Matters Search Tool (5 km buffer)

Naturemap flora and fauna searches (5 km buffer)

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

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

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

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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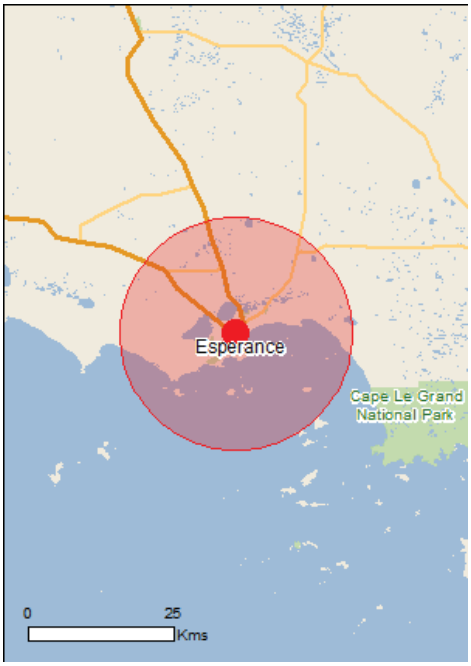
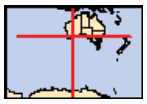


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 20.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	43
Listed Migratory Species:	50

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	82
Whales and Other Cetaceans:	14
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	13
Regional Forest Agreements:	None
Invasive Species:	14
Nationally Important Wetlands:	2
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Lake warden system	Within Ramsar site

Listed Threatened Ecological Communities [Resource Information]

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

Name	Status	Type of Presence
Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia	Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Cereopsis novaehollandiae grisea Cape Barren Goose (south-western), Recherche Cape Barren Goose [25978]	Vulnerable	Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Status	Type of Presence
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Mammals		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat may occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat likely to occur within area
Plants		
Anigozanthos bicolor subsp. minor Little Kangaroo Paw, Two-coloured Kangaroo Paw, Small Two-colour Kangaroo Paw [21241]	Endangered	Species or species habitat likely to occur within area
Eucalyptus insularis Twin Peak Island Mallee [3057]	Endangered	Species or species habitat likely to occur within area
Kennedia glabrata Northcliffe Kennedia [16452]	Vulnerable	Species or species habitat likely to occur within area
Lambertia echinata subsp. echinata Prickly Honeysuckle [56729]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Sharks		
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

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

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Breeding known to occur within area

Name	Threatened	Type of Presence
Ardenna tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Hydroprogne caspia Caspian Tern [808]		Breeding known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Onychoprion anaethetus Bridled Tern [82845]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Breeding known to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land -

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Cereopsis novaehollandiae grisea Cape Barren Goose (south-western), Recherche Cape Barren Goose [25978]	Vulnerable	Breeding known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Roosting known to occur within area
Himantopus himantopus Black-winged Stilt [870]		Species or species habitat known to occur within area
Larus novaehollandiae Silver Gull [810]		Breeding known to occur within area
Larus pacificus Pacific Gull [811]		Breeding known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Pelagodroma marina White-faced Storm-Petrel [1016]		Breeding known to occur within area
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Breeding known to occur within area
Pterodroma macroptera Great-winged Petrel [1035]		Breeding likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Puffinus assimilis Little Shearwater [59363]		Breeding known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Breeding known to occur within area

Name	Threatened	Type of Presence
Puffinus tenuirostris Short-tailed Shearwater [1029]		Breeding known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area
Sterna anaethetus Bridled Tern [814]		Foraging, feeding or related behaviour likely to occur within area
Sterna caspia Caspian Tern [59467]		Breeding known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Breeding known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Fish		
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stigmatopora olivacea a pipefish [74966]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat likely to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding likely to occur within area

Name	Threatened	Type of Presence
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area

Whales and other Cetaceans [Resource Information]

Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Esperance 827 and Part 373 & 826	WA
Helms Arboretum	WA
Lake Warden	WA
Mullet Lake	WA
Recherche Archipelago	WA
Shark Lake	WA
Unnamed WA04182	WA
Unnamed WA24511	WA
Unnamed WA24953	WA
Unnamed WA32259	WA
Unnamed WA42379	WA
Woody Island	WA
Woody Lake	WA

Invasive Species [Resource Information]

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

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area

Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area

Nationally Important Wetlands [Resource Information]

Name	State
Lake Warden System	WA
Pink Lake	WA

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-33.84682 121.88311

Acknowledgements

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

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

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

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

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NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report_Flora 5km

Created By Guest user on 19/11/2018

Current Names Only Yes
Core Datasets Only Yes
Species Group All Plants
Method 'By Circle'
Centre 121° 52' 57" E,33° 50' 49" S
Buffer 5km
Group By Family

Family	Species	Records
Aizoaceae	3	3
Amaranthaceae	1	1
Anarthriaceae	3	3
Apiaceae	3	12
Apocynaceae	1	2
Araliaceae	2	4
Areschougiaceae	1	2
Asparagaceae	10	28
Asphodelaceae	1	1
Asteraceae	29	41
Bonnemaisoniaceae	1	1
Boraginaceae	3	6
Brassicaceae	15	25
Bryaceae	2	2
Callithamniaceae	1	1
Campanulaceae	2	2
Caprifoliaceae	1	1
Casuarinaceae	1	1
Caulerpaceae	3	4
Centrolepidaceae	1	1
Ceramiaceae	4	8
Chenopodiaceae	8	11
Cladophoraceae	1	1
Codiaceae	2	3
Corallinaceae	2	2
Crassulaceae	2	2
Cupressaceae	3	14
Cymodoceaceae	1	1
Cyperaceae	13	13
Cystocloniaceae	2	2
Dasyaceae	6	10
Delesseriaceae	1	2
Dicranaceae	2	3
Dilleniaceae	3	8
Ditrichaceae	1	1
Droseraceae	6	6
Ericaceae	20	35
Euphorbiaceae	5	19
Fabaceae	62	153
Faucheaceae	1	1
Frankeniaceae	2	2
Geraniaceae	1	3
Goodeniaceae	13	28
Grimmiaceae	1	1
Gyrostemonaceae	2	7
Haemodoraceae	3	7
Haloragaceae	2	7
Halymeniaceae	2	2
Hemerocallidaceae	3	3
Hydrocharitaceae	1	1
Hymenocladiaceae	1	1
Iridaceae	4	4
Juncaceae	1	2
Juncaginaceae	2	2
Kallymeniaceae	1	1
Lamiaceae	4	9
Lauraceae	1	1
Lentibulariaceae	1	1
Liagoraceae	1	1
Loganiaceae	4	26
Malvaceae	5	17
Menyanthaceae	1	1
Mychodeaceae	3	7
Myrtaceae	80	193
Nitrariaceae	1	1
Olacaceae	1	2
Onagraceae	2	2
Orchidaceae	32	43
Orobanchaceae	1	1
Papaveraceae	1	1
Phyllanthaceae	2	11
Pittosporaceae	4	7
Plocamiaceae	2	8
Poaceae	21	31
Polygalaceae	2	4

Polygonaceae	3	4
Posidoniaceae	5	9
Potamogetonaceae	1	1
Pottiaceae	3	6
Primulaceae	1	1
Proteaceae	34	82
Ranunculaceae	2	11
Restionaceae	2	3
Rhamnaceae	6	22
Rhodomelaceae	16	23
Rhodymeniaceae	2	2
Rosaceae	1	1
Rubiaceae	3	5
Rutaceae	7	17
Santalaceae	2	2
Sapindaceae	2	5
Scrophulariaceae	5	9
Sematophyllaceae	1	1
Solanaceae	5	12
Stylidiaceae	7	13
Thymelaeaceae	6	25
Urticaceae	1	1
Wrangeliaceae	2	5
Zygophyllaceae	1	4
TOTAL	**555**	**1138**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Aizoaceae					
1.	2796	*Carpobrotus modestus (Inland Pigface)*			
2.	2798	*Carpobrotus virescens (Coastal Pigface, Kolboko, Bain)*			
3.	2813	*Mesembryanthemum crystallinum (Iceplant)*	Y		
Amaranthaceae					
4.	2655	*Amaranthus albus (Tumbleweed)*	Y		
Anarthriaceae					
5.	1059	*Anarthria humilis*			
6.	1060	*Anarthria laevis*			
7.	13773	*Hopkinsia adscendens*		P3	
Apiaceae					
8.	6218	*Daucus glochidiatus (Australian Carrot)*			
9.	6249	*Platysace compressa (Tapeworm Plant)*			
10.	6289	*Xanthosia huegelii*			
Apocynaceae					
11.	6587	*Gomphocarpus fruticosus (Narrowleaf Cottonbush)*	Y		
Araliaceae					
12.	6234	*Hydrocotyle medicaginoides (Trefoil Pennywort)*			
13.	6280	*Trachymene pilosa (Native Parsnip)*			
Areschougiaceae					
14.	27211	*Rhabdonia coccinea*			
Asparagaceae					
15.	1301	*Laxmannia brachyphylla (Stilted Paper-lily)*			
16.	1224	*Lomandra collina (Pale Mat Rush)*			
17.	1233	*Lomandra mucronata*			
18.	1241	*Lomandra rigida (Stiff Mat Rush)*			
19.	1328	*Thysanotus dichotomus (Branching Fringe Lily)*			
20.	1338	*Thysanotus manglesianus (Fringed Lily)*			
21.	1341	*Thysanotus nudicaulis*			
22.	1343	*Thysanotus patersonii*			
23.	1351	*Thysanotus sparteus*			
24.	16992	*Yucca aloifolia*	Y		
Asphodelaceae					
25.	1364	*Asphodelus fistulosus (Onion Weed)*	Y		
Asteraceae					
26.	7812	*Achillea millefolium (Yarrow, Milfoil)*	Y		
27.	7838	*Arctotheca calendula (Cape Weed, African Marigold)*	Y		
28.	13329	*Argentipallium tephrodes*			
29.	7850	*Asteridea nivea*			
30.	7871	*Brachyscome ciliaris*			
31.	7925	*Chondrilla juncea (Skeleton Weed)*	Y		
32.	7937	*Cirsium vulgare (Spear Thistle, Scotch Thistle)*	Y		
33.	7939	*Conyza bonariensis (Flaxleaf Fleabane)*	Y		
34.		*Conyza sp.*			
35.	20074	*Conyza sumatrensis*	Y		
36.	7943	*Cotula australis (Common Cotula)*			
37.	7961	*Dittrichia graveolens (Stinkwort)*	Y		
38.	16311	*Gazania linearis*	Y		
39.	8008	*Helianthus annuus (Sunflower, Common Sunflower)*	Y		
40.	8099	*Leontodon saxatilis (Hairy Hawkbit)*	Y		
41.	16449	*Leucophyta brownii*			
42.	29418	*Monoculus monstrosus*	Y		
43.	8127	*Olearia axillaris (Coastal Daisybush)*			
44.	8137	*Olearia imbricata (Imbricate Daisy Bush)*			
45.	20661	*Oncosiphon suffruticosum (Calomba Daisy)*	Y		
46.	12645	*Ozothamnus lepidophyllus*			
47.	8182	*Podotheca angustifolia (Sticky Longheads)*			
48.	13300	*Rhodanthe citrina*			
49.	8207	*Senecio glossanthus (Slender Groundsel)*			
50.	8216	*Senecio picridioides*			
51.	25882	*Senecio pinnatifolius var. maritimus (Coastal Groundsel)*			
52.	25883	*Senecio pinnatifolius var. pinnatifolius*			
53.	45036	*Solidago chilensis*	Y		

