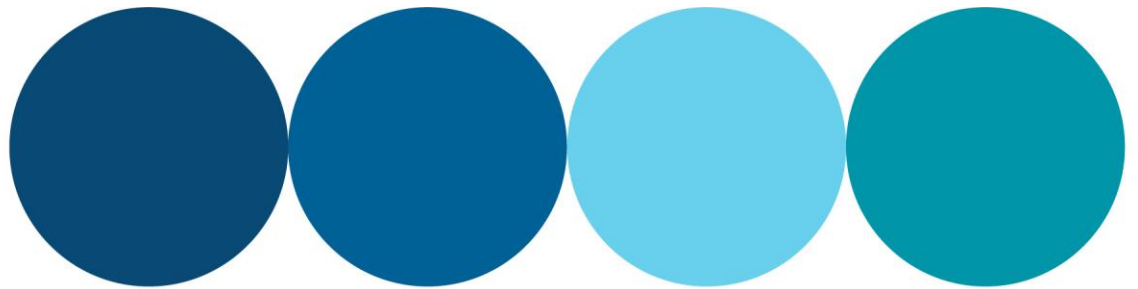


Environmental Offset Proposal

CD00116 Vasse Diversion Drain Upgrade





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1. Introduction

1.1. Purpose of this Document

The purpose of this document is to provide details on the offsets proposed for the Vasse Diversion Drain Upgrade project in accordance with the requirements of the Department of Water and Environmental Regulation (DWER) Clearing Permit process and the *Environment Protection and Biodiversity Conservation Act* (EPBC Act) 1999 bilateral assessment process.

This document has been prepared for the DWER Chief Executive Officer's (CEO) consideration and approval, as well as the approval of the Minister for the Environment and Energy (or a delegate thereof) as a part of a bilateral assessment.

1.2. Project Overview

The Water Corporation proposes to upgrade the Vasse Diversion Drain (VDD) within the City of Busselton. The VDD is located approximate 220km south of Perth and consists of a manmade channel and commences just north of the Busselton Golf Course with the diversion headworks, in the form of a barrier levee (Vasse River Diversion Dam (VRDD)) and extends to the ocean at Geograph Bay. The purpose of the drain is to divert the Vasse and Sabina River toward the west of Busselton and provide flood protection for the town. The infrastructure associated with the project includes (Figure 1, Appendix A):

- Reconstruct the Vasse Diversion Drain with a spillway structure
- Reconstruct entire length of the VDD levees with an engineering homogenous sand bank with a crest width of 4m surfaced wide to a height ranging from 1.25 to 1.75m above natural ground level.
- Excavation of the channel between the levee banks to increase the capacity of the drain.
- Removal of sediments, sands and other loose materials deposited above the general level of the invert of the drain between chainages 850 and 1122

Upgrade of the infrastructure will involve the clearing of small amounts of vegetation and fauna habitat.

1.3. Proponent

The Water Corporation has an obligation to provide sustainable management of water services, including the supply of water, and the treatment and disposal of wastewater within Western Australia. The Water Corporation is the proponent for the proposed project.

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2. Environmental Offset Policies

This offset proposal has been developed in accordance with the Western Australian Government's Environmental Offset Policy (EPA, 2011) as well as the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy (SEWPAC, 2012).

2.1. WA Environmental Offsets Principles

The following principles from the WA Government offsets policy have been considered:

- Environmental offsets will only be considered after avoidance and mitigation options have been pursued.
- Environmental offsets are not appropriate for all projects.
- Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted.
- Environmental offsets will be based on sound environmental information and knowledge.
- Environmental offsets will be applied within a framework of adaptive management.
- Environmental offsets will be focussed on longer term strategic outcomes.

2.2. Federal Offset Requirements

Consideration has also been given to the following requirements of the Federal Offsets Policy:

- Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter.
- Suitable offsets must be built around direct offsets but may include other compensatory measures.
- Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter.
- Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter.
- Suitable offsets must effectively account for and manage the risks of the offset not succeeding.
- Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs.
- Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable.
- Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.



3. Clearing Area

The proposed clearing area is 4.62 ha and is shown in overview in Figure 1, Appendix A. The project area is the maximum disturbance footprint and includes the clearing area for native vegetation and fauna habitat. The Project area is 42.01 hectares (ha) in total, of which approximately 6.14ha is made up of the existing VDD channel and 4.62ha contains native vegetation.

3.1. Biological Assessments

A spring flora, vegetation and fauna survey was undertaken in 2016 by GHD. The survey methodology employed by GHD was undertaken with reference to the Environmental Protection Authority (EPA) *Guidance Statement No. 51 Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA 2004a)* and EPA and Department of Parks and Wildlife, *Technical Guide – Terrestrial Flora and vegetation Surveys for Environmental Impact Assessment (EPA and DPaW 2015)* The flora and vegetation survey included a follow up targeted Carunup King Spider Orchid Survey. The fauna survey was undertaken in conjunction with the vegetation and flora survey with reference to the EPA *Guidance Statement No.56 Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (EPA 2004b)* and *Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA 2010)* the fauna survey included a targeted Black Cockatoo and Western ringtail possum habitat assessment.

In 2017 there were some changes made to the alignment due to change of infrastructure requirements and a specific effort to avoid identified Possum habitat Black Cockatoo habitat trees. Due to this change an additional Flora, Vegetation and Fauna Survey was undertaken by GHD to address the variation in the project footprint that was covered in the previous GHD survey.

A copy of all biological surveys undertaken is included in Appendix B.

3.2. Hierarchy of avoidance, minimisation, rectification and mitigation

Potential impacts to Black Cockatoo habitat trees and Possum Habitat (which are a MNES) have been specifically considered during project design and minimised as far as practical. The Project area has been designed to avoid potential breeding trees as much as possible. Approximately 11.5 ha of potential Black Cockatoo habitat trees were recorded during the GHD Black Cockatoo habitat assessments. An additional 74 potential breeding trees (3 with large hollows suitable for breeding) were also recorded. The final refined project area intersects 4.31ha of potential Black Cockatoo habitat trees reducing the area by 3.65ha. Impact to potential breeding trees has been reduced from 74 trees to 49 trees including two of the three trees with hollow suitable for breeding. Approximately 7.88ha of Western Ringtail Possum habitat was recorded during the GHD habitat assessment the final refined project area intersects 4.31 ha of Western Ringtail Possum habitat, reducing the area by approximately 3.65ha.

Revegetation of the clearing areas will be undertaken for locations where the clearing will no longer be required for access or maintenance following the upgrade of the Diversion Drain. This will be undertaken in accordance with a Revegetation Management Plan and will be based on revegetation through direct seeding or seedlings. Weed Management will also be implemented to increase the likelihood of success of the revegetation. The areas that will be able to be revegetated are likely to be minimal in light of the need to keep areas clearing for access and maintenance of the Vasse Diversion Drain. As such, it is not deemed suitable for the revegetation to be considered as a part of this Offset Proposal.



The Water Corporation will prepare a number of management plans for implementation during the Project, including a Construction Environmental Management Plan (CEMP) which will be prepared by the Contractor in accordance with the Construction Environmental Management Framework (CEMF) that is prepared by the Water Corporation. The CEMF will identify the key objectives and outcomes that the CEMP will be required to meet. Environmental management actions that will be addressed will include (but not be limited to):

- Development and implementation of a Black Cockatoo and Western Ringtail Possum Management Plan.
- Minimise vegetation clearing and the area of disturbance on the ground by utilising existing cleared areas where possible.
- Retention, where possible, of potential black cockatoo and western ringtail possum habitat trees (particularly hollow-bearing trees). A pre-clearance survey will be undertaken to flag the potential black cockatoo trees within the project footprint and possum habitat trees (using distinctive flagging for those with hollows) to allow contractors to see which trees should be avoided where possible.
- A pre-clearing inspection of trees to be cleared will be undertaken to ensure there are no breeding activities or possums present in the trees. If breeding activities are identified clearing is to be avoided until such time nestlings have left the nest without human intervention.
- All vegetation proposed to be cleared will be clearly demarcated on site prior to the commencement of project activities.
- Clearing of vegetation shall not exceed the limits of clearing and mature trees shall be conserved as far as practicable.
- All staff and contractors involved in clearing activities will be inducted on the potential impacts to fauna and advised to stop works in the vicinity of any injured or shocked animals that are encountered.
- In the event that sick, injured or orphaned native wildlife are located on the project site, the WILDCARE Helpline ((08) 9474 9055) will be contacted for assistance.
- No pets, traps or firearms are allowed within the project area.
- Fauna are not to be fed or intentionally harmed or killed.
- Restrict movement of machines and other vehicles to the limits of the areas cleared.
- Identify areas to undertake weed control to stop spread of weeds.
- Control/spray identified significant weeds species within the project area prior to construction to limit the amount of propagative material that may be spread during disturbance.
- Remove or kill any other weeds growing in project area that are likely to spread and result in environmental harm to adjacent areas of native vegetation that are in good or better condition

3.3. Summary of Assessment against the Environmental Protection Act (WA) Ten Clearing Principles

The DWER have yet to undertake their assessment of the proposed clearing against the ten clearing principles, however an assessment undertaken by GHD on Water Corporation's behalf has indicated that the proposed clearing is at variance to principles B and F and may be at variance to principles G,I and J as detailed below.

Principle B - Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia



Six (6) fauna habitat types have been identified across the Project area, including 6.41 ha of native vegetation, 0.04 ha of rehabilitated areas and 9.6 ha of aquatic habitat. A further 15.83 ha of highly disturbed areas, representing approximately half of the survey area, provides little to no value to fauna. While large sections of the survey area have previously been disturbed, where native vegetation remains it retains some structure and provides habitat for fauna.

Fauna surveys undertaken in the Project area identified the presence of four (4) fauna species of conservation significance; Queda, (Priority 4 DpAW), Osprey Migratory Wetland (EPBC Act), Schedule 5 (WC Act), Western Ringtail Possum Critically Endangered (EPBC Act), Endangered (WC Act), Carters Freshwater Mussel Vulnerable (WC Act) (GHD 2017). An additional 18 conservation significant fauna were identified as likely to occur in the Project area, including Carnaby's, Baudin's and Forest Red-tailed Black Cockatoos.

The vegetation within the Project area was identified as suitable foraging habitat and potential breeding and roosting habitat for the three (3) threatened species of Black Cockatoo. None of the three species were recorded within the Project area at the time of the survey.

Seventy four (74) potential habitat trees were identified within the survey areas by GHD. The Project area has since been refined to reduce the amount of clearing required and in particular retain as many potential black cockatoo habitat trees as possible. As a result, a total of 49 potentially Black Cockatoo breeding trees are located within the Project area. Of these, 2 are hollow-bearing, although none of these trees had evidence of current or previous Black Cockatoo use (i.e. old chew marks). No Evidence of foraging was recorded throughout the project area, there is 4.81 ha of suitable foraging habitat.

The Western Ringtail Possum has previously been recorded within the project footprint (GHD 2017a and 017b). Evidence of their presence (including scats and dreys) were recorded throughout the project footprint in the Peppermint Woodland and Marri and Flooded Gum Woodland (GHD 2017b). A total of 4.23 ha of primary corridor and supportive habitat for Western Ringtail Possum is present within the project footprint.

The VDD provides suitable habitat for the Carters Mussel which was recorded in the southern section of the project footprint during the 2016 fauna assessment (GHD 201a). This species can be found in freshwater streams, rivers, billabongs, ponds, wetlands and lakes inland from the coast. (Murdoch University and SERCUL 2016). Livestock and impacts from urban development may cause erosion of the habitat for this species, while livestock have been known to crush shells (Murdoch University and SERCUL 2016). This species is also prone to decrease levels of oxygen within the water and increased levels of salinity (GHD 2017a).

The majority of the habitats recorded in the Project Area are well represented in the immediate vicinity of the Project area and the broader Blackwood district (particularly in the conservation areas and State Forest) and would be utilised by all the conservation significant species known or likely to occur in the area. Furthermore, there is no habitat within the survey area that would be considered specific to or solely relied upon by any of the conservation significant species known or likely to occur within the area. Given the relatively small area to be cleared, the linear nature of the Project area, the extent of suitable habitat within the immediate vicinity and existing disturbances within the Project Area, the proposed clearing is not expected to have a significant impact upon fauna species of conservation significance.

2017a). ***Principle F - Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland***

The project footprint intersects the Vasse-Wonnerup Wetlands Ramsar site. This Ramsar site covers an area of 1,115 ha including Wonnerup Inlet, the Vasse and Wonnerup estuaries and lower reaches along the Sabina and Abba rivers (Wetland Research and Management 2007). The wetland system has been historically modified. Regardless of these past disturbances, the wetlands provide important habitat for



waterbirds while also providing flood and storm protection for low-lying coastal communities, including the township of Busselton.

Five Geomorphic Wetlands occur within the project footprint, including two Conservation Category wetlands and three Multiple Use wetlands. The Geomorphic Wetlands located in the middle of the project footprint are also associated with the Vasse-Wonerup system, a Ramsar listed wetland.

Vegetation association, Tall *Melaleuca* shrubland (0.31 ha) located within the Geomorphic Wetlands UFI 222, UFI 223, UFI 13198 and UFI 13995 of the project footprint is considered riparian vegetation, and is restricted to these areas within the landscape. This vegetation ranged from Very Good to Completely Degraded condition, with 0.13 ha in Very Good to Good condition, 0.12 ha in Good to Degraded condition.

Approximately one quarter of the project footprint is classified as multiple use wetland. Small areas of native vegetation remain within these areas, however are not considered riparian vegetation as they are not associated with any defined watercourse or wetland, and were in Completely Degraded condition. Species associated with floodplains were recorded within the Marri and Flooded Gum woodland in the south of the project footprint. These areas were predominantly in Degraded to Completely Degraded condition, with no understorey remaining.

Clearing of the *Melaleuca* shrubland vegetation associated with the wetlands located within the project footprint is at variance to this principle. Although the vegetation is associated with a drainage system, this is highly modified and degraded with the proposed clearing unlikely to significantly deteriorate this system further.

3.4. Summary of Impact to Matters of National Environmental Significance (MNES)

The proposal has been determined to be a controlled action by the Federal Department of the Environment and Energy (Decision Notice dated 9th August 2017). The DotEE has determined that the proposed action is likely to have a significant impact on the following matters protected by the EPBC Act:

- Listed threatened species and communities (section 18 & section 18A).

Specifically, it was identified that the proposed action is likely to have a significant impact on, but not limited to, the vulnerable Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*), the vulnerable Baudin's Black Cockatoo (*Calyptorhynchus baudinii*) the endangered Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) and the Western Ringtail Possum (*pseudocheirus occidentalis*).



4. Direct Offset

The direct offset that is proposed for this project is the allocation of a portion of an Advanced Offset site that has been agreed to, for use as future project offsets, between DWER and the Water Corporation. The site is Reserve 24734, known as Rocky Gully, and the strategic land banking of this site for future offsets was agreed to in 2016. The proposed offset site is located approximately 230km to the south west of the Project Area (shown in Figure 2, Appendix A). It is put forward that 24 ha of this site be allocated for use as an offset for this project (Vasse Diverison Drain) and its respective proposed clearing activities. The proposed allocated portion of the greater Rocky Gully site is shown in Figure 3, Appendix A.

Following the agreement, the land was transferred to the Western Australian Department of Biodiversity Conservation and Attractions (DBCA) in June 2017 (then Department of Parks and Wildlife) and is now identified as Reserve 52970. Prior to this, Reserve 24734 was zoned for 'Public Purposes – Water Reserve' in the Shire of Plantagenet Local Planning Scheme 3 and did not have any active management measures in place for the protection of its environmental qualities. Vesting part of the reserve in the Conservation and Parks Commission has therefore significantly increased the level of protection in place, due to formal protection under the *Conservation and Land Management Act*, and has also allowed for the management of the land by DBCA.

4.1. Biological Survey

AECOM conducted a Level 1 Flora, Vegetation and Fauna survey including a Black Cockatoo and riparian assessment of the Rocky Gully Reserve (currently owned by the Water Corporation) in July 2016 to determine its environmental value for use as an offset site.

Please refer to Appendix C for a copy of the survey report.