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
54.	8266	*Vittadinia gracilis*			
Bonnemaisoniaceae					
55.	26485	*Asparagopsis armata*			
Boraginaceae					
56.	6680	*Cynoglossum australe (Australian Hound's-tongue)*			
57.	6684	*Halgania andromedifolia*			
58.	6710	*Heliotropium europaeum (Common Heliotrope)*	Y		
Brassicaceae					
59.	11187	*Brassica barrelieri subsp. oxyrrhina (Smooth-stem Turnip)*	Y		
60.	2999	*Brassica rapa*	Y		
61.	3000	*Brassica tournefortii (Mediterranean Turnip)*	Y		
62.	2995	*Brassica x napus*	Y		
63.	3001	*Cakile edentula (American Sea Rocket)*	Y		
64.	3002	*Cakile maritima (Sea Rocket)*	Y		
65.	3008	*Carrichtera annua (Ward's Weed)*	Y		
66.	3018	*Lepidium africanum (Rubble Peppercress)*	Y		
67.	3021	*Lepidium bonariense (Peppercress)*	Y		
68.	3026	*Lepidium fasciculatum (Bundled Peppercress)*		P3	
69.	3044	*Lepidium rotundum (Veined Peppercress)*			
70.	3048	*Lobularia maritima (Sweet Alyssum)*	Y		
71.	3061	*Raphanus raphanistrum (Wild Radish)*	Y		
72.	3063	*Rapistrum rugosum (Turnip Weed)*	Y		
73.	3072	*Sisymbrium orientale (Indian Hedge Mustard)*	Y		
Bryaceae					
74.	32426	*Rosulabryum campylothecium*			
75.	32429	*Rosulabryum torquescens*			
Callithamniaceae					
76.	27204	*Ptilocladia vestita*			
Campanulaceae					
77.	7403	*Lobelia heterophylla (Wing-seeded Lobelia)*			
78.	7389	*Wahlenbergia preissii*			
Caprifoliaceae					
79.	35322	*Centranthus ruber subsp. ruber*	Y		
Casuarinaceae					
80.	1739	*Allocasuarina thuyoides (Horned Sheoak)*			
Caulerpaceae					
81.	26563	*Caulerpa flexilis*			
82.	26570	*Caulerpa obscura*			
83.	26573	*Caulerpa racemosa*			
Centrolepidaceae					
84.	1121	*Centrolepis aristata (Pointed Centrolepis)*			
Ceramiaceae					
85.	26599	*Ceramium puberulum*			
86.	26830	*Euptilota articulata*			
87.	27053	*Macrothamnion pellucidum*			
88.	27364	*Wollastoniella myriophylloides*			
Chenopodiaceae					
89.	2475	*Atriplex semibaccata (Berry Saltbush)*			
90.	2490	*Chenopodium glaucum (Glaucous Goosefoot)*	Y		
91.	2494	*Chenopodium murale (Nettle-leaf Goosefoot)*	Y		
92.	33501	*Dysphania cristata (Crested Goosefoot)*			
93.	33480	*Dysphania pumilio (Clammy Goosefoot)*			
94.	2542	*Maireana erioclada*			
95.	2578	*Rhagodia baccata (Berry Saltbush)*			
96.	2640	*Suaeda baccifera*	Y		
Cladophoraceae					
97.	26607	*Chaetomorpha aerea*			
Codiaceae					
98.	26672	*Codium galeatum*			
99.	26678	*Codium muelleri*			
Corallinaceae					
100.	27069	*Metagoniolithon stelliferum*			
101.	27070	*Metamastophora flabellata*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Crassulaceae					
102.	20331	*Aeonium arboreum*	Y		
103.	3136	*Crassula alata*	Y		
Cupressaceae					
104.	93	*Callitris drummondii (Drummond's Cypress Pine)*			
105.	96	*Callitris preissii (Rottnest Island Pine, Maro)*			
106.	97	*Callitris roei (Roe's Cypress Pine)*			
Cymodoceaceae					
107.	126	*Amphibolis antarctica (Sea Nymph)*			
Cyperaceae					
108.	749	*Bolboschoenus caldwellii (Marsh Club-rush)*			
109.	43241	*Carex thecata*			
110.	783	*Cyperus congestus (Dense Flat-sedge)*	Y		
111.	831	*Eleocharis sphacelata (Tall Spikerush, Djabren)*			
112.	20216	*Ficinia nodosa (Knotted Club Rush)*			
113.	899	*Gahnia ancistrophylla (Hooked-leaf Saw Sedge)*			
114.	16249	*Gahnia sp. Headland (G.J. Keighery 8501)*			
115.	907	*Gahnia trifida (Coast Saw-sedge)*			
116.	939	*Lepidosperma pruinosum*			
117.		*Lepidosperma sp.*			
118.	945	*Lepidosperma squamatum*			
119.	1004	*Schoenus nitens (Shiny Bog-rush)*			
120.	1037	*Tricostularia compressa*			
Cystocloniaceae					
121.	26971	*Hypnea ramentacea*			
122.	26973	*Hypnea valentiae*			
Dasyaceae					
123.	26734	*Dasya clavigera*			
124.	26739	*Dasya extensa*			
125.	26936	*Heterosiphonia muelleri*			
126.	26938	*Heterosiphonia wrangelioides*			
127.	27330	*Thuretia australasica*			
128.	27331	*Thuretia quercifolia*			
Delesseriaceae					
129.	27150	*Platysiphonia victoriae*			
Dicranaceae					
130.	32461	*Campylopus bicolor var. bicolor*			
131.	32338	*Campylopus introflexus*	Y		
Dilleniaceae					
132.	5110	*Hibbertia andrewsiana*			
133.	5117	*Hibbertia cuneiformis (Cutleaf Hibbertia)*			
134.	5162	*Hibbertia racemosa (Stalked Guinea Flower)*			
Ditrichaceae					
135.	32351	*Eccremidium pulchellum*			
Droseraceae					
136.	48726	*Drosera australis*			
137.	14298	*Drosera macrantha subsp. macrantha*			
138.	11768	*Drosera neesii subsp. neesii*			
139.	3114	*Drosera nitidula (Shining Sundew)*			
140.	3130	*Drosera scorpioides (Shaggy Sundew)*			
141.	48708	*Drosera trichocaulis*			
Ericaceae					
142.	6295	*Acrotriche cordata (Coast Ground Berry)*			
143.	6316	*Andersonia macranthera*			
144.	6318	*Andersonia parvifolia*			
145.	29108	*Andersonia sp. Kulin (J.M. Powell 2588)*			
146.	6321	*Andersonia sprengelioides*			
147.	6326	*Astroloma epacridis*			
148.	41742	*Astroloma sp. Narrogin (R.D. Royce 8158)*			
149.	30138	*Brachyloma geissoloma*			
150.	38260	*Dielsiodoxa oligarrhenoides*			
151.	6368	*Leucopogon carinatus*			
152.	44222	*Leucopogon corymbiformis*		P2	
153.	40940	*Leucopogon obovatus subsp. obovatus*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
154.	6419	*Leucopogon obtusatus*			
155.	6427	*Leucopogon parviflorus (Coast Beard-heath)*			
156.	6442	*Leucopogon rotundifolius*		P3	
157.	34163	*Leucopogon sp. Newdegate (M. Hislop 3585)*			
158.	20647	*Lissanthe rubicunda*			
159.	34736	*Lysinema pentapetalum*			
160.	6465	*Oligarrhena micrantha*			
161.	48618	*Styphelia sp. South Coast (J.M. Powell 3374)*			
Euphorbiaceae					
162.	4582	*Adriana quadripartita (Bitter Bush)*			
163.	4636	*Euphorbia paralias (Sea Spurge)*	Y		
164.	4643	*Euphorbia segetalis (Shortstemmed Carnation Weed)*	Y		Y
165.	4648	*Euphorbia terracina (Geraldton Carnation Weed)*	Y		
166.	31911	*Ricinocarpos megalocarpus*			
Fabaceae					
167.	14608	*Acacia aemula subsp. aemula*			
168.	3262	*Acacia cochlearis (Rigid Wattle)*			
169.	3277	*Acacia crispula*			
170.	12672	*Acacia cupularis*			
171.	3282	*Acacia cyclops (Coastal Wattle)*			
172.	3296	*Acacia dermatophylla*			
173.	3353	*Acacia gonophylla*			
174.	3453	*Acacia myrtifolia*			
175.	3457	*Acacia nigricans*			
176.	16138	*Acacia pachyphylla*			
177.	16141	*Acacia pravifolia*			
178.	3498	*Acacia pritzeliana*			
179.	15482	*Acacia pulchella var. goadbyi*			
180.	3525	*Acacia rostellifera (Summer-scented Wattle)*			
181.	3527	*Acacia saligna (Orange Wattle, Kudjong)*			
182.	30032	*Acacia saligna subsp. saligna*			
183.	3564	*Acacia subcaerulea*			
184.	3582	*Acacia triptycha*			
185.	19627	*Aotus sp. Esperance (P.G. Wilson 7904)*			
186.	3716	*Bossiaea preissii*			
187.	10861	*Callistachys lanceolata (Wonnich)*			
188.	13112	*Chorizema aciculare subsp. aciculare*			
189.	3759	*Chorizema nervosum*			
190.	13108	*Chorizema obtusifolium*			
191.	3763	*Chorizema uncinatum*			
192.	16736	*Daviesia apiculata*			
193.	15507	*Daviesia incrassata subsp. reversifolia*			
194.	3867	*Dipogon lignosus (Dolichos Pea)*	Y		
195.	37740	*Eutaxia inuncta*			
196.	20214	*Eutaxia myrtifolia*			
197.	3879	*Eutaxia parvifolia*			
198.	11044	*Gastrolobium heterophyllum*			
199.	20453	*Gastrolobium latifolium*			
200.	19725	*Gastrolobium musaceum*			
201.	10981	*Gastrolobium parviflorum*			
202.	3924	*Gastrolobium spinosum (Prickly Poison)*			
203.	3946	*Gompholobium baxteri*			
204.	10909	*Gompholobium confertum*			
205.	3954	*Gompholobium polymorphum*			
206.	3992	*Isotropis cuneifolia (Granny Bonnets)*			
207.	3993	*Isotropis drummondii (Lamb Poison)*			
208.	4002	*Jacksonia capitata*			
209.	4028	*Jacksonia spinosa*			
210.	14777	*Jacksonia viscosa*			
211.	4037	*Kennedia coccinea (Coral Vine)*			
212.	4044	*Kennedia prostrata (Scarlet Runner)*			
213.	11528	*Labichea lanceolata subsp. brevifolia*			
214.	4079	*Medicago polymorpha (Burr Medic)*	Y		
215.	4080	*Medicago sativa (Alfalfa)*	Y		
216.	4084	*Melilotus albus*	Y		
217.	4085	*Melilotus indicus*	Y		
218.	4090	*Mirbelia dilatata (Holly-leaved Mirbelia)*			
219.	4096	*Mirbelia ovata*			
220.	4113	*Ornithopus compressus (Yellow Serradella)*	Y		