4.2. Appropriateness

4.2.1. Like for Like

The following table shows a comparison of the key environmental factors and characteristics of the proposed Clearing area and the proposed offset site (Rocky Gully Reserve) to demonstrate the relevance and proportionality of the proposed offset:

Table 1. Comparison table of Environmental Characteristics

| Characteristic/Factor | Proposed Clearing Area | Rocky Gully Reserve |
|-----------------------|--|--|
| IBRA Region | Swan Coastal plain | Jarrah Forest IBRA |
| IBRA Sub-region | Banksia woodland and Tuart | Southern Jarrah Forest Bioregion |
| Vegetation type | <p>five vegetation types were mapped by GHD (GHD, 2017) and described for the survey area. Six vegetation types were identified and described from the survey area. Eucalyptus woodland in the south of the survey area, Melaleuca shrublands in the middle of the survey area, associated with agonis flexuosa tall shrublands to woodlands in the north of the survey area. The survey area in the south was dominated by Eucalyptus woodland, while the north of the survey area was dominated Agonis flexuosa shrublands and woodlands,. The vegetation types identified by GHD, 2017 are as follows:</p> <ul style="list-style-type: none"> • Marri and Flooded Gum woodland (VT1) - <i>Eucalyptus rudis</i>, <i>Corymbia calophylla</i> and <i>Agonis flexuosa</i> open woodland over <i>Melaleuca rhapsiophylla</i> tall hrubland over *<i>Avena fatua</i> tussock grassland over *<i>Watsonia meriana</i> and *<i>Oxalis pes-caprae</i> herbland • Peppermint woodland (VT2) - <i>Agonis flexuosa</i> woodland with scattered <i>Corymbia calophylla</i> trees over <i>Acacia saligna</i> and <i>Melaleuca rhapsiophylla</i> mid to tall shrubland over *<i>Ehrharta longifolia</i> tussock grassland over *<i>Zantedeschia aethiopica</i>, *<i>Watsonia meriana</i> and *<i>Oxalis pescaprae</i> open herbland • <i>Acacia</i> and Peppermint shrubland (VT3 and VT4) - <i>Agonis flexuosa</i>, <i>Acacia saligna</i> and <i>Jacksonia furcellata</i> tall shrubland over Poaceae sp. tussock grassland over <i>Conostylis aculeata</i> subsp. <i>Aculeate</i> | <p>The three vegetation types mapped as occurring within the Rocky Gully Reserve area (Aecom 2016) are (Figure 4, Appendix A):</p> <ul style="list-style-type: none"> • <i>Eucalyptus marginata</i> subsp. <i>marginata</i> and <i>Corymbia calophylla</i> mid open forest (2000 cm, 50%) over <i>Agonis theiformis</i>, <i>Bossiaea linophylla</i> and <i>Xanthorrhoea preissii</i> (200 cm, 30%) mid to tall shrubland over <i>Anarthria prolifera</i>, <i>Cheilanthes austrotenuifolia</i> and <i>Bossiaea ornata</i> mid to low open mixed sedge/shrub and forbland. Occasional <i>Banksia grandis</i> were observed, usually in poor condition with numerous dead and fallen trees. High diversity of other forbs and shrubs in this community including <i>Leucopogon</i> species, Fabaceae (pea) species, and <i>Lomandra</i>. • <i>Eucalyptus marginata</i> subsp. <i>marginata</i> and <i>Corymbia calophylla</i> mid open forest over <i>Bossiaea linophylla</i>, <i>Leucopogon obovatus</i> subsp. <i>revolutus</i> and <i>Hakea lissocarpa</i> mid open shrubland over <i>Hypocalymma angustifolium</i>, <i>Cyathochaeta avenacea</i> and <i>Astroloma pallidum</i> mid to low open mixed rush/shrubland. The most notable difference between EmBIHa and EmAtAp is the lack of tall shrubs of <i>Agonis theiformis</i> which has led to a more diverse low shrub and forb understorey. Encompassed in this community are small bare areas of white sand and exposed granite, too small to map as separate communities for the purposes of this assessment. • <i>Melaleuca preissiana</i>, <i>Eucalyptus marginata</i> subsp. <i>marginata</i> and occasional <i>Eucalyptus rudis</i> low to mid woodland to open woodland over <i>Astartea scoparia</i>, <i>Taxandria parviceps</i> and <i>Melaleuca viminea</i> subsp. <i>viminea</i> tall shrubland over <i>Cyathochaeta avenacea</i>, <i>Leptocarpus kraussii</i> and <i>Philydrella</i> |



| | | |
|------------------|---|---|
| | <p>open sedgeland over <i>*Pelargonium capitatum</i>, <i>*Romulea rosea</i> and <i>*Watsonia meriana</i> open herbland</p> <ul style="list-style-type: none"> Tall <i>Melaleuca</i> shrubland (VT5) - <i>Melaleuca cuticularis</i>, <i>M. lanceolate</i> and <i>M. raphiophylla</i> tall open shrubland over <i>Lepidosperma carphoides</i> and <i>Gahnia trifida</i> sedgeland Peppermint woodland over sedgeland (VT6) - <i>Agonis flexuosa</i> woodland over <i>Acacia littorea</i>, <i>Olearia axillaris</i> and <i>Spyridium globulosum</i> tall open shrubland over <i>Spinifex longifolius</i> and <i>*Bromus diandrus</i> tussock grassland over <i>Lepidosperma effusum</i> sedgeland over <i>Acanthocarpus preissii</i> and <i>*Fumaria capreolata</i> herbland Rehabilitated areas (RA) - Consists of areas rehabilitated with local and regional native species <p>A total of 4.31 ha of vegetation is proposed to be cleared.</p> | <p><i>drummondii</i> low sedgeland. The tall shrubland stratum occurs as a mosaic, with often only one of these species occurring as thickets at various locations. <i>Hypocalymma angustifolium</i> observed within ecotone between riparian vegetation and adjacent Jarrah Forest. Contains occasional <i>Juncus kraussii</i>.</p> <p>A total of 24 ha of vegetation is proposed to be allocated as an offset for this project.</p> |
| Dominant Species | Marri and Flooded Gum | Jarrah and Marri |
| Condition | The vegetation condition throughout the survey area was rated as very good to completely degraded. The majority of vegetation within the survey area was rated as degraded to completely degraded condition, with little to no understorey remaining. Vegetation structure was significantly altered by disturbance, largely due to weeds and clearing, however retained basic vegetation structure (GHD 2017) | 99% of the vegetation within the Rocky Gully reserve is considered to be of “excellent” condition (Aecom 2016) (Figure 5, Appendix A). The proposed offset area to be used for the project is entirely within the ‘Excellent’ condition rating. |
| Fauna habitat | <p>The Flora and Fauna surveys undertaken by GHD noted that the vegetation within the proposed clearing area (4.31ha) would potentially be used for foraging, breeding and roosting for all three conservation significant Black Cockatoo species.</p> <p>The targeted black cockatoo habitat assessment undertaken by GHD identified a total of total of 49 potential black cockatoo habitat trees (DBH >500 mm). Of these, only 2 trees have hollows, although none were observed or known to be actively used by black cockatoos for breeding or roosting. 4.31 ha of black cockatoo foraging habitat will</p> | <p>The Flora and Fauna survey carried out by AECOM, noted that the Rocky Gully area is comprised of ‘quality’ habitat for the three conservation significant species of Black Cockatoos.</p> <p>The AECOM survey estimated that approximately 54 possible breeding trees per hectare are present within the Rocky Gully Reserve, with the area also containing foraging and roosting habitat for Black Cockatoos. No signs of roosting were observed during the survey, however the site is extensive and a detailed search for signs of roosting was outside of the survey’s scope.</p> <p>Numerous occurrences of Baudin’s Black Cockatoos were noted during the survey.</p> |



| | | |
|------------------------|--|---|
| | potentially be removed (1.20ha high value and 3.11ha of low value habitat). | The proposed offset site of 24 ha could therefore provide as many as 1200 potential breeding trees (estimate only) and will provide 24 ha of suitable foraging habitat for all three conservation significant Black Cockatoo species. |
| Ecological Communities | No TECs or were identified within the proposed Clearing Area. 2.88ha align with the DPaW Priority 1 listed PEC Eucalyptus rudis (flooded gum), corymbia calophylla, Agonis flexuosa closed low forest. | No TECs or PECs occur within the Rocky Gully Reserve. |
| Riparian Vegetation | Geomorphic Wetlands occur within the survey area These are UFI 222, UFI 223, UFI 224, UFI 13198, and UFI 13995 and are considered significant as they are restricted to these areas in the landscape The proposed impacted area of riparian vegetation within the proposed clearing area is 0.74 ha. | The Rocky Gully reserve contains the Rocky Gully creek-line and associated riparian vegetation. The reserve is located at the headwaters of a tributary to the Frankland river. Within the portion of Rocky Gully reserve proposed for offset for this project there is approx. 11 ha of riparian vegetation in pristine condition. |



4.2.2. Long-Term Benefit

As a part of the advanced/strategic offset process, the Water Corporation has already transferred the land tenure to the Conservation and Parks Commission for conservation purposes (refer to the Certificate of Title included as Appendix D). The Water Corporation considers the offset proposed will assist to achieve environmentally beneficial outcomes through the security of the transference of the land into the conservation estate in perpetuity.