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
221.	4115	*Ornithopus sativus (French Serradella)*	Y		
222.	4172	*Pultenaea ericifolia*			
223.	28286	*Pultenaea heterochila*			
224.	4201	*Sphaerolobium daviesioides (Prickly Globe-pea)*			
225.	4206	*Sphaerolobium macranthum*			
226.	4256	*Templetonia retusa (Cockies Tongues)*			
227.	17542	*Trifolium arvense var. arvense*	Y		
228.	11474	*Vicia sativa subsp. nigra*	Y		
Faucheaceae					
229.	26860	*Gloiocladia halymenioides*			
Frankeniaceae					
230.	5209	*Frankenia pauciflora (Seaheath)*			
231.	5213	*Frankenia tetrapetala (Four Petaled Frankenia)*			
Geraniaceae					
232.	4343	*Pelargonium capitatum (Rose Pelargonium)*	Y		
Goodeniaceae					
233.	7418	*Coopernookia polygalacea*			
234.	7439	*Dampiera fasciculata (Bundled-leaf Dampiera)*			
235.	7461	*Dampiera parvifolia (Many-bracted Dampiera)*			
236.	7499	*Goodenia concinna (Elegant Goodenia)*			
237.	7503	*Goodenia decursiva*			
238.	7537	*Goodenia pterigosperma*			
239.	7575	*Lechenaultia formosa (Red Leschenaultia)*			
240.	7590	*Lechenaultia tubiflora (Heath Leschenaultia)*			
241.	7606	*Scaevola crassifolia (Thick-leaved Fan-flower)*			
242.	7607	*Scaevola cuneiformis (Wedge-leaved Scaevola)*			
243.	7614	*Scaevola globulifera*			
244.	13151	*Scaevola thesioides subsp. filifolia*			
245.	7665	*Velleia trinervis*			
Grimmiaceae					
246.	32386	*Grimmia laevigata*			
Gyrostemonaceae					
247.	2779	*Cypselocarpus haloragoides*			
248.	2787	*Gyrostemon sheathii*			
Haemodoraceae					
249.	1415	*Anigozanthos rufus (Red Kangaroo Paw)*			
250.	1424	*Conostylis bealiana*			
251.	1426	*Conostylis breviscapa*			
Haloragaceae					
252.	6143	*Glischrocaryon aureum (Common Popflower)*			
253.	6171	*Haloragis digyna*			
Halymeniaceae					
254.	26850	*Gelinaria ulvoidea*			
255.	48666	*Halymenia harveyana*			
Hemerocallidaceae					
256.	1315	*Stawellia gymnocephala*			
257.	1260	*Stypandra glauca (Blind Grass)*			
258.	1361	*Tricoryne elatior (Yellow Autumn Lily)*			
Hydrocharitaceae					
259.	161	*Halophila australis*			
Hymenocladiaceae					
260.	26962	*Hymenocladia dactyloides*			
Iridaceae					
261.	1513	*Chasmanthe floribunda (African Cornflag)*	Y		
262.	1518	*Gladiolus angustus (Long Tubed Painted Lady)*	Y		
263.	19669	*Patersonia lanata forma lanata*			
264.	1550	*Patersonia occidentalis (Purple Flag, Koma)*			
Juncaceae					
265.	11922	*Juncus kraussii subsp. australiensis*			
Juncaginaceae					
266.	33276	*Triglochin isingiana*			
267.	146	*Triglochin minutissima*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Kallymeniaceae					
268.	26538	*Callophyllis rangiferina*			
Lamiaceae					
269.	6902	*Microcorys subcanescens*			
270.	6804	*Pityrodia chrysocalyx*		P3	
271.	6928	*Salvia reflexa (Mintweed)*	Y		
272.	6939	*Westringia dampieri*			
Lauraceae					
273.	11242	*Cassytha racemosa forma pilosa*			
Lentibulariaceae					
274.	7145	*Utricularia menziesii (Redcoats)*			
Liagoraceae					
275.	27023	*Liagora harveyana*			
Loganiaceae					
276.	6507	*Logania fasciculata*			
277.	6509	*Logania micrantha*			
278.	6515	*Logania vaginalis (White Spray)*			
279.	46217	*Orianthera callosa*			
Malvaceae					
280.	40923	*Commersonia craurophylla (Brittle Leaved Rulingia)*			
281.	5011	*Guichenotia ledifolia*			
282.	5030	*Lasiopetalum discolor*			
283.	5047	*Lasiopetalum rosmarinifolium*			
284.	5096	*Thomasia quercifolia (Oak Leaved Thomasia)*		P4	
Menyanthaceae					
285.	36181	*Ornduffia parnassifolia*			
Mychodeaceae					
286.	27077	*Mychodea aciculare*			
287.	27079	*Mychodea carnosa*			
288.	27080	*Mychodea disticha*			
Myrtaceae					
289.	20330	*Agonis baxteri*			
290.	20347	*Astartea astarteoides*			
291.	5352	*Baeckea latens*			
292.	5383	*Beaufortia empetrifolia (South Coast Beaufortia)*			
293.	5391	*Beaufortia schaueri (Pink Beaufortia, Pink Bottlebrush)*			
294.	5407	*Calothamnus gibbosus*			
295.	5409	*Calothamnus gracilis*			
296.	35816	*Calothamnus quadrifidus subsp. quadrifidus*			
297.	5449	*Calytrix decandra (Pink Starflower)*			
298.	48451	*Calytrix hirta*			
299.	5465	*Calytrix leschenaultii*			
300.	5489	*Chamelaucium axillare (Esperance Waxflower)*			
301.	5491	*Chamelaucium ciliatum*			
302.	5495	*Chamelaucium megalopetalum (Large Waxflower)*			
303.	5500	*Conothamnus aureus*			
304.	43962	*Cyathostemon sp. Esperance (A. Fairall 2431)*		P1	
305.	5510	*Darwinia diosmoides*			
306.	5533	*Darwinia vestita (Pom-pom Darwinia)*			
307.	5550	*Eucalyptus angulosa (Ridge-fruited Mallee, Kwararl)*			
308.	5600	*Eucalyptus conglobata (Port Lincoln Mallee)*			
309.	20292	*Eucalyptus conglobata subsp. conglobata*			
310.	12870	*Eucalyptus densa*			
311.	15667	*Eucalyptus eremophila subsp. eremophila (Sand Mallee)*			
312.	12377	*Eucalyptus extensa*			
313.	5648	*Eucalyptus flocktoniae (Merrit, Merid)*			
314.	5675	*Eucalyptus incrassata (Lerp Mallee)*			
315.	14299	*Eucalyptus kessellii*			
316.	5695	*Eucalyptus leptocalyx (Hopetoun Mallee)*			
317.	5713	*Eucalyptus micranthera (Alexander River Mallee)*			
318.	5723	*Eucalyptus occidentalis (Flat-topped Yate, Moidj)*			
319.	12891	*Eucalyptus phaenophylla subsp. interjacens*			
320.	19666	*Eucalyptus phenax subsp. phenax*			
321.	5745	*Eucalyptus pileata (Capped Mallee)*			
322.	18551	*Eucalyptus platypus subsp. platypus*			
323.	16180	*Eucalyptus pleurocarpa*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
324.	13525	*Eucalyptus quadrans*			
325.	5767	*Eucalyptus salubris (Gimlet)*			
326.	10834	*Eucalyptus scyphocalyx (Goblet Mallee)*			
327.		*Eucalyptus sp.*			
328.	12889	*Eucalyptus tumida*			
329.	5796	*Eucalyptus uncinata (Hook-leaved Mallee)*			
330.	18085	*Eucalyptus utilis*			
331.	15808	*Eucalyptus valens*			
332.	8587	*Eucalyptus x erythrandra*			
333.	19661	*Eucalyptus x missilis*		P4	
334.	5839	*Kunzea preissiana*			
335.	5849	*Leptospermum incanum*			
336.	5851	*Leptospermum maxwellii*			
337.	5853	*Leptospermum oligandrum*			
338.	5856	*Leptospermum sericeum (Silver Teatree)*			
339.	5857	*Leptospermum spinescens*			
340.	5881	*Melaleuca brevifolia*			
341.	5885	*Melaleuca calycina*			
342.	5900	*Melaleuca cuticularis (Saltwater Paperbark)*			
343.	15603	*Melaleuca fulgens subsp. fulgens*			
344.	5913	*Melaleuca glaberrima*			
345.	13272	*Melaleuca incana subsp. tenella*			
346.	5922	*Melaleuca lanceolata (Rottnest Teatree, Moonah)*			
347.	5948	*Melaleuca pentagona*			
348.	11686	*Melaleuca pentagona var. latifolia*			
349.	15993	*Melaleuca pentagona var. pentagona*			
350.	19609	*Melaleuca plumea*			
351.	5955	*Melaleuca pulchella (Claw Flower)*			
352.	5961	*Melaleuca scabra (Rough Honeymyrtle, Wurru Bush)*			
353.	18165	*Melaleuca societatis*			
354.	5971	*Melaleuca striata*			
355.	5973	*Melaleuca suberosa (Corky Honeymyrtle)*			
356.	5980	*Melaleuca thymoides*			
357.	20543	*Micromyrtus elobata subsp. elobata*			
358.	34841	*Oxymyrrhine gracilis*			
359.	6007	*Phymatocarpus maxwellii*			
360.	20102	*Taxandria callistachys*			
361.	20134	*Taxandria marginata*			
362.	6065	*Thryptomene saxicola (Rock Thryptomene)*			
363.	15432	*Verticordia densiflora var. densiflora*			
364.	12432	*Verticordia inclusa*			
365.	6096	*Verticordia minutiflora*			
366.	12450	*Verticordia plumosa var. grandiflora*			
367.	14718	*Verticordia sieberi var. sieberi*			
368.	12470	*Verticordia vicinella*			
Nitrariaceae					
369.	4366	*Nitraria billardierei (Nitre Bush)*			
Olacaceae					
370.	2366	*Olax phyllanthi*			
Onagraceae					
371.	6138	*Oenothera drummondii (Beach Evening Primrose)*	Y		
372.	14292	*Oenothera stricta subsp. stricta*	Y		
Orchidaceae					
373.	1580	*Caladenia cairnsiana (Zebra Orchid)*			
374.	15343	*Caladenia decora*			
375.	1594	*Caladenia graminifolia*			
376.	15353	*Caladenia heberleana*			
377.	1599	*Caladenia latifolia (Pink Fairy Orchid)*			
378.	15362	*Caladenia longicauda subsp. crassa*			
379.	13860	*Caladenia longicauda subsp. rigidula*			
380.	1589	*Caladenia x ericksoniae*			
381.	1624	*Corybas despectans*			
382.	20717	*Cyanicula aperta*			
383.	10964	*Cyrtostylis robusta*			
384.	12941	*Diuris conspicillata*			
385.	42231	*Diuris decrementa*			
386.	33159	*Diuris immaculata*			Y
387.	1640	*Drakaea glyptodon (King-in-his-carriage)*			

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388.	1645	*Epiblema grandiflorum (Babe-in-a-cradle)*			
389.	15413	*Eriochilus dilatatus subsp. undulatus*			
390.	13866	*Eriochilus pulchellus*			
391.	34158	*Microtis alboviridis*			
392.	1658	*Microtis atrata (Swamp Mignonette Orchid)*			
393.	1667	*Paracaleana nigrita (Flying Duck Orchid)*			
394.	15425	*Prasophyllum calcicola*			
395.	1677	*Prasophyllum macrostachyum (Laughing Leek Orchid)*			
396.	17650	*Prasophyllum odoratissimum*			
397.	1682	*Prasophyllum sargentii*			
398.	1694	*Pterostylis rogersii (Curled-tongue Shell Orchid)*			
399.	10998	*Pterostylis turfosa (Bird Orchid)*			
400.	16367	*Pyrorchis nigricans (Red beaks, Elephants ears)*			
401.	1701	*Thelymitra antennifera (Vanilla Orchid)*			
402.	10856	*Thelymitra benthamiana (Leopard Orchid)*			
403.	11143	*Thelymitra graminea*			
404.	1716	*Thelymitra tigrina (Tiger Orchid)*			
Orobanchaceae					
405.	11271	*Euphrasia collina subsp. tetragona*			
Papaveraceae					
406.	2964	*Papaver hybridum (Rough Poppy)*	Y		
Phyllanthaceae					
407.	4675	*Phyllanthus calycinus (False Boronia)*			
408.	4685	*Phyllanthus scaber*			
Pittosporaceae					
409.	3154	*Billardiera coriacea*			
410.	25798	*Billardiera fusiformis (Australian Bluebell)*			
411.	25796	*Billardiera heterophylla (Australian Bluebell)*			
412.	19421	*Marianthus bicolor (Painted Marianthus)*			
Plocamiaceae					
413.	27156	*Plocamium mertensii*			
414.	27157	*Plocamium preissianum*			
Poaceae					
415.	13380	*Amphibromus nervosus*			
416.	17231	*Austrostipa acrociliata*			
417.	17236	*Austrostipa drummondii*			
418.	17240	*Austrostipa flavescens*			
419.	17241	*Austrostipa hemipogon*			
420.	17244	*Austrostipa macalpinei*			
421.	248	*Bromus catharticus (Prairie Grass)*	Y		
422.	349	*Ehrharta longiflora (Annual Veldt Grass)*	Y		
423.	11451	*Hemarthria uncinata var. uncinata*			
424.	467	*Lagurus ovatus (Hare's Tail Grass)*	Y		
425.	11384	*Lolium temulentum forma temulentum*	Y		
426.	502	*Panicum capillare (Witchgrass)*	Y		
427.	516	*Parapholis incurva (Coast Barbgrass)*	Y		
428.	551	*Phalaris minor (Lesser Canary Grass)*	Y		
429.	577	*Poa poiformis (Coastal Poa)*			
430.	10970	*Rostraria cristata*	Y		
431.	614	*Sorghastrum nutans*	Y		Y
432.	624	*Spinifex hirsutus (Hairy Spinifex)*			
433.	11112	*Tribolium uniolae*	Y		
434.	12052	*Vulpia myuros forma megalura*	Y		
435.	33101	*Vulpia myuros forma myuros*	Y		
Polygalaceae					
436.	4553	*Comesperma drummondii (Drummond's Milkwort)*			
437.	4554	*Comesperma flavum*			
Polygonaceae					
438.	8850	*Fallopia convolvulus*	Y		
439.	11052	*Persicaria prostrata*			
440.	46434	*Rumex hypogaeus*	Y		
Posidoniaceae					
441.	122	*Posidonia angustifolia*			
442.	123	*Posidonia australis (Fibreball Weed)*			
443.	124	*Posidonia ostenfeldii*			
444.	108	*Posidonia robertsoniae*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
445.	125	*Posidonia sinuosa*			
Potamogetonaceae					
446.	48624	*Althenia cylindrocarpa*			
Pottiaceae					
447.	32315	*Barbula calycina*			
448.	32320	*Barbula subcalycina*			
449.	32449	*Trichostomum brachydontium*			
Primulaceae					
450.	6484	*Samolus repens (Creeping Brookweed)*			
Proteaceae					
451.	1773	*Adenanthos cuneatus (Coastal Jugflower)*			
452.	1832	*Banksia media (Southern Plains Banksia)*			
453.	32203	*Banksia nivea subsp. nivea*			
454.	1836	*Banksia nutans (Nodding Banksia)*			
455.	11360	*Banksia nutans var. nutans (Nodding Banksia)*			
456.	32198	*Banksia obovata (Wedge-leaved Dryandra)*			
457.	1837	*Banksia occidentalis (Red Swamp Banksia)*			
458.	32143	*Banksia prolata*			
459.	32145	*Banksia prolata subsp. calcicola*		P4	
460.	1843	*Banksia pulchella (Teasel Banksia)*			
461.	1850	*Banksia speciosa (Showy Banksia)*			
462.	1868	*Conospermum distichum*			
463.	16349	*Conospermum leianthum subsp. leianthum*			
464.	16350	*Conospermum leianthum subsp. orientale*			
465.	15611	*Conospermum stoechadis subsp. stoechadis (Common Smokebush)*			
466.	1883	*Conospermum teretifolium (Spider Smokebush)*			
467.	1944	*Franklandia fucifolia (Lanoline Bush)*			
468.	1961	*Grevillea baxteri (Cape Arid Grevillea)*		P4	
469.	1991	*Grevillea disjuncta*			
470.	2053	*Grevillea oligantha*			
471.	2139	*Hakea cinerea (Ashy Hakea)*			
472.	2141	*Hakea clavata (Coastal Hakea)*			
473.	12226	*Hakea denticulata*			
474.	12227	*Hakea drupacea*			
475.	2187	*Hakea nitida (Frog Hakea)*			
476.	13335	*Hakea obliqua subsp. obliqua*			
477.	2214	*Hakea trifurcata (Two-leaf Hakea)*			
478.	2216	*Hakea varia (Variable-leaved Hakea)*			
479.	16880	*Isopogon formosus subsp. formosus*			
480.	2240	*Isopogon trilobus (Barrel Coneflower)*			
481.	2248	*Lambertia inermis (Chittick, Djidiok)*			
482.	2296	*Petrophile fastigiata*			
483.	16375	*Stirlingia anethifolia*			
484.	16864	*Synaphea petiolaris subsp. petiolaris*			
Ranunculaceae					
485.	10804	*Clematis linearifolia*			
486.	2929	*Clematis pubescens (Common Clematis)*			
Restionaceae					
487.	17834	*Chordifex sphacelatus*			
488.	16595	*Desmocladus flexuosus*			
Rhamnaceae					
489.	16188	*Cryptandra minutifolia subsp. brevistyla*			
490.	4818	*Pomaderris myrtilloides*			
491.	4823	*Siegfriedia darwinioides*			
492.	4828	*Spyridium globulosum (Basket Bush)*			
493.	13479	*Trymalium ledifolium var. rosmarinifolium*			
494.	15757	*Trymalium spatulatum*			
Rhodomelaceae					
495.	35909	*Amansia pinnatifida*			
496.	26762	*Dictyomenia sonderi*			
497.	26795	*Doxodasya bolbochaete*			
498.	26796	*Doxodasya lanuginosa*			
499.	26803	*Echinothamnion hystrix*			
500.	26995	*Kuetzingia canaliculata*			
501.	26997	*Laurencia arbuscula*			
502.	48408	*Laurencia dendroidea*			

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503.	27001	*Laurencia filiformis*			
504.	27002	*Laurencia forsteri*			
505.	35864	*Lenormandia muelleri*			
506.	27013	*Lenormandia spectabilis*			
507.	27107	*Osmundaria prolifera*			
508.	27173	*Polysiphonia decipiens*			
509.	27177	*Polysiphonia mollis*			Y
510.	27360	*Vidalia spiralis*			
Rhodymeniaceae					
511.	26518	*Botryocladia sonderi*			
512.	26686	*Coelarthrum opuntia*			
Rosaceae					
513.	20496	*Rubus laudatus*	Y		
Rubiaceae					
514.	7348	*Opercularia hispidula (Hispid Stinkweed)*			
515.	18256	*Opercularia spermacocea*			
516.	7362	*Sherardia arvensis (Field Madder)*	Y		
Rutaceae					
517.	4404	*Boronia albiflora*			
518.	4409	*Boronia coerulescens*			
519.	4425	*Boronia inornata (Desert Boronia)*			
520.	4441	*Boronia spathulata (Boronia)*			
521.	4446	*Boronia tetrandra (Yellow Boronia)*			
522.	4492	*Nematolepis phebalioides*			
523.	18536	*Philotheca fitzgeraldii*			
Santalaceae					
524.	10765	*Exocarpos sparteus (Broom Ballart, Djuk)*			
525.	2349	*Leptomeria pachyclada*			
Sapindaceae					
526.	4756	*Dodonaea caespitosa*			
527.	4757	*Dodonaea ceratocarpa*			
Scrophulariaceae					
528.	7054	*Dischisma arenarium*	Y		
529.	7180	*Eremophila alternifolia (Poverty Bush)*			
530.	7264	*Eremophila saligna (Willowy Eremophila)*			
531.	7291	*Myoporum insulare (Blueberry Tree, boobialla)*			
532.	7295	*Myoporum tetrandrum (Boobialla)*			
Sematophyllaceae					
533.	32433	*Sematophyllum homomallum*			
Solanaceae					
534.	6949	*Anthocercis littorea (Yellow Tailflower)*			
535.	11555	*Anthocercis viscosa subsp. caudata*			
536.	6968	*Lycium ferocissimum (African Boxthorn)*	Y		
537.	7033	*Solanum rostratum (Buffalo Burr)*	Y		
538.	7037	*Solanum symonii*			
Stylidiaceae					
539.	7678	*Stylidium adnatum (Common Beaked Triggerplant)*			
540.	7682	*Stylidium albomontis*			
541.	7758	*Stylidium macranthum (Crab Claws)*			
542.	7775	*Stylidium pilosum (Silky Triggerplant)*			
543.	7777	*Stylidium preissii (Lizard Triggerplant)*			
544.	7794	*Stylidium rupestre (Rock Triggerplant)*			
545.	20599	*Stylidium turleyae*			
Thymelaeaceae					
546.	5231	*Pimelea angustifolia (Narrow-leaved Pimelea)*			
547.	5232	*Pimelea argentea (Silvery Leaved Pimelea)*			
548.	5241	*Pimelea drummondii*			
549.	5242	*Pimelea erecta*			
550.	5243	*Pimelea ferruginea*			
551.	5267	*Pimelea subvillifera*			
Urticaceae					
552.	1766	*Urtica incisa (Scrub Nettle)*			
Wrangeliaceae					
553.	26900	*Haloplegma preissii*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
554.	27369	*Wrangelia velutina*			

Zygophyllaceae

555.	4387	*Zygophyllum billardierei (Coast Twinleaf)*			

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

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

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report_Fauna 5km

Created By Guest user on 19/11/2018

Current Names Only Yes
Core Datasets Only Yes
Species Group All Animals
Method 'By Circle'
Centre 121° 52' 57" E,33° 50' 49" S
Buffer 5km
Group By Species Group