4.3. Statutory Requirements Met

The offset meets statutory, planning and regulatory requirements, pursuant to:

- Part V of the *Environmental Protection Act 1986*.
- EPA Guidance Statement No. 19 – Environmental offsets – Biodiversity.
- EPA Position Statement No. 9 – Environmental Offsets;.
- EPBC Act Environmental Offsets Policy.

4.4. Offset Documentation and Auditing

The area proposed for clearing and the proposed offset location will be defined and documented within the Clearing Permit as determined by DWER and as such will be auditable in the future according to the conditions of that permit.

4.5. Offsets Ratio and Net Gain

Utilising the recommended Offset Guideline developed and used by the Department of the Environment and Energy (Commonwealth) for MNES, the Water Corporation proposes the following offset outcomes for the projects:

Table 2. Offset Ratio and Net Gain

| Impact | Black Cockatoo Foraging and potential Breeding Habitat |
|------------------------|--|
| Clearing Impact (ha) | 4.81 ha |
| Quantam of Impact (ha) | 2.89 ha |
| Offset Outcome (ha) | 21.6 ha |

| Impact | Western Ringtail Possum Habitat |
|------------------------|---------------------------------|
| Clearing Impact (ha) | 4.31 ha |
| Quantam of Impact (ha) | 2.16 ha |
| Offset Outcome (ha) | 21.6 ha |



| Impact | Western Ringtail Possum Habitat |
|------------------------|---------------------------------|
| Clearing Impact (ha) | 0.71 ha |
| Quantam of Impact (ha) | .28 ha |
| Offset Outcome (ha) | 4 ha |

A copy of the calculator outcomes in full is provided as Appendix E.



5. Stakeholder Consultation

The proposed offset site has been transferred to the DBCA (previously DPaW) vested in the Conservation and Parks Commission for protection in perpetuity. During the establishment of the advanced offset site (strategic land banking), consultation was undertaken with the following stakeholders:

- DWER.
- DBCA (previously the Department of Parks and Wildlife).
- Department of Mines, Industry Regulation and Safety (DMIRS) (previously the Department of Mines and Petroleum).
- Department of Planning, Lands and Heritage (DPLH) (previously the Department of Lands).

A copy of the [final correspondence with these stakeholders is included in Appendix F.](#)



6. Glossary

Clearing is the killing of, removal of, severing or ringbarking of trunks or stems of, or the doing of any other substantial damage, including draining or flooding land, burning and grazing of stock, to some or all of the native vegetation in an area. (Clearing does not include pruning of native vegetation, to the extent the pruning does not cause substantial damage to the native vegetation).

Clearing principles are the principles for clearing native vegetation set out in Schedule 5 of the EP Act.

Environmental Offsets are beneficial activities undertaken to counterbalance an adverse environmental impact to achieve 'no net environmental loss' or a 'net environmental benefit'.

Environmentally Sensitive Areas (ESAs) are defined areas having significant environmental value which have been declared in Regulation 6 of the Clearing Regulations.

Native vegetation means indigenous aquatic or terrestrial vegetation but does not include vegetation that was intentionally sown, planted or propagated unless:


- (a) that vegetation was sown, planted or propagated as required under the EP Act or another written law; or
- (b) that vegetation is of a class declared by regulation to be included in this definition and includes dead vegetation unless that dead vegetation is of a class declared by regulation to be excluded from this definition but does not include vegetation in a plantation.



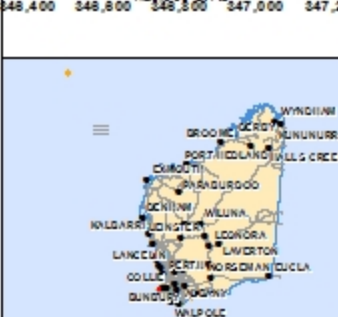
Appendix A

Figures



Legend
 Proposed Clearing Area Approx 4.62

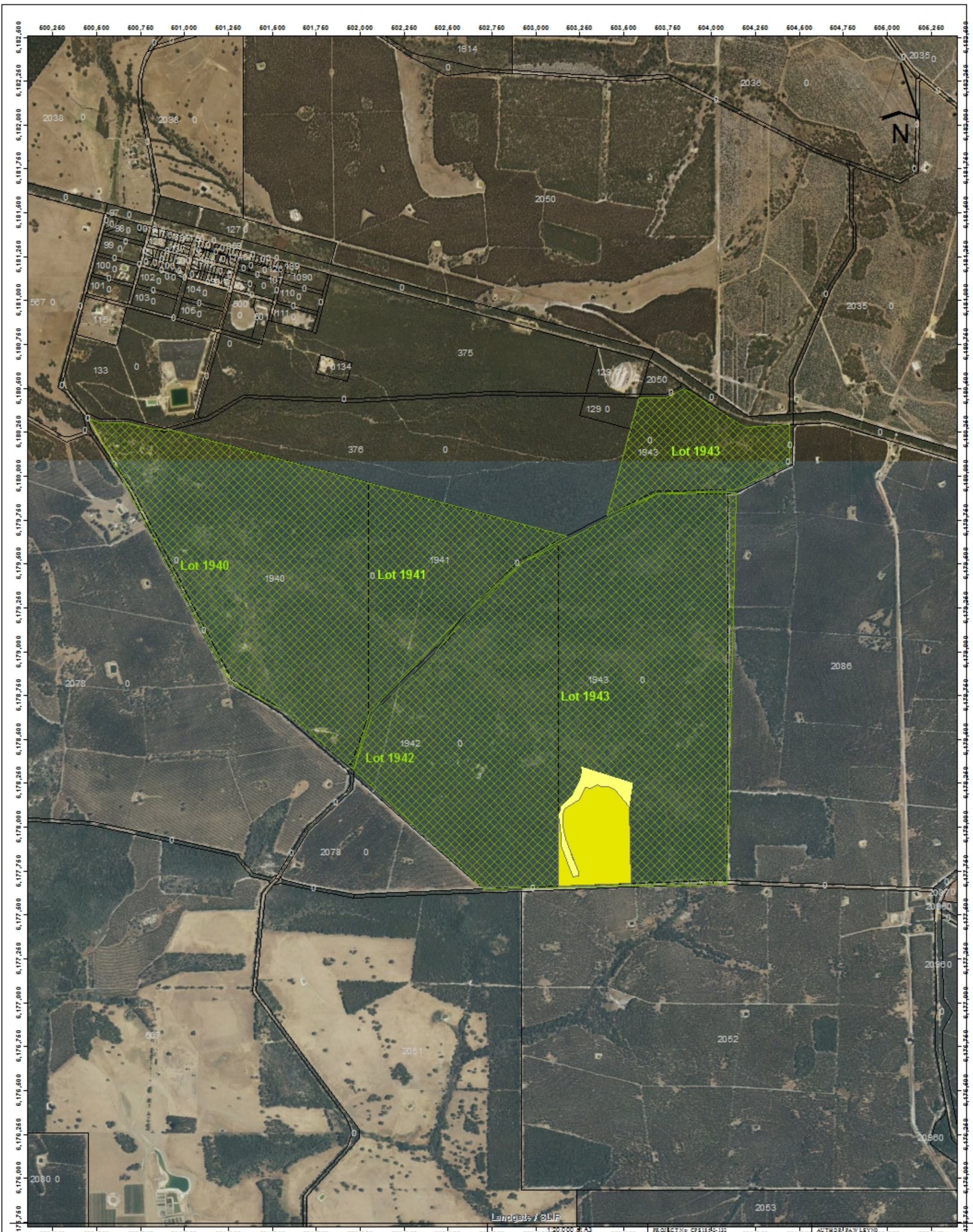
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PROJECT: Vasse Diversion Drain
 GROUP: Environment Branch, Approvals Section
 DATE: 15-Mar-2010
 DOCUMENT: Mapping on template.mxd



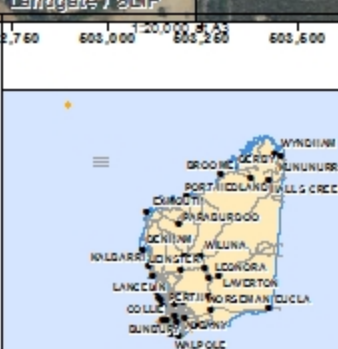
**Vasse Diversion Drain
 Site Location and project area Figure 1**