Species Group	Species	Records
Amphibian	3	19
Bird	164	3385
Fish	36	43
Invertebrate	98	234
Mammal	17	26
Reptile	25	99
TOTAL	**343**	**3806**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Amphibian					
1.	25401	*Crinia pseudinsignifera (Bleating Froglet)*			
2.	25383	*Litoria cyclorhyncha (Spotted-thighed Frog)*			
3.	25433	*Pseudophryne guentheri (Crawling Toadlet)*			
Bird					
4.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
5.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
6.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
7.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
8.	25536	*Accipiter fasciatus (Brown Goshawk)*			
9.	25755	*Acrocephalus australis (Australian Reed Warbler)*			
10.	41323	*Actitis hypoleucos (Common Sandpiper)*		IA	
11.	24310	*Anas castanea (Chestnut Teal)*			
12.	24312	*Anas gracilis (Grey Teal)*			
13.	24313	*Anas platyrhynchos (Mallard)*			
14.		*Anas platyrhynchos subsp. domesticus*			
15.	24315	*Anas rhynchotis (Australasian Shoveler)*			
16.	24316	*Anas superciliosa (Pacific Black Duck)*			
17.	47414	*Anhinga novaehollandiae (Australasian Darter)*			
18.	24561	*Anthochaera carunculata (Red Wattlebird)*			
19.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
20.	25554	*Apus pacificus (Fork-tailed Swift, Pacific Swift)*		IA	
21.	24285	*Aquila audax (Wedge-tailed Eagle)*			
22.	25558	*Ardea ibis (Cattle Egret)*			
23.	41324	*Ardea modesta (great egret, white egret)*			
24.	25736	*Arenaria interpres (Ruddy Turnstone)*		IA	
25.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
26.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
27.	24318	*Aythya australis (Hardhead)*			
28.		*Barnardius zonarius*			
29.	24319	*Biziura lobata (Musk Duck)*			
30.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
31.	24427	*Cacomantis flabelliformis subsp. flabelliformis (Fan-tailed Cuckoo)*			
32.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
33.	24269	*Calamanthus campestris (Rufous Fieldwren)*			
34.	24779	*Calidris acuminata (Sharp-tailed Sandpiper)*		IA	
35.	24780	*Calidris alba (Sanderling)*		IA	
36.	25738	*Calidris canutus (Red Knot, knot)*		IA	
37.	24783	*Calidris canutus subsp. rogersi (Red Knot (north-eastern Siberia))*		T	
38.	24784	*Calidris ferruginea (Curlew Sandpiper)*		T	
39.	24786	*Calidris melanotos (Pectoral Sandpiper)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
				IA	
40.	24788	*Calidris ruficollis (Red-necked Stint)*		IA	
41.	24790	*Calidris tenuirostris (Great Knot)*		T	
42.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
43.	25551	*Cereopsis novaehollandiae (Cape Barren Goose)*		T	
44.	24320	*Cereopsis novaehollandiae subsp. grisea (Recherche Cape Barren Goose, Cape Barren Goose)*		T	
45.	25575	*Charadrius leschenaultii (Greater Sand Plover)*		IA	
46.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
47.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
48.	47909	*Cheramoeca leucosterna (White-backed Swallow)*			
49.		*Chroicocephalus novaehollandiae*			
50.	24288	*Circus approximans (Swamp Harrier)*			
51.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
52.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
53.	24399	*Columba livia (Domestic Pigeon)*	Y		
54.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
55.	25592	*Corvus coronoides (Australian Raven)*			
56.	24417	*Corvus coronoides subsp. perplexus (Australian Raven)*			
57.	25701	*Coturnix ypsilophora (Brown Quail)*			
58.	24420	*Cracticus nigrogularis (Pied Butcherbird)*			
59.	25595	*Cracticus tibicen (Australian Magpie)*			
60.	24422	*Cracticus tibicen subsp. dorsalis (White-backed Magpie)*			
61.	25596	*Cracticus torquatus (Grey Butcherbird)*			
62.	24322	*Cygnus atratus (Black Swan)*			
63.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
64.	24470	*Dromaius novaehollandiae (Emu)*			
65.		*Egretta novaehollandiae*			
66.		*Elanus axillaris*			
67.	47937	*Elseyornis melanops (Black-fronted Dotterel)*			
68.		*Eolophus roseicapillus*			
69.	24567	*Epthianura albifrons (White-fronted Chat)*			
70.	24379	*Erythrogonys cinctus (Red-kneed Dotterel)*			
71.	25744	*Eudyptes chrysocome (Rockhopper Penguin)*			
72.	24816	*Eudyptes pachyrhynchus (Fiordland Penguin)*			
73.	24817	*Eudyptes sclateri (Erect-crested Penguin)*			Y
74.	25621	*Falco berigora (Brown Falcon)*			
75.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
76.	25623	*Falco longipennis (Australian Hobby)*			
77.	25727	*Fulica atra (Eurasian Coot)*			
78.	25730	*Gallirallus philippensis (Buff-banded Rail)*			
79.	25530	*Gerygone fusca (Western Gerygone)*			
80.	47962	*Glyciphila melanops (Tawny-crowned Honeyeater)*			
81.	24443	*Grallina cyanoleuca (Magpie-lark)*			
82.	25627	*Haematopus fuliginosus (Sooty Oystercatcher)*			
83.	24485	*Haematopus fuliginosus subsp. fuliginosus (Sooty Oystercatcher)*			
84.	24487	*Haematopus longirostris (Pied Oystercatcher)*			
85.	24293	*Haliaeetus leucogaster (White-bellied Sea-Eagle)*			
86.	24295	*Haliastur sphenurus (Whistling Kite)*			
87.	47965	*Hieraaetus morphnoides (Little Eagle)*			
88.	25734	*Himantopus himantopus (Black-winged Stilt)*			
89.	24491	*Hirundo neoxena (Welcome Swallow)*			
90.	48587	*Hydroprogne caspia (Caspian Tern)*		IA	
91.	24510	*Larus dominicanus (Kelp Gull)*			
92.	25638	*Larus pacificus (Pacific Gull)*			
93.	24557	*Leipoa ocellata (Malleefowl)*		T	
94.	25659	*Lichenostomus leucotis (White-eared Honeyeater)*			
95.	25661	*Lichmera indistincta (Brown Honeyeater)*			
96.	30932	*Limosa lapponica (Bar-tailed Godwit)*		IA	
97.		*Lophoictinia isura*			
98.	24326	*Malacorhynchus membranaceus (Pink-eared Duck)*			
99.	24583	*Manorina flavigula (Yellow-throated Miner)*			
100.	25758	*Megalurus gramineus (Little Grassbird)*			
101.	24598	*Merops ornatus (Rainbow Bee-eater)*			
102.		*Microcarbo melanoleucos*			
103.	48008	*Morus serrator (Australasian Gannet)*			
104.	25610	*Myiagra inquieta (Restless Flycatcher)*			
105.	24738	*Neophema elegans (Elegant Parrot)*			
106.	24739	*Neophema petrophila (Rock Parrot)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
107.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
108.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
109.	24328	*Oxyura australis (Blue-billed Duck)*		P4	
110.	24619	*Pachycephala inornata (Gilbert's Whistler)*			
111.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
112.	25682	*Pardalotus striatus (Striated Pardalote)*			
113.	24642	*Passer montanus (Eurasian Tree Sparrow)*	Y		
114.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
115.	48060	*Petrochelidon ariel (Fairy Martin)*			
116.	48061	*Petrochelidon nigricans (Tree Martin)*			
117.	25697	*Phalacrocorax carbo (Great Cormorant)*			
118.	24665	*Phalacrocorax fuscescens (Black-faced Cormorant)*			
119.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
120.	25699	*Phalacrocorax varius (Pied Cormorant)*			
121.	24409	*Phaps chalcoptera (Common Bronzewing)*			
122.	25587	*Phaps elegans (Brush Bronzewing)*			
123.	48071	*Phylidonyris niger (White-cheeked Honeyeater)*			
124.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
125.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
126.	24842	*Platalea regia (Royal Spoonbill)*			
127.	25720	*Platycercus icterotis (Western Rosella)*			
128.	24747	*Platycercus spurius (Red-capped Parrot)*			
129.	24843	*Plegadis falcinellus (Glossy Ibis)*		IA	
130.	24381	*Pluvialis dominica (American Golden Plover)*			
131.	24383	*Pluvialis squatarola (Grey Plover)*		IA	
132.	25703	*Podargus strigoides (Tawny Frogmouth)*			
133.	25704	*Podiceps cristatus (Great Crested Grebe)*			
134.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
135.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
136.	24769	*Porzana fluminea (Australian Spotted Crake)*			
137.	24771	*Porzana tabuensis (Spotless Crake)*			
138.	42344	*Purnella albifrons (White-fronted Honeyeater)*			
139.		*Purpureicephalus spurius*			
140.	24776	*Recurvirostra novaehollandiae (Red-necked Avocet)*			
141.	48096	*Rhipidura albiscapa (Grey Fantail)*			
142.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
143.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
144.	24279	*Sericornis frontalis subsp. maculatus (White-browed Scrubwren)*			
145.	30948	*Smicrornis brevirostris (Weebill)*			
146.	24645	*Stagonopleura oculata (Red-eared Firetail)*			
147.	48594	*Sternula nereis (Fairy Tern)*			
148.	24329	*Stictonetta naevosa (Freckled Duck)*			
149.	25655	*Stipiturus malachurus (Southern Emu-wren)*			
150.	24554	*Stipiturus malachurus subsp. westernensis (Southern Emu-wren)*			
151.	25597	*Strepera versicolor (Grey Currawong)*			
152.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
153.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
154.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
155.	34007	*Thalassarche chlororhynchos (Atlantic Yellow-nosed Albatross)*		T	
156.	48597	*Thalasseus bergii (Crested Tern)*		IA	
157.	48135	*Thinornis rubricollis (Hooded Plover, Hooded Dotterel)*		P4	
158.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
159.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
160.	24309	*Todiramphus sanctus subsp. sanctus (Sacred Kingfisher)*			
161.	48141	*Tribonyx ventralis (Black-tailed Native-hen)*			
162.	24803	*Tringa brevipes (Grey-tailed Tattler)*		P4	
163.	24806	*Tringa glareola (Wood Sandpiper)*		IA	
164.	24808	*Tringa nebularia (Common Greenshank, greenshank)*		IA	
165.	24809	*Tringa stagnatilis (Marsh Sandpiper, little greenshank)*		IA	
166.	25577	*Vanellus miles (Masked Lapwing)*			
167.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			

Fish

168.		*Acanthopagrus butcheri*			
169.		*Aldrichetta forsteri*			
170.		*Allomycterus pilatus*			
171.		*Ammotretis elongatus*			
172.		*Aracana aurita*			
173.		*Aracana ornata*			
174.		*Asymbolus vincenti*			
175.		*Aulopus purpurissatus*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
176.		*Brachaluteres jacksonianus*			
177.		*Capropygia unistriata*			
178.		*Carcharhinus brachyurus*			
179.		*Diodon sp.*			
180.		*Eubalichthys mosaicus*			
181.		*Galaxias maculatus*			
182.	34030	*Geotria australis (Pouched Lamprey)*		P1	
183.		*Gonorynchus greyi*			
184.		*Kathetostoma laeve*			
185.		*Lepidoblennius marmoratus*			
186.		*Leptoichthys fistularius*			
187.		*Makaira sp.*			Y
188.		*Muraenichthys breviceps*			
189.		*Phycodurus eques subsp. glauerti*			Y
190.		*Phyllopteryx taeniolatus*			
191.		*Platycephalus speculator*			
192.		*Pseudocaranx dentex*			
193.		*Pseudolabrus parilus*			
194.		*Pseudophycis breviuscula*			
195.		*Scobinichthys granulatus*			
196.		*Scomber australasicus*			
197.		*Scomberomorus semifasciatus*			
198.		*Sillago bassensis*			
199.		*Siphonognathus argyrophanes*			
200.		*Siphonognathus radiatus*			
201.		*Threpterius maculosus*			
202.		*Upeneichthys lineatus*			
203.		*Zeus faber*			

Invertebrate

204.		*Agaue similis*			
205.		*Agaue tenuipes*			
206.		*Agauopsis miliaris*			
207.		*Aname mainae*			
208.		*Aname tepperi*			
209.		*Anisops sp.*			
210.		*Anisops thienemanni*			
211.		*Apocyclops dengizicus*			
212.		*Araneus senicaudatus*			
213.		*Argiope trifasciata*			
214.		*Austracantha minax*			
215.		*Austrochiltonia subtenuis*			
216.		*Bdelloidea sp. 2:2*			
217.		*Brachionus plicatilis complex ("towerinninensis" form)*			Y
218.		*Brachionus quadridentatus cluniorbicularis*			
219.		*Brachionus rotundiformis*			
220.		*Brachionus sp.*			
221.		*Bradyagaue exilis*			Y
222.		*Calanoida sp.*			
223.		*Capitella sp.*			
224.		*Capitellidae sp.*			
225.		*Cercophonius granulosus*			
226.		*Chironomus aff. alternans (V24) (CB)*			
227.		*Chironomus occidentalis*			
228.		*Cladopelma curtivalva*			
229.		*Cladotanytarsus sp. A (SAP)*			
230.		*Clynotis albobarbatus*			
231.		*Corixidae sp.*			
232.		*Cormocephalus michaelseni*			
233.		*Coxiella sp.*			
234.		*Cryptochironomus griseidorsum*			
235.		*Culicoides sp.*			
236.		*Cyprideis australiensis*			
237.		*Diacypris compacta*			
238.		*Diacypris spinosa*			
239.		*Diaprepocoris barycephala*			
240.		*Diaprepocoris sp.*			
241.		*Dicrotendipes conjunctus*			
242.		*Enchytraeidae sp.*			
243.		*Ephydridae sp.*			
244.		*Ephydridae sp. 3 (SAP)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
245.		*Ephydridae sp. 7(SAP)*			
246.		*Geogarypus taylori*			
247.		*Gladioferens imparipes*			
248.		*Halicyclops sp. 1 (nr ambiguus) (SAP)*			
249.		*Harpacticoida sp*			
250.		*Hexarthra fennica*			
251.		*Hirudinea sp.*			
252.		*Hogna crispipes*			
253.		*Holasteron esperance*			Y
254.		*Isopeda leishmanni*			
255.		*Lampona cylindrata*			
256.		*Leptoceridae sp.*			
257.		*Leptocythere lacustris*			
258.		*Mesocyclops brooksi*			
259.		*Micronecta robusta*			
260.		*Missulena granulosa*			
261.		*Missulena hoggi*			
262.		*Muscidae sp.*			
263.		*Mytilocypris mytiloides*			
264.		*Mytilocypris sp.*			
265.		*Nematoda sp.*			
266.		*Nephila edulis*			
267.		*Nicodamus mainae*			
268.		*No invertebrates*			
269.		*Notalina spira*			
270.		*Notonectidae sp.*			
271.		*Ochthebius sp. 4*			Y
272.		*Oecetis sp.*			
273.		*Oecobius navus*			
274.		*Oribatida sp. 1 (PLP)*			Y
275.		*Palaemonetes australis*			
276.		*Paralimnophyes pullulus (V42)*			
277.		*Paranais litoralis*			
278.		*Parartemia longicaudata*			
279.		*Parartemia sp.*			
280.		*Platycypris baueri*			
281.		*Polypedilum nr vespertinus (M2) (SAP)*			
282.		*Polypedilum nubifer*			
283.		*Procladius paludicola*			
284.		*Protogarypinus giganteus*			
285.		*Protozoan sp*			
286.		*Psychodidae sp.*			
287.		*Reticypris clava*			
288.		*Sarscypridopsis aculeata*			
289.		*Sphaeromatidae sp.*			
290.		*Steatoda grossa*			
291.		*Sternopriscus sp.*			
292.		*Stratiomyidae sp.*			
293.		*Synsphyronus callus*			
294.		*Synsphyronus mimulus*			
295.		*Tanytarsus barbitarsis*			
296.		*Tanytarsus fuscithorax/semibarbitarsus*			
297.		*Tetragnatha nitens*			
298.		*Tetragnatha valida*			
299.		*Urodacus novaehollandiae*			
300.		*Venatrix pullastra*			
301.	34113	*Westralunio carteri (Carter's Freshwater Mussel)*		T	
Mammal					
302.	24208	*Arctocephalus forsteri (New Zealand Fur Seal, long-nosed fur-seal)*		S	
303.	24039	*Canis lupus subsp. dingo (Dingo)*	Y		
304.	24086	*Cercartetus concinnus (Western Pygmy-possum, Mundarda)*			
305.	24052	*Delphinus delphis (Common Dolphin)*			
306.	24043	*Eubalaena australis (Southern Right Whale)*		T	
307.	24056	*Grampus griseus (Risso's Dolphin)*			
308.	24070	*Kogia breviceps (Pygmy Sperm Whale)*			
309.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
310.	24213	*Mirounga leonina (Southern Elephant Seal)*			
311.	24223	*Mus musculus (House Mouse)*	Y		
312.	24210	*Neophoca cinerea (Australian Sea-lion)*		T	
313.	48022	*Notamacropus irma (Western Brush Wallaby)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
				P4	
314.	24243	*Rattus fuscipes (Western Bush Rat)*			
315.	24245	*Rattus rattus (Black Rat)*	Y		
316.	30954	*Tursiops aduncus (Indo-Pacific Bottlenose Dolphin)*			
317.	24069	*Tursiops truncatus (Bottlenose Dolphin)*			
318.	24206	*Vespadelus regulus (Southern Forest Bat)*			
Reptile					
319.	25242	*Acanthophis antarcticus (Southern Death Adder)*		P3	
320.	42368	*Acritoscincus trilineatus (Western Three-lined Skink)*			
321.	24991	*Aprasia repens (Sand-plain Worm-lizard)*			
322.	24994	*Aprasia striolata (Lined Worm-lizard)*			
323.	24980	*Christinus marmoratus (Marbled Gecko)*			
324.	30888	*Cryptoblepharus pulcher subsp. clarus*			
325.	42385	*Ctenophorus chapmani (Eastern Heath Dragon)*			
326.	25049	*Ctenotus labillardieri*			
327.	25766	*Delma fraseri (Fraser's Legless Lizard)*			
328.	25346	*Dermochelys coriacea (Leatherback Turtle)*		T	
329.	25251	*Echiopsis curta (Bardick)*			
330.	25096	*Egernia kingii (King's Skink)*			
331.	25250	*Elapognathus coronatus (Crowned Snake)*			
332.	25117	*Hemiergis peronii subsp. peronii*			
333.	25131	*Lerista distinguenda*			
334.	25184	*Menetia greyii*			
335.	25192	*Morethia obscura*			
336.	25252	*Notechis scutatus (Tiger Snake)*			
337.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
338.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
339.	25263	*Pseudonaja modesta (Ringed Brown Snake)*			
340.	25008	*Pygopus lepidopodus (Common Scaly Foot)*			
341.	30818	*Rhinoplocephalus bicolor (Square-nosed Snake)*			
342.	25203	*Tiliqua occipitalis (Western Bluetongue)*			
343.	25225	*Varanus rosenbergi (Heath Monitor)*			

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

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

Appendix D – Likelihood of occurrence assessments

Flora likelihood of occurrence assessment

Fauna likelihood of occurrence assessment

Flora likelihood of occurrence assessment guidelines

Likelihood of occurrence	Guideline
Known	Species recorded within survey area from field survey results.
Likely	Species previously recorded within 5 km and large areas of suitable habitat occur in the project footprint.
Possible	Species previously recorded within 5 km and areas of suitable habitat occur/may occur in the project footprint.
Unlikely	Species previously recorded within 5 km, but suitable habitat does not occur in the project footprint.
Highly unlikely	Species not previously recorded within 5 km, suitable habitat does not occur in the project footprint and/or the project footprint is outside the natural distribution of the species.
Other considerations	Intensity of survey, availability of access, growth form type, recorded flowering times, cryptic nature of species

Source information - desktop searches

PMST – DEE Protected Matters Search Tool (PMST) to identify flora listed under the EPBC Act potentially occurring within the study area

TPFL and WAHERB – records of threatened flora from TPFL and WAHERB database searches within the study area

NM – DBCA *NatureMap* (accessed May 2018)

Flora likelihood of occurrence assessment

Family	Taxon	Status		Description (if available) (WA Herbarium 2017, DEE 2017)	Likelihood of occurrence	Source
		EPBC Act	WC Act /DBCA			
Haemodoraceae	*Anigozanthos bicolor* subsp. *minor*	En	T	Rhizomatous, perennial, herb, 0.05-0.2 m high. Fl. green&red, Aug to Oct. Sand. Well-watered sites.	Unlikely – the species has not been recorded within 5 km of the project footprint, but suitable habitat occurs.	PMST
Myrtaceae	*Eucalyptus insularis* subsp. *continentalis*	En	T	(Mallee), 1.5-8 m high. Fl. white-cream, Aug. Sand. Granite outcrops & hills.	Highly unlikely – the species has not been recorded within 5 km of the project footprint and no suitable habitat occurs.	PMST
Fabaceae	*Kennedia glabrata*	Vu	T	Prostrate shrub, 0.05-0.5 m high, to 5 m wide. Fl. red, Aug to Nov. Soil pockets, sandy soils. Granite oucrops.	Highly unlikely – Species not previously recorded within 5 km of the project footprint and project footprint is outside the natural distribution of the species.	PMST

Family	Taxon	Status		Description (if available) (WA Herbarium 2017, DEE 2017)	Likelihood of occurrence	Source
		EPBC Act	WC Act /DBCA			
Proteaceae	*Lambertia echinata* subsp. *echinata*	En	T	Prickly, much-branched, non-lignotuberous shrub, to 1.5 m high. Fl. orange-red-pink, Sep to Oct. Gravelly sandy loam, brown sandy loam, white-grey sand, granite, laterite. Below & between rock outcrops, slopes, hill crests.	Highly unlikely – the species has not been recorded within 5 km of the project footprint and no suitable habitat occurs.	PMST
Myrtaceae	*Cyathostemon* sp. Esperance (A. Fairall 2431)		P1		Possible – the species has been recorded within 5 km of the project footprint and some suitable habitat may occur.	NM, WAHERB
Dilleniaceae	*Hibbertia carinata*		P1	Shrub, to 0.4 m high. Fl. yellow, Aug to Sep. Well-drained gravelly sand, yellow sand with gravel.	Likely – the species has been recorded within 5 km of the project footprint and suitable habitat occurs.	WAHERB
Ericaceae	*Leucopogon corymbiformis*		P2	Erect shrub, to 0.7 m high. Fl. White, July to Sep. Grows on sandplain or subcoastal dunes in *Banksia* woodland or heath.	Likely – the species has been recorded within 20 km of the project footprint and suitable habitat is likely to occur.	NM, WAHERB
Anarthriaceae	*Hopkinsia adscendens*		P3	Rhizomatous, perennial, herb, to 0.4 m high. Fl. Oct. Sand. Dry or seasonally damp habitats along streams.	Unlikely – the species has been recorded within 5 km of the project footprint, but no suitable habitat occurs.	NM, WAHERB
Brassicaceae	*Lepidium fasciculatum*		P3	Erect annual, herb, (0.1-)0.3-0.6 m high.	Possible – the species has been recorded within 5 km of the project footprint and some suitable habitat may occur.	NM, WAHERB
Ericaceae	*Leucopogon rotundifolius*		P3	Robust shrub, (0.2-)0.5-1.5 m high. Fl. white, Jan or Mar to Aug or Nov. Skeletal soils. Granite outcrops, steep hillslopes.	Unlikely – the species has been recorded within 5 km of the project footprint, but no suitable habitat occurs.	NM, WAHERB

Family	Taxon	Status		Description (if available) (WA Herbarium 2017, DEE 2017)	Likelihood of occurrence	Source
		EPBC Act	WC Act /DBCA			
Lamiaceae	*Pityrodia chrysocalyx*		P3	Erect, branched shrub, 0.3-0.75(-1) m high. Fl. white, Aug to Oct. Sandy soils.	Possible – the species has been recorded within 5 km of the project footprint and some suitable habitat occurs.	NM, WAHERB
Malvaceae	*Thomasia quercifolia*		P4	Shrub, ca 1 m high.	Possible – the species has been recorded within 5 km of the project footprint and some suitable habitat may occur.	NM
Myrtaceae	*Eucalyptus x missilis*		P4	(Mallee), to 3 m high, bark smooth. Fl. yellow/cream-white, Jan to Apr. Sand over limestone or granite. Coastal sites.	Possible – the species has been recorded within 5 km of the project footprint and some suitable habitat may occur.	NM, WAHERB
Proteaceae	*Banksia prolata* subsp. *calcicola*		P4	Non-lignotuberous shrub, 0.4-1 m high. Fl. yellow, Jul to Sep. White sand over limestone. Coastal areas	Unlikely – the species has been recorded within 5 km of the project footprint, but no suitable habitat occurs.	NM, WAHERB, TPFL
Proteaceae	*Grevillea baxteri*		P4	Erect to spreading shrub, 0.8-3.6 m high. Fl. green-yellow-orange-brown-red, Feb or May to Jul or Sep to Dec. Sand. Sandplains.	Possible – the species has been recorded within 5 km of the project footprint and some suitable habitat occurs.	NM, WAHERB

Fauna likelihood of occurrence assessment guidelines

Assessment outcome	Description
Present	Species recorded during the field survey or from recent, reliable records from within or close proximity to the survey area.
Likely	Species are **likely** to occur in the survey area where there is suitable habitat within the survey area and there are recent records of occurrence of the species in close proximity to the survey area. OR Species known distribution overlaps with the survey area and there is suitable habitat within the survey area.
Unlikely	Species assessed as **unlikely** include those species previously recorded within 20 km of the survey area however: • There is limited (i.e. the type, quality and quantity of the habitat is generally poor or restricted) habitat in the survey area. • The suitable habitat within the survey area is isolated from other areas of suitable habitat and the species has no capacity to migrate into the survey area. OR Those species that have a known distribution overlapping with the survey area however: • There is limited habitat in the survey area (i.e. the type, quality and quantity of the habitat is generally poor or restricted). • The suitable habitat within the survey area is isolated from other areas of suitable habitat and the species has no capacity to migrate into the survey area.
Highly unlikely	Species that are considered **highly unlikely** to occur in the survey area include: • Those species that have no suitable habitat within the survey area. • Those species that have become locally extinct, or are not known to have ever been present in the region of the survey area.

Source information - desktop searches

NM – DBCA *NatureMap* (accessed May 2018)

PMST – DEE Protected Matters Search Tool (PMST) to identify fauna listed under the EPBC Act potentially occurring within the study area (accessed May 2018)

Fauna likelihood of occurrence assessment

Species name	Common name	Status		Search		Description and habitat requirements	Likelihood of occurrence
		State	Federal	NM	PMST		
Actitis hypoleucos	*Common Sandpiper*	IA	MI	Y	Y	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow, and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags (DEE 2018)	Unlikely Species known from the region but no suitable habitat present.
Ardenna carneipes	*Flesh-footed Shearwater, Fleshy-footed Shearwater*	VU & IA	MI	N	Y	The Flesh-footed Shearwater is a trans-equatorial migrant. The species nests in colonies in burrows under trees or shrubs. Most feeding is undertaken offshore over continental shelves where it feeds on fish and squid, mostly caught by pursuit-plunging (Marchant & Higgins 1990)	Unlikely Species known from the region but no suitable habitat present.
Apus pacificus	*Fork-tailed Swift, Pacific Swift*	IA	MI	Y	Y	The Fork-tailed Swift is common in coastal and sub coastal areas between Carnarvon and Augusta including near and offshore islands. There are scattered records along south coast from Denmark east to Cocklebiddy on the Great Australian Bight, and sparsely scattered records inland. They are found across a range of habitats, from inland open plains to wooded areas. They are most often observed over inland plains in Australia, but sometimes recorded over coastal cliffs and beaches as well as urban areas. They have been recorded well out to sea as well as from offshore islands especially when on passage from Indonesia. This species is almost exclusively aerial (DotE 2015).	Unlikely Species known from the region but no suitable habitat present.

Species name	Common name	Status		Search		Description and habitat requirements	Likelihood of occurrence
		State	Federal	NM	PMST		
Arenaria interpres	*Ruddy Turnstone*	IA	MI	Y	N	The Ruddy Turnstone is found in most coastal regions with exposed rock coast lines or coral reefs, and also near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. It can be found on sand, coral or shell beaches, shoals, cays and dry ridges of sand or coral, and in occasionally near river beds, and on inland lakes and adjacent farmland. It strongly prefers rocky shores or beaches with large deposits of rotting seaweed. It has occasionally been sighted in estuaries, harbours, bays and coastal lagoons, among low saltmarsh or on exposed beds of seagrass, around sewage ponds and on mudflats. In south-west Australia, it may occur on pebble-strewn shores of saltlakes near the coast. On Rottnest Island, it prefers shores with scattered fragments of limestone (DotE 2016). It is also common on all the larger islands south to Penguin Island, but is uncommon from Augusta to Cape Arid (Nevill 2013).	Unlikely Species known from the region but no suitable habitat present.
Botaurus poiciloptilus	Australian Bittern	EN	EN	N	Y	The Australasian Bittern's preferred habitat is wetlands with tall dense vegetation. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds (e.g. *Phragmites*, *Cyperus*, *Eleocharis*, *Juncus*, *Typha*, *Baumea*, *Bolboschoenus*) or cutting grass (*Gahnia*) growing over a muddy or peaty substrate. In the south west, the Bittern is largely confined to coastal areas, especially along the south coast. It also occurs around swamps, lakes, pools, rivers and channels fringed with lignum *Muehlenbeckia*, canegrass *Eragrostis* or other dense vegetation (Marchant 1990). They can be found in reed beds near Two Peoples Bay, in lakes near Mt Manypeaks, and the Lake Muir area (Nevill 2013).	Unlikely Species known from the region but no suitable habitat present.