Legend

- Jarrah Mari Forest Offset
- Riparian Vegetation Offset
- Rocky Gull offset site reserved for future offsets

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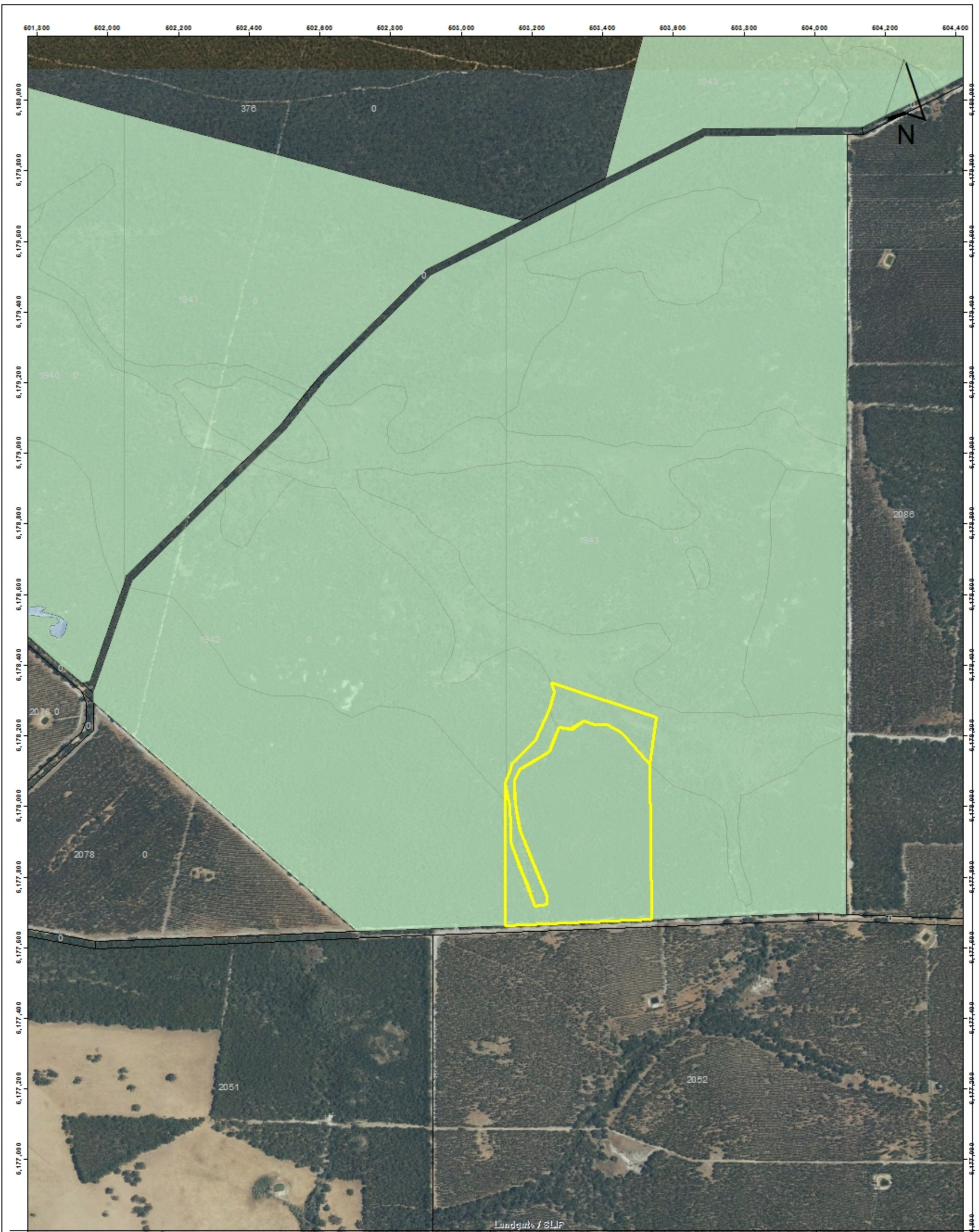


PROJECT: 01145-10
 GROUP: Environment Branch, Approvals Section
 DOCUMENT: mapping on template.mxd
 AUTHORITY: WATERS
 DATE: 15-Mar-2010



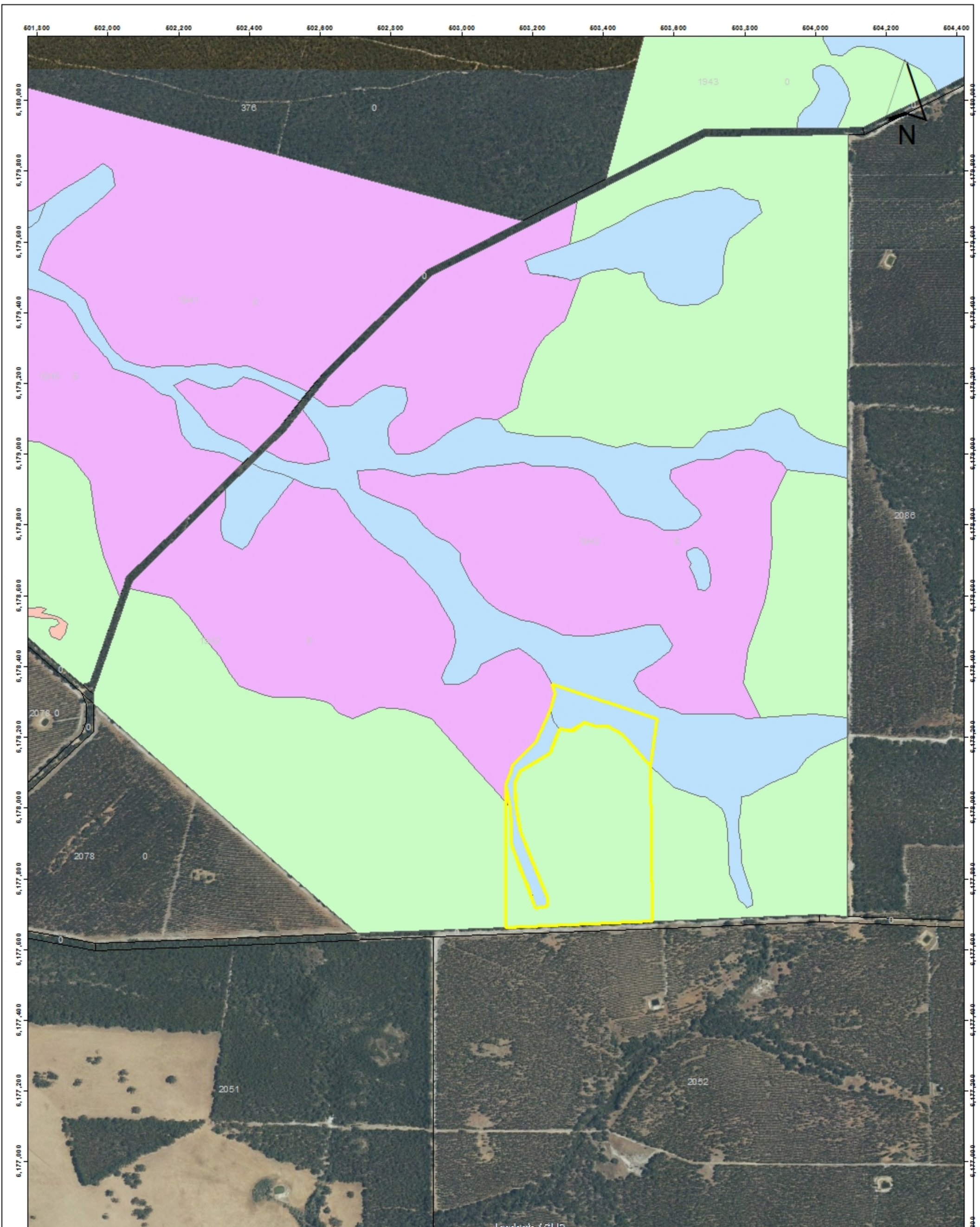
**Rocky Gully
Offset Site**

Figure 2



| | | |
|--|-----------------------|--|
| <p>Legend</p> <ul style="list-style-type: none"> Proposed Offset Allocation Proposed Offset Allocation <all other values> <p>Condition</p> <ul style="list-style-type: none"> Completely Degraded Degraded Excellent Very Good <p><small>Coordinate System: Victorian Datum, GSD The information shown here is the exclusive property of the Water Corporation and the respective copyright owners. It is subject to change without notice and should be used in conjunction with the associated materials. The user of this product should be aware, modified, reproduced or published in any form without the consent of the issuer.</small></p> | <p>1:10,000 Scale</p> | <p>Project No: CP5115-0-112 Group: Environment Branch, Approvals Section Document: mapping on template.mxd</p> <p>Author: PAUL LEVINS Date: 15-Mar-2010</p> <p>WATER CORPORATION</p> <p>Rocky Gully Offset Site</p> |
|--|-----------------------|--|