Species name	Common name	Status		Search		Description and habitat requirements	Likelihood of occurrence
		State	Federal	NM	PMST		
Calidris acuminata	*Sharp-tailed Sandpiper*	IA	MI	Y	Y	In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry (DEE 2018).	Unlikely Species known from the region but no suitable habitat present.
Calidris alba	*Sanderling*	IA	MI	Y	Y	In Australia, the species is almost always found on the coast, mostly on open sandy beaches exposed to open sea-swell, and also on exposed sandbars and spits, and shingle banks, where they forage in the wave-wash zone and amongst rotting seaweed. Sanderlings also occur on beaches that may contain wave-washed rocky outcrops. Less often the species occurs on more sheltered sandy shorelines of estuaries, inlets and harbours (DEE 2018)	Unlikely Species known from the region but no suitable habitat present.
Calidris canutus	*Red Knot*	VU	EN, MI	Y	Y	In Australasia the Red Knot mainly inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps (DEE 2018). They are found near mudflats and estuaries from Murchison to Bunbury but are then uncommon from Wilson Inlet to Esperance. In the Perth region they are mainly found in Alfred Cove and Peel Inlet (Nevill 2013).	Unlikely Species known from the region but no suitable habitat present.

Species name	Common name	Status		Search		Description and habitat requirements	Likelihood of occurrence
		State	Federal	NM	PMST		
Calidris ferruginea	*Curlew Sandpiper*	VU & IA	CR & MI	Y	Y	Curlew Sandpipers mainly occur in areas with soft mud conditions, including intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are found inland less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. In WA, they are widespread around coastal and subcoastal plains from Cape Arid to south-west Kimberley Division, but are more sparsely distributed between Carnarvon and Dampier Archipelago (DEE 2018). They are common on the Swan Coastal Plain, particularly near large drying lakes like Thompson and Forrestdale, and Peel Inlet. They are less common along the southern coast to Esperance (Nevill 2013).	Unlikely Species known from the region but no suitable habitat present.
Calidris melanotos	*Pectoral Sandpiper*	IA	MI	N	Y	In Australia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum (DEE 2018). The bird can be seen on the Swan Coastal Plain but is rare to scarce on Lake Thompson, and as well on any freshwater wetland in the southwest with shallow, well-grassed margins. They are seen at Lake Warden, Esperance, and at Lake McLarty (Nevill 2013).	Unlikely Species known from the region but no suitable habitat present.

Species name	Common name	Status		Search		Description and habitat requirements	Likelihood of occurrence
		State	Federal	NM	PMST		
Calidris ruficollis	*Red-necked Stint*	IA	MI	Y	Y	The Red-necked Stint can be found in fresh and saline water, but primarily in coastal regions (Nevill 2013). It is mostly found in areas including sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores. Occasionally they have been recorded on exposed or ocean beaches, and on stony or rocky shores, reefs or shoals. They also occur in saltworks and sewage farms; saltmarsh; ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in saltflats. They have occasionally been recorded on dry gibber plains, with little or no perennial vegetation (DEE 2018). They are common in many parts of the south west, and can be found in the Murchison down to Busselton and Augusta to Cape Arid, and on islands, particularly Rottnest (Nevill 2013).	Unlikely Species known from the region but no suitable habitat present.
Calidris tenuirostris	*Great Knot*	VU & IA	CR & MI	Y	Y	The Great Knot typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons. They are occasionally found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, saltlakes and non-tidal lagoons. The Great Knot rarely occurs on inland lakes and swamps (DEE 2018). In the south west they can be found in the Murchison region and then further down the coast to Bunbury, in the Perth region, Alfred Cove, Woodman Point, and the Peel Inlet. They are scarce on the south coast past Busselton (Nevill 2013).	Unlikely Species known from the region but no suitable habitat present.
Calyptorhynchus latirostris	*Carnaby's Cockatoo, White-tailed*	EN	EN	Y	Y	Carnaby's Cockatoo occurs in uncleared or remnant native eucalypt woodlands, especially those that contain salmon gum, wandoo, marri, jarrah and	Likely

Species name	Common name	Status		Search		Description and habitat requirements	Likelihood of occurrence
		State	Federal	NM	PMST		
	Short-billed Black Cockatoo					karri, and in shrubland or kwongan heathland dominated by Hakea, Dryandra, Banksia and Grevillea species. Breeding activity is restricted to eucalypt woodlands mainly in the semiarid and subhumid interior, from Kalbarri in the north, Three Springs District south to the Stirling Range, west to Cockleshell Gully and east to Manmanning. The species has expanded its breeding range westward and south into the jarrah-marri forests of the Darling Scarp and into the tuart forests of the Swan Coastal Plain, including the Yanchep area, Lake Clifton and near Bunbury. It ness in trees older than 120-150 years (DEE 2018).	Species known from the region, potentially suitable habitat present.
Cereopsis novaehollandiae subsp. grisea	*Recherche Cape Barren Goose, Cape Barren Goose*	VU	VU	Y	Y	The Cape Barren Goose inhabits grasslands and low fields of succulent herbs (comprised of Carpobrotus sp.), and occasionally open areas in taller and denser vegetation (although islands that are covered by woodlands or thickets support few birds). It has also been recorded on beaches, and near lakes and freshwater 'soaks', on the mainland. It is concentrated on islands and rocks in the Archipelago of the Recherche, and also west on West Island, Red Island and Hauloff Rock. It is a casual visitor to the south-coastal mainland from Bremer Bay to Cape Arid. The diet consists of leaves (including from Rhagodia baccata) and seeds (including from Myoporum insulare) (DotE 2016).	Unlikely Species known from the region but no suitable habitat present.
Charadrius bicinctus	*Double-banded Plover*	IA	MI	N	Y	The Double-banded Plover is found on littoral, estuarine and fresh or saline terrestrial wetlands and also saltmarsh, grasslands and pasture. It occurs on muddy, sandy, shingled or sometimes rocky beaches, bays and inlets, harbours and margins of fresh or saline terrestrial wetlands such as lakes, lagoons and swamps, shallow estuaries and rivers. It is sometimes associated with coastal	Unlikely Species known from the region but no suitable habitat present.

Species name	Common name	Status		Search		Description and habitat requirements	Likelihood of occurrence
		State	Federal	NM	PMST		
						lagoons, inland saltlakes and saltworks, and is also found on seagrass (especially Zostera) and kelp beds. It is found on open grassy areas including short pasture, ploughed or newly cropped paddocks, swards, airstrips, and sports grounds near the coast and further inland. The bird is sometimes found on exposed reefs and rock platforms with shallow rock pools and also on coastal sand dunes. It sometimes takes advantage of floodwaters, and drowned river valleys. It is also found around sewage farms and saltworks, gravel roads and quarries (DEE 2016). Those birds that migrate to WA mainly come to the beaches on the Great Australian Bight, while few come to the deep south west and even fewer to the west coast. They can be seen on the beaches adjacent to Eyre Bird Observatory, occasionally off Perth coast, and at Lake McLarty near Mandurah (Nevill 2013).	
Gallinago megala	*Swinhoe's Snipe*	IA	MI	N	Y	During the non-breeding season Swinhoe's Snipe occurs at the edges of wetlands, such as wet paddy fields, swamps and freshwater streams. The species is also known to occur in grasslands, drier cultivated areas (including crops of rapeseed and wheat) and market gardens (Higgins & Davies 1996). Habitat specific to Australia includes the dense clumps of grass and rushes round the edges of fresh and brackish wetlands. This includes swamps, billabongs, river pools, small streams and sewage ponds. They are also found in drying claypans and inundated plains pitted with crab holes (Higgins & Davies 1996)	Unlikely Species known from the region but no suitable habitat present.
Gallinago stenura	*Pin-tailed Snipe*	IA	MI	N	Y	During non-breeding period the Pin-tailed Snipe occurs most often in or at the edges of shallow freshwater swamps, ponds and lakes with emergent, sparse to dense cover of grass/sedge or other vegetation. The species is also found in drier,	Unlikely Species known from the region but no suitable habitat present.

Species name	Common name	Status State	Status Federal	Search NM	Search PMST	Description and habitat requirements	Likelihood of occurrence
						more open wetlands such as claypans in more arid parts of species' range. It is also commonly seen at sewage ponds; not normally in saline or inter-tidal wetlands (Higgins & Davies 1996).	
Hydroprogne caspia	*Caspian Tern*	IA	MI	Y	N	The Caspian Tern is mostly found in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred. They also occur on near-coastal or inland terrestrial wetlands that are either fresh or saline, especially lakes (including ephemeral lakes), waterholes, reservoirs, rivers and creeks. They also use artificial wetlands, including reservoirs, sewage ponds and saltworks. In offshore areas the species prefers sheltered situations, particularly near islands, and is rarely seen beyond reefs (Higgins & Davis 1996). Large numbers may shelter along the coast, behind coastal sand-dunes or coastal lakes during rough weather, and have been recorded inland after storms (Higgins & Davies 1996). The Caspian Tern usually forages in open wetlands, including lakes and rivers. They often prefer sheltered shallow water near the margins, but can also be found in open coastal waters. In coastal inlets they may prefer to forage in tidal channels, or over submerged mudbanks (Higgins & Davis 1996).	Unlikely Species known from the region but no suitable habitat present.
Leipoa ocellata	*Malleefowl*	VU	VU	Y	Y	The Malleefowl generally occurs in semi-arid areas of Western Australia, in shrublands and low woodlands that are dominated by mallee vegetation, as well as native pine *Callitris* woodlands, *Acacia* shrublands, paperbark, sheoak, Broombush *Melaleuca uncinata* vegetation, eucalypt woodlands, or coastal heathlands. Mostly they are found where there are sandy or gravel soils. The nest is a large mound of sand or soil and organic matter (Jones and Goth 2008; Morcombe	Unlikely Species known from the region but no suitable habitat present.

Species name	Common name	Status		Search		Description and habitat requirements	Likelihood of occurrence
		State	Federal	NM	PMST		
						2004; Nevill 2013). In WA they are found from the southwest Nullarbor to Albany, north, and then west from Moore River up to Shark Bay, past Cue, across to Wiluna and east to the northern Victoria Desert south of the Blackstone Ranges (Nevill 2013; Pizzey and Knight 2012).	
Limosa lapponica laueri	*Bar-tailed Godwit*	IA	VU, MI	N	Y	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (DEE 2018). They are uncommon in the south west, but can be sighted from Geraldton to Bunbury, at Alfred Cove, and then at a few estuaries on the south coast including Kalgan River Mouth and Oyster Harbour (Nevill 2013).	Unlikely Species known from the region but no suitable habitat present.
Motacilla cinerea	Grey Wagtail	IA	MI	N	Y	The Grey Wagtail is an opportunistic migrant to Australia. The species typically migrates to Indonesia occasionally landing in Australia. Most records for the species are from Northern Australia and South Australia. Habitat for the species is often associated with water bodies and/or grassed areas (Morcombe 2004)	Unlikely Species known from the region but no suitable habitat present.
Numenius madagascariensis	*Eastern Curlew, Far Eastern Curlew*	VU & IA	CR & MI	N	Y	The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, sometimes within the mangroves, and in coastal saltworks and sewage	Unlikely Species known from the region but no suitable habitat present.