Figure 5



Legend

- Proposed Offset Allocation
- Proposed Offset Allocation
- all other values-
- Community**
- Cleared
- EmAaP
- EmBiHa
- MpAsCa
- Riparian Vegetation Offset
- Jarrah-Wheat Forest Offset

Landgate / SLIP

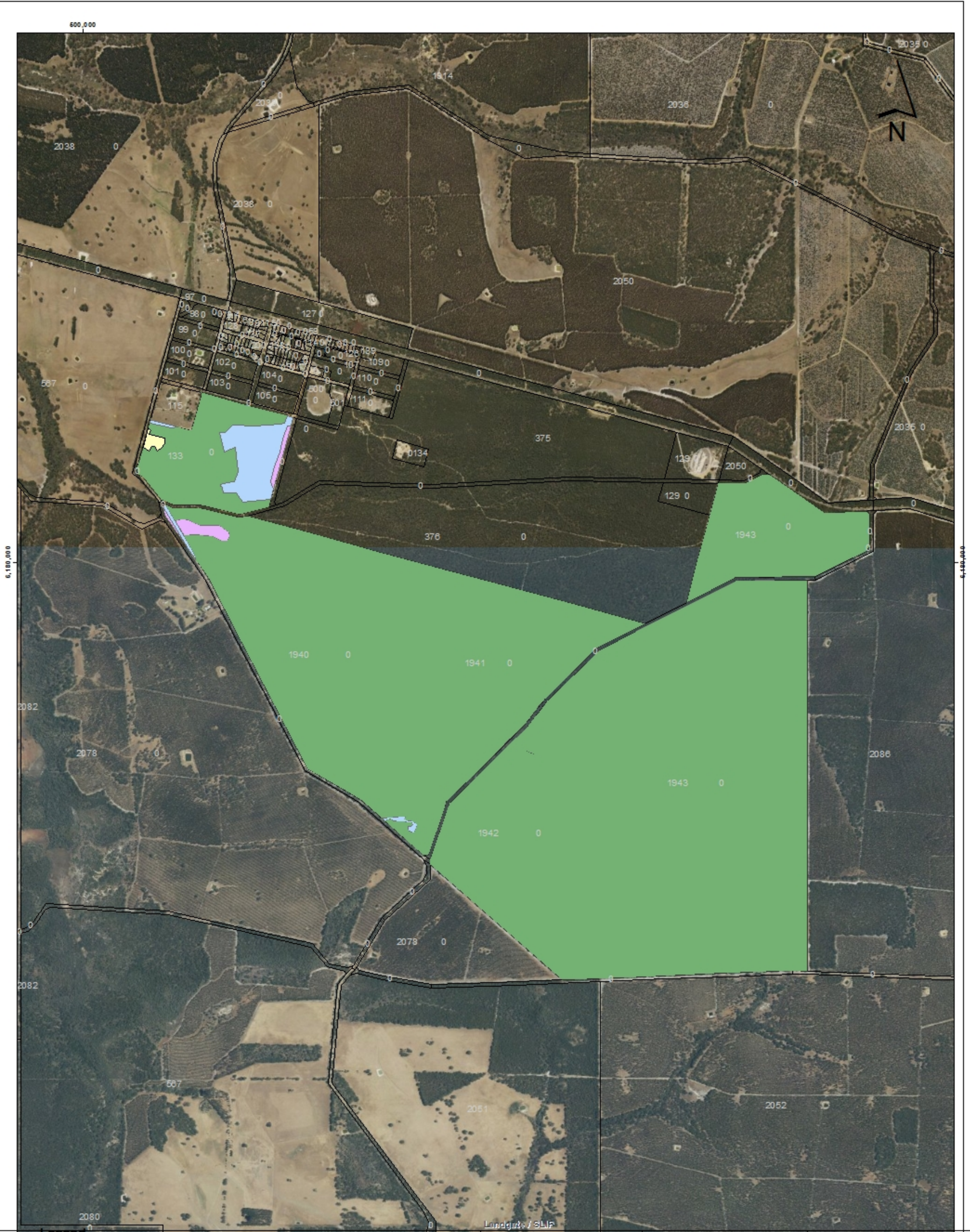
Project No: CP5115-0-112
 GROUP: Environment Branch, Approvals Section
 DATE: 15-Mar-2010



Rocky Gully Offset Site



Figure 3



Legend

600,000

<all other values>

Condition

- Completely Degraded
- Degraded
- Excellent
- Very Good
- Riparian Vegetation Offset
- Jarrah Marri Forest Offset

Download System: GDA 1984 MGA Zone 50 Vertical Datum: AHD

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1:20,000 at A3

The inset map shows the state of Western Australia with several regional centers marked: WILMINGTON, BROOME, OCEAN, KUNUNURRA, PORT HEDLAND, HILLS CREEK, CURRIE, PERSEVERANCE, WILUNA, WARRBURG, WILKINSON, WILUNA, LORRORA, LANCUNA, PERTH, NORTH BRIDGES, BUNBURY, WALPOLE.

PROJECT No: CP5185-0-102

GROUP: Environment Branch, Approvals Section

DOCUMENT: mapping on template.mxd

AUTHOR: PAW LEVNO

DATE: 15-Mar-2010

Rocky Gully Offset Site

Figure 5



Appendix B

Biological Assessment Reports

– Project Area



Water Corporation
Vasse Diversion Drain Upgrade
Flora and Fauna Study

April 2017

Executive summary

The Water Corporation (the Corporation) proposes to upgrade the Vasse Diversion Drain within the City of Busselton. The Vasse Diversion Drain (hereon referred to as the survey area) is located approximately 220 km from Perth on the shores of Geographe Bay. The Corporation requires a biological survey to understand the key flora, vegetation and fauna values, specifically the presence of Black Cockatoos and Western Ringtail Possum habitat within the drain areas proposed for upgrading.

GHD Pty Ltd (GHD) was commissioned to undertake a biological survey of the survey area (approximately 31.9 ha). The purpose of the survey was to define the biological values within the survey area, in particular their spatial location and conservation significance. The outcomes of the assessment will be used in the environmental assessment and approvals process and will inform the need for and scope of further field investigations and/or more detailed environmental impact assessment.

This report is subject to, and must be read in conjunction with, the limitations set out in Section 1.6 and the assumptions and qualifications contained throughout the Report.

The biological survey included a desktop assessment of the survey area and a field assessment that was conducted on 28 and 29 September 2016. This assessment determined the following:

- The survey area occurs within the Busselton-Capel Groundwater Area
- No conservation areas occur within the survey area, however an unnamed C Class Nature Reserve is adjacent to the most northern section of the survey area
- Seven Geomorphic Wetlands occur within the survey area. Two Conservation Category Wetlands, UFI 223 and UFI 13198 occur within a small section of the survey area, located between Bussell Highway and Busselton Bypass
- A large Environmentally Sensitive Area occurs within the survey area and is likely to be associated with the Conservation Category wetland
- An assessment of vegetation extents remaining indicates that the vegetation within the survey area are not well represented in the locality and region. The current extents remaining of vegetation association 1000 are less than the 30% threshold level at both the State and Local Government Area (LGA) level. The remaining extent of vegetation association 27 is below the 30% threshold at the Interim Biogeographic Regionalisation of Australia (IBRA) bioregion level and LGA level. Vegetation association 949 is below the 30% threshold level at the LGA level only
- Three broad floristic formations containing six vegetation types (in addition to rehabilitated areas, the drain and highly disturbed areas) were identified from the survey area
- No Threatened Ecological Communities were recorded within the survey area during the time of the assessment. Two vegetation types recorded during the assessment (Marri and Flooded Gum woodland and Peppermint woodland (total of 2.88 ha)) align with the Department of Parks and Wildlife (DPAW) Priority 1 listed Priority Ecological Community, *Eucalyptus rudis* (flooded gum), *Corymbia calophylla*, *Agonis flexuosa* Closed Low Forest (near Busselton)
- The vegetation within the survey area was rated as Very Good to Completely Degraded in condition. The vegetation throughout the survey area has been impacted by historical clearing and weed invasion

- Vegetation association, Tall *Melaleuca* shrubland (0.74 ha) located within the Geomorphic Wetlands survey area is considered riparian vegetation, and is restricted to these areas within the landscape and considered significant vegetation
- Seventy-three flora taxa (including subspecies and varieties) representing 32 families and 62 genera were recorded from the survey area during the 2016 field survey. This total comprised 35 native taxa and 38 introduced flora taxa
- No flora taxa listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), *Wildlife Conservation Act* (WC Act) or by DPaW were identified during the survey
- A flora likelihood of occurrence assessment concluded that seven taxa may possibly occur within the survey area and the remaining 54 taxa are unlikely or highly unlikely to occur within the survey area
- Six habitat types were recorded in the survey area and included Marri and Flooded Gum woodland, Peppermint woodland, Tall Melaleuca shrubland, Rehabilitated Areas, Vasse Drain and Highly Disturbed Areas
- 37 fauna species, consisting of 22 bird species, three reptiles, eight mammals, three amphibians and one mollusc were recorded within the survey area during the surveys
- Evidence of four species of conservation significance were recorded within the survey area during the survey. They included the Western Ringtail Possum (*Pseudocheirus occidentalis*), listed as Endangered under the EPBC Act and Critically Endangered under the WC Act, Carter's Freshwater Mussel (*Westralunio carteri*) listed as Vulnerable under the WC Act, the Quenda (*Isoodon obesulus* subsp. *fusciventer*), listed as Priority 4 by DPaW and the Osprey (*Pandion haliaetus*), listed under Schedule 5 under the WC Act
- There is 5.67 ha of core and supportive habitat within the survey area for the Western Ringtail Possum. The Peppermint woodland provides high value breeding habitat for the species. Although no dreys were identified within the survey area, a number were identified adjacent to the survey area.
- Approximately 38 individuals of the Vulnerable, WC Act listed Carters Mussel were recorded within one population identified in the south of survey area (9.6 ha) during the 2016 assessment
- An assessment on the likelihood of conservation significant fauna species occurring in the survey area was undertaken. Four conservation significant fauna species were identified as present within the survey area and 18 species are considered as likely to occur within the survey area.
- The Baudin's Cockatoo (listed as Vulnerable under the EPBC Act and Endangered under the WC Act), the Forest Red-tailed Black-Cockatoo (listed as Vulnerable under the EPBC Act and WC Act) and the Carnaby's Black Cockatoo (listed as Endangered under the EPBC Act and WC Act) may forage on the mixed woodlands and shrubs (5.67 ha) within the survey area. 2.41 ha of roosting habitat was recorded within the survey area in the form of Marri and Flooded Gum woodland. Additionally, there are 37 Marri and Flooded Gum trees within the survey area with a Diameter at Breast Height (DBH) of greater than 500 millimetres (mm) that are classified as 'potential breeding trees' for Black Cockatoos (DSEWPac 2012). One tree contains one medium hollow and two trees contain three small hollows that could provide suitable breeding habitat in the future.

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Appendices

Appendix A - (Figures)

Appendix B - (Relevant legislation, conservation codes and background information)

Appendix C - (Desktop searches)

Appendix D - (Flora data)

Appendix E - (Fauna data)

1. Introduction

1.1 Background

The Water Corporation (the Corporation) proposes to upgrade the Vasse Diversion Drain (VDD) within the City of Busselton. The Corporation requires a biological survey to understand the key flora, vegetation and fauna values, specifically the presence of Black Cockatoos and Western Ringtail Possum habitat within the drain areas proposed for upgrading.

1.2 Purpose of this report

GHD Pty Ltd (GHD) was commissioned to undertake a level 1 flora and fauna survey of the survey area. The purpose of the survey was to define the flora, vegetation and fauna values within the survey area, in particular their spatial location and conservation significance. The outcomes of the assessment will be used in the environmental assessment and approvals process and will inform the need for and scope of further field investigations and/or more detailed environmental impact assessment.

1.3 Survey area

The VDD is located in the City of Busselton approximately 220 km from Perth on the shores of Geographe Bay. GHD completed a flora and fauna assessment of a 6.3 km section of the VDD from the ocean outfall point at Geographe Bay in the north to the Busselton Golf Course in the south in 2009. The survey area incorporates the area assessed in 2009, as well as an additional area not previously surveyed.

The survey area associated with this assessment is approximately 31.9 hectare (ha) and is shown in Figure 1, Appendix A.

1.4 Scope of works

This flora and fauna assessment included both desktop and field assessments. The scope of works included:

- A review of the previous GHD (2010) report for the VDD
- A review of the Department of the Environment and Energy (DotEE) Protected Matters database to identify species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) potentially occurring within the survey area
- A review of the Department of Parks and Wildlife (DPaW) *NatureMap* database for flora and fauna species previously recorded within a 5 kilometre (km) buffer of the survey area
- A review of DPaW Threatened and Priority Ecological Communities and Flora databases. These databases will identify conservation significant communities or species (flora) present within the survey area and surrounds that are contained in DPaW records
- Consideration of previous vegetation mapping of the survey area (Smith 1973) and the pre-European extent remaining
- An assessment of aerial photography, geology/soils and hydrology information to provide background information on the variability of the environment and likely vegetation types
- Desktop identification of Environmentally Sensitive Areas, Bush Forever Sites, Environmental Protection Policy Areas and DPaW-managed conservation estates and reserves

- Desktop identification of Geomorphic wetlands and hydrological features
- A level 1 flora and vegetation survey to verify and refine the desktop information collated
- A level 1 fauna survey including targeted assessment for the three EPBC Act listed Black Cockatoo species and EPBC Act listed Western Ringtail Possum to verify and refine the desktop information collated
- Prepare a concise flora and vegetation and fauna survey report (this document)
- Prepare a letter report outlining recommendations and providing referral advice.

The field survey aimed to verify the outcomes of the desktop study and provide a detailed assessment of the existing environment in the survey area and its relationship to adjoining areas.

1.5 Relevant legislations, conservation codes and background information

In Western Australia significant 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 Project is provided in Appendix B

1.6 Limitations and assumptions

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

GHD otherwise disclaims responsibility to any person other than Water Corporation 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. 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 Water Corporation 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, and testing undertaken at or in connection with, 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, services, third party operational works 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, vegetation and fauna within the survey area (Figure 1, Appendix A). Should the survey 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 identify relevant environmental information pertaining to the survey area and to assist in survey design. This included a review of:

- GHD 2010, Report for Vasse Diversion Drain Upgrade, Flora and Fauna Study, unpublished report for the Water Corporation
- The DotEE Protected Matters Search Tool (PMST) to identify communities and species listed under the EPBC Act potentially occurring within a 5 km buffer of the survey area (DotE 2016b) (Appendix C)
- The DPaW Threatened Ecological Communities (TEC) and Priority Ecological Communities (PEC) database to determine the potential for TECs or PECs to be present within 5 km of the survey area
- The DPaW's *NatureMap* database for flora and fauna species previously recorded within 10 km of the survey area (DPaW 2007–) (Appendix C)
- The DPaW Threatened and Priority Flora database (TPFL) and Western Australian Herbarium database (WAHERB) for Threatened and Priority flora species listed under *Wildlife Conservation Act 1950* (WC Act) and listed as priority by DPaW, previously recorded within a 5 km buffer of the survey area
- Existing datasets including: previous vegetation mapping of the survey area (e.g. Smith 1973), aerial photography, geology/soils and hydrology information to provide background information on the variability of the environment, likely vegetation units and fauna habitats and to identify areas with potential to contain TECs, PECs, and Threatened and Priority listed flora and fauna species.

2.2 Field survey

2.2.1 Vegetation and flora

GHD ecologist (Gaynor Owen, SL011312) conducted a single season vegetation and flora assessment of the survey area on 28 and 29 September 2016. The field survey was undertaken to verify the results of the desktop assessment, identify and describe the dominant vegetation units, assess vegetation condition and identify and record vascular flora taxa present at the time of survey. Additionally, opportunistic searching for conservation significant or other significant ecological communities and flora taxa was undertaken.

The survey methodology employed by GHD was undertaken with reference to the Environmental Protection Authority (EPA) *Guidance Statement No. 51 Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004a) and EPA and Department of Parks and Wildlife, *Technical Guide – Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA and DPaW 2015).