Species name	Common name	Status		Search		Description and habitat requirements	Likelihood of occurrence
		State	Federal	NM	PMST		
						farms. In the south west, Eastern Curlews are recorded from Eyre, and there are scattered records from Stokes Inlet to Peel Inlet (Marchant & Higgins 1993). They are uncommon further south of Geraldton, but can be spotted in Alfred Cove, Peel Inlet and the Albany region (Nevill 2013).	
Numenius minutus	*Little Curlew, Little Whimbrel*	IA	MI	N	Y	The Little Curlew is most often found feeding in short, dry grassland and sedgeland, including dry floodplains and blacksoil plains, which have scattered, shallow freshwater pools or areas seasonally inundated. Open woodlands with a grassy or burnt understorey, dry saltmarshes, coastal swamps, mudflats or sandflats of estuaries or beaches on sheltered coasts, mown lawns, gardens, recreational areas, ovals, racecourses and verges of roads and airstrips are also used. Little Curlews generally spend the non-breeding season in northern Australia from Port Hedland to the Queensland coast. There are more scattered records of the species from inland Australia and in the southwest (DotE 2016).	Unlikely Species known from the region but no suitable habitat present.
Onychoprion anaethetus	*Bridled Tern*	IA	MI	N	Y	In Australia, Bridled Terns are widespread, breeding on offshore islands in western, northern and north-eastern Australia, extending from Cape Leeuwin in the south-west, around northern Australia. The species forages in offshore, continental shelf waters and is only rarely recorded along mainland coasts, even those adjacent or close to breeding colonies (DEE 2018).	Unlikely Species known from the region but no suitable habitat present.
Pandion haliaetus	*Osprey*	-	-	N	Y	Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging. They frequent	Unlikely Species known from the region but no suitable habitat present.

Species name	Common name	Status		Search		Description and habitat requirements	Likelihood of occurrence
		State	Federal	NM	PMST		
						a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes. They exhibit a preference for coastal cliffs and elevated islands in some parts of their range but may also occur on low sandy, muddy or rocky shores and over coral cays (DEE 2016). The osprey is found along all of the south west coast line except east of Cape le Grand where it becomes scarce (Nevill 2013).	
Sternula nereis nereis	*Australian Fairy Tern*	VU	VU	N	Y	The Fairy Tern occurs along the coast of WA as far north as the Dampier Archipelago near Karratha, but mostly in the southern part of Australia including most of the coastline in the south west. It nests on sheltered sandy beaches, coastal inlets, spits and banks above the high tide line and below vegetation. It has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands, and mainland coastline (DEE 2018; Nevill 2013). They can also be seen in saltfields, saline or brackish lakes, and sewage ponds near the coast (Pizzey and Knight 2012).	Unlikely Species known from the region but no suitable habitat present.
Oxyura australis	*Blue-billed Duck*	P4	-	Y	N	The blue-billed duck is a small Australian almost entirely aquatic duck (Morcombe 2004). The blue-billed duck is endemic to Australia's temperate regions, ranging from the south west of WA, extending to southern Queensland, through New South Wales and Victoria, to Tasmania. The species is readily seen on freshwater lakes and billabongs where deep fresh water is present (Morcombe 2004).	Unlikely Species known from the region but no suitable habitat present.
Plegadis falcinellus	*Glossy Ibis*	IA	MI	Y	N	The Glossy Ibis' preferred habitat for foraging and breeding are shallow, grassy, fresh water marshes at the edges of lakes and rivers, lagoons, flood-	Unlikely

Species name	Common name	Status		Search		Description and habitat requirements	Likelihood of occurrence
		State	Federal	NM	PMST		
						plains, wet meadows, swamps, reservoirs, sewage ponds, and cultivated areas under irrigation. The species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons, and in wooded swamps, artificial wetlands (such as irrigated fields), and in mangroves. It may retreat to permanent wetlands and/or coastal areas (including tidal wetlands) during drought (DEE 2018). It can be seen at Herdsman Lake regularly, and at Joondalup, Thompson and Forrestdale Lakes when winter wet. They are found on the Swan Coastal Plain in Wallering and Benger Swamps, and Lake McClarty when winter wet (Nevill 2013).	Species known from the region but no suitable habitat present.
Pluvialis squatarola	*Grey Plover*	IA	MI	Y	N	Grey Plovers occur almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes. The species is also very occasionally recorded further inland, where they occur around wetlands or salt-lakes (DEE 2018).	Unlikely Species known from the region but no suitable habitat present.
Thalassarche carteri	*Yellow-nosed Albatross*	VU & IA	MI	Y	N	In the Australasian region, the species occupies inshore and offshore waters. The species nests on tussock-covered coastal cliffs and slopes, often in rocky situations (DEE 2018).	Unlikely Species known from the region but no suitable habitat present.
Thalasseus bergii	*Crested Tern*	IA	MI	Y	N	The Crested tern occurs in tropical and warm temperate coastal parts of Australia. When not breeding, the greater crested tern will roost or rest on open shores, less often on boats, pilings, harbour buildings and raised salt mounds in lagoons. It is rarely seen on tidal creeks or inland waters.	Unlikely Species known from the region but no suitable habitat present.

Species name	Common name	Status		Search		Description and habitat requirements	Likelihood of occurrence
		State	Federal	NM	PMST		
Tringa nebularia	*Common Greenshank, greenshank*	IA	MI	Y	Y	The Common Greenshank is found in a wide variety of inland wetlands and coastal habitats of varying salinity. It occurs in sheltered coastal areas typically with large mudflats and saltmarsh, mangroves or seagrass, including embayments, harbours, river estuaries, deltas and lagoons, but less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats, and artificial wetlands. They occur around most of the coast from Cape Arid in the south to Carnarvon in the north-west (DEE 2018), and are moderately common here given suitable habitat. They can be found in areas including Wannamal Lake, many Perth lakes, Alfred Cove, Peel Inlet, Vasse and Harvey Estuaries, and the Albany and Esperance regions (Nevill 2013).	Unlikely Species known from the region but no suitable habitat present.
Tringa brevipes	*Grey-tailed Tattler*	IA & P4	MI	N	Y	The Grey-tailed Tattler is often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide. It has been found around shores of rock, shingle, gravel or shells and also on intertidal mudflats in embayments, estuaries and coastal lagoons, especially fringed with mangroves. In Moreton Bay, Queensland, it is most abundant in areas with dense beds of seagrass. In Tasmania it is also abundant in areas with seagrass beds. It is less often on open flat sandy beaches or sandbanks, especially around accumulated seaweed or isolated clumps of dead coral. It is occasionally found around near-coastal wetlands, such as lagoons and lakes and ponds in sewage farms and saltworks. Inland records for the species	Unlikely Species known from the region but no suitable habitat present.

Species name	Common name	Status		Search		Description and habitat requirements	Likelihood of occurrence
		State	Federal	NM	PMST		
						are rare with sightings on river banks and the edges of rock pools (Higgins & Davies 1996).	
Notamacropus irma	*Western Brush Wallaby*	P4	-	Y	N	The Western Brush Wallaby is a grazer found primarily in open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. It is also found in some areas of mallee and heathland, and is uncommon in karri forest. This species was once very common in the south-west of Western Australia but has undergone a reduction in range and a significant decline in abundance in its current habitat. (Van Dyke & Strahan 2008).	Likely Species known from the region, potentially suitable habitat present.
Acanthophis antarcticus	*Southern Death Adder*	P3	-	Y	N	The Southern Death Adder habitat ranges from rainforest to shrublands and heaths. This species is declining in many areas, probably due to habitat destruction and altered fire regimes (Wilson and Swan 2013).	Likely Species known from the region, potentially suitable habitat present.
Dasyurus geoffroii	Chuditch, Western Quoll	VU	VU	N	Y	The Chuditch inhabits eucalypt forest (especially Jarrah, *E. marginata*), dry woodland, mallee shrublands, heaths, and desert, particularly in the south coast of WA. They also occur at lower densities in drier woodland and mallee shrubland in the goldfields and wheatbelt, as well as in Kalbarri National Park (translocated). Chuditch require adequate numbers of suitable den and refuge sites (horizontal hollow logs or earth burrows) to survive (DEC 2012). In Jarrah forest, Chuditch populations occur in both moist, densely vegetated, steeply sloping forest and drier, open, gently sloping forest (Van Dyke and Strahan 2008). The species can travel large distances, and for this reason requires habitats that are of a suitable size and not excessively fragmented.	Likely Species known from the region, potentially suitable habitat present.

Appendix E – Field Survey Results

Flora species recorded within the project area

Family	Genus	Species	Status	Q1	Q2	Q3	Oppo
Aizoaceae	*Carpobrotus*	*virescens*					x
Aizoaceae	*Tetragonia*	*implexicoma*					x
Araliaceae	*Trachymene*	*pilosa*					x
Asparagaceae	**Asparagus*	*asparagoides*		x	x	x	
Asparagaceae	*Lomandra*	*mucronata*					x
Asparagaceae	*Thysanotus*	*manglesianus*				x	
Asphodelaceae	**Asphodelus*	*fistulosus*					x
Asteraceae	**Cirsium*	*vulgare*					x
Asteraceae	**Sonchus*	*asper*		x		x	
Asteraceae	**Sonchus*	*oleraceus*		x	x	x	
Asteraceae	*Olearia*	*axillaris*			x		x
Brassicaceae	**Brassica*	*tournefortii*			x	x	
Campanulaceae	*Wahlenbergia*	*capensis*					x
Chenopodiaceae	*Rhagodia*	*baccata*			x		
Cupressaceae	*Callitris*	*preissii*			x		
Cyperaceae	*Ficinia*	*nodosa*					x
Cyperaceae	*Lepidosperma*	*gladiatum*					x
Cyperaceae	*Lepidosperma*	*squamatum*		x	x	x	
Cyperaceae	*Schoenus*	*grandiflorus*					x
Cyperaceae	*Tetraria*	sp. Mt Madden		x			
Ericaceae	*Leucopogon*	*parviflorus*		x	x		
Euphorbiaceae	**Euphorbia*	*terracina*		x	x	x	
Fabaceae	*Acacia*	*cochlearis*		x	x		
Fabaceae	*Acacia*	*cyclops*					x
Fabaceae	*Acacia*	*rostellifera*					x
Fabaceae	*Acacia*	*saligna*				x	
Fabaceae	*Templetonia*	*retusa*			x	x	
Geraniaceae	**Pelargonium*	*capitatum*		x	x	x	
Geraniaceae	*Geranium*	*solanderi*			x		
Hemerocallidaceae	*Dianella*	*revoluta*					x
Iridaceae	*Patersonia*	*occidentalis*					x
Lauraceae	*Cassytha*	*racemosa*				x	
Loganiaceae	*Logania*	*vaginalis*					x
Myrtaceae	*Eucalyptus*	*gomphocephala*	planted				x
Myrtaceae	*Melaleuca*	*pentagona*			x		
Orchidaceae	*Caladenia*	*latifolia*					x
Orchidaceae	*Prasophyllum*	*odoratissimum*					x
Oxalidaceae	**Oxalis*	*pes-caprae*					x
Papaveraceae	**Fumaria*	*bastardii*				x	
Phyllanthaceae	*Phyllanthus*	*calycinus*		x	x	x	
Pinaceae	**Pinus*	*sp.*	planted				x
Poaceae	**Avena*	*barbata*					x
Poaceae	**Cenchrus*	*clandestinus*					x

Family	Genus	Species	Status	Q1	Q2	Q3	Oppo
Poaceae	**Ehrharta*	*calycina*			x	x	
Poaceae	**Ehrharta*	*longiflora*		x	x	x	
Poaceae	**Eragrostis*	*curvula*					x
Poaceae	**Lagurus*	*ovatus*		x	x	x	
Poaceae	*Austrostipa*	*sp.*		x	x		
Poaceae	*Poa*	*poiformis*		x			
Polygalaceae	**Polygala*	*myrtifolia*			x		
Polygonaceae	*Muehlenbeckia*	*adpressa*		x			
Primulaceae	**Lysimachia*	*arvensis*		x	x	x	
Ranunculaceae	*Clematis*	*linearifolia*		x	x	x	
Restionaceae	*Desmocladus*	*flexuosus*		x	x	x	
Rhamnaceae	*Spyridium*	*globulosum*		x	x	x	
Zygophyllaceae	*Roepera*	*billardierei*					x

Fauna species recorded within the project area

Family	Taxon	Common Name	Status
Birds			
Acanthizidae	*Sericornis frontalis*	White-browed Scrubwren	
Acanthizidae	*Acanthiza chrysorrhoa*	Inland Thornbill	
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	
Columbidae	*Phaps chalcoptera*	Common Bronzewing	
Corvidae	*Corvus coronoides*	Australian Raven	
Hirundinidae	*Hirundo neoxena*	Welcome Swallow	
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater	
Mammal			
Canidae	*Canis lupus*	Dog	*
Leporidae	*Oryctolagus cuniculus*	Rabbit	*
Macropidae	*Macropus fuliginosus*	Western Grey Kangaroo	
Reptiles			
Varanidae	*Varanus rosenbergi*	Heath Monitor	

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