Data collection

Field assessment methodology involved quadrats and opportunistic sampling. Quadrats were established in areas representative of a vegetation assemblage. Quadrats were 10 m x 10 m in size (area of 100 m²), with shape and/or size adjusted as necessary. Field data at each quadrat was recorded on a pro-forma data sheet and included the parameters indicated in Table 1.

Eight non-permanent quadrats were described throughout the survey area.

Table 1 Data collected during the field survey

| Aspect | Measurement |
|--------------------------------|---|
| Collection attributes | Personnel/recorder; quadrat code, date, quadrat dimensions, photograph of the quadrat. |
| Physical features | Aspect/slope, landform/soil attributes. Ground surface cover. Leaf and wood litter. |
| Location of important features | 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 Vegetation Condition rating scale (EPA and DPaW 2015) |
| 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 a modified Braun-Blanquet scale) |

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

Vegetation units

Vegetation units were identified and boundaries delineated using a combination of aerial photography, topographical features and field data/observations.

Vegetation units were described based on structure, dominant taxa and cover characteristics as defined by quadrat data and field observations. No floristic analysis was undertaken to assist in the classification of vegetation units. Vegetation units were compared to known TECs and PECs by inference only, no floristic/statistical analysis was undertaken.

Vegetation unit descriptions follow the National Vegetation Information System (NVIS) and are consistent with NVIS Level V (association), and are grouped within NVIS Level III (broad floristic formation). At Level V up to three taxa per stratum are used to describe the association (Executive Steering Committee for Australian Vegetation Information (ESCAVI) 2003).

Vegetation mapping has been undertaken at a scale of 1:6,000; this is considered a suitable scale for this project.

Vegetation condition

The vegetation condition of the survey area was assessed and mapped in accordance with the vegetation condition rating scale published by EPA and DPaW 2015. The scale recognises the intactness of vegetation, level of disturbance and weeds and the inherent ability of the remnant to be returned to a natural state without intensive intervention and consists of six rating levels as outlined in Appendix B

Flora identification and nomenclature

Species that were well known to the survey ecologist were identified in the field, while species that could not be identified in the field were collected and assigned a unique number to facilitate

tracking. Plant species were identified by the use of local and regional flora keys and by comparison with the named species held at the Western Australian Herbarium (WA Herbarium).

The conservation status of all recorded flora was compared against the current lists available on *FloraBase* (WA Herbarium 1998–) and the EPBC Act Threatened species database provided by DotE (2016a).

Nomenclature used in this report follows that used by the WA Herbarium as reported on *FloraBase* (WA Herbarium 1998–).

2.2.2 Fauna

The fauna field assessment was undertaken concurrently with the vegetation and flora assessment on 28 and 29 September 2016. The field survey was undertaken to identify fauna habitat types, assess habitat value and connectivity, identify and record fauna taxa present at the time of survey, and identify fauna habitats for conservation significant species.

The survey methodology employed by GHD was undertaken with reference to the EPA *Guidance Statement No. 56 Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004b) and *Technical Guide – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA 2010).

Habitat assessment

A fauna habitat assessment was undertaken to document the type, condition and extent of habitats within the survey area, this 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/boulder piles, and the type and extent of each refuge
- Presence/absence of waterways including type, extent and habitat quality within waterways
- Identification of wildlife corridors within and immediately adjacent to the survey area
- A photograph of the habitat type.

Opportunistic fauna searches

The fauna survey was an opportunistic survey and did not involve any fauna trapping. The survey involved visual and aural surveys for any fauna species utilising the survey area. The survey area was also searched for any fauna signs, such as tracks, scats, bones, diggings and feeding signs.

Surveys also included systematic searching across all habitat types, which is an effective method of surveying for many wildlife species. This involved searching through microhabitats where wildlife is known to frequent, including turning over logs or rocks, turning over leaf litter and examining hollow logs.

Targeted survey for Black Cockatoo

In addition to the targeted searches for conservation significant fauna species, a targeted habitat assessment for the Carnaby's Black Cockatoo, Baudin's Black Cockatoo and Forest Red-tailed Black Cockatoo was undertaken. The aim of the habitat assessment was to assess the presence, quality and extent of habitat for Black Cockatoos within the survey area. The assessment involved visual and aural assessment of the survey area identifying breeding habitat (presence/absence of actual and potential breeding trees), foraging habitat, roosting

areas, current activity and any other signs of use by Black Cockatoos. For the purpose of this assessment, the DSEWPaC (2012) Black Cockatoo referral guidelines were used to define breeding, foraging and night roosting habitat.

Information collected during the field survey included:

- Foraging habitat – the location and extent of suitable Black Cockatoo foraging habitat was identified for the survey area, based on the vegetation associations and presence/absence of known foraging species. During the field surveys any direct or indirect evidence of foraging by Black Cockatoos was recorded via GPS
- Breeding habitat – suitable breeding habitat for Black Cockatoo is defined by DSEWPaC (2012) as trees of species known to support breeding within the range of the species which either have a suitable nest hollow or are of a suitable diameter at breast height (DBH) to develop a nest hollow. For most tree species, suitable DBH is 500 millimetres (mm). Breeding habitat was identified and recorded via GPS, and mapped according to the presence of suitable breeding trees (including the presence and size of tree hollows). On average, Black Cockatoos are known to nest in hollows with an entrance diameter greater than 20-30 centimetres (cm) (Johnstone and Storr 1998; Groom 2011). Therefore, during the field survey a suitable nesting hollow currently able to support breeding was defined as a tree hollow with an entrance diameter greater than 20 cm. All trees with hollows with an entrance diameter less than 20 cm were also recorded
- Night roosting habitat – suitable roosting habitat is defined by DSEWPaC (2012). Suitable roosting habitat was identified based on the presence of suitable tall trees, proximity of known roosting sites and the presence of suitable foraging habitat
- Opportunistic observations (both visual and aural) of Black Cockatoos within the survey area and surrounding region.

This information was used to map and calculate the amount of foraging habitat, potential breeding habitat and night roosting sites within the survey area. Any area containing known foraging species or potential nesting trees was considered as habitat for Black Cockatoos. It is important to note that the accuracy of the GPS used to record breeding habitat is approximately ± 5 m, and therefore location data for individual trees includes up to ± 5 m error.

Fauna nomenclature

Nomenclature used in this report follows that used by the Western Australian Museum and the DPaW NatureMap database with the exception of birds where Christidis and Boles (2008) was used.

2.3 Desktop and survey limitations

2.3.1 Desktop limitations

The EPBC Act PMST is based on bioclimatic modelling for the potential presence of species. As such, this does not represent actual records of the species within the area. The records from the DPaW searches of threatened flora and fauna provide more accurate information for the general area. However, some records of collections, sightings or trappings can be dated and often misrepresent the current range of threatened species.

New Wildlife Conservation (Rare Flora) and Wildlife Conservation (Specially Protected Fauna) Notices were gazetted on 3 November 2015. The format of these Notices has been changed to align with the EPBC Act threatened species lists. To date information contained in publically available databases such as *NatureMap* does not reflect these newly gazetted Notices. This report has been updated to reflect the conservation status of flora and fauna listed in these

Notices. However, the outputs of database searches contained in this report such as *NatureMap*, does not reflect the conservation status of flora and fauna listed in these Notices.

2.3.2 Field survey limitations

Guidance Statement No. 51 and No. 56 (EPA 2004a, 2004b) states that flora and fauna survey reports for environmental impact assessment in Western Australia 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.

Table 2 Survey limitations

| Aspect | Constraint | Comment |
|---|------------|--|
| Sources of information and availability of contextual information. | Minor | Adequate information is available for the survey area, this includes: <ul style="list-style-type: none"> Broad scale (1:250,000) mapping by Smith (1973) and digitised by Shepherd et al. (2002) |
| Scope (what life forms were sampled etc.) | Nil | Vascular flora species were sampled during the survey. Non-vascular flora, invertebrates and aquatic fauna were not sampled as part of the survey. |
| Proportion of flora collected and identified (based on sampling, timing and intensity) Proportion of fauna identified, recorded and/or collected | Minor | The vegetation and flora survey was a single season survey only and was undertaken in late September. This is generally considered as a suitable time for surveying in the Swan Coastal Plain region as it falls within the peak flowering period. The flora recorded from the field survey is detailed in Section 4.2 and a full flora species list provided in Appendix D. The portion of flora collected and identified is considered high. The fauna survey was a habitat assessment and recording of opportunistic sightings only. The fauna assessment only sampled those species that can be easily seen, heard or have distinctive signs, such as tracks, scats, diggings etc. This survey was conducted over two days only and sightings of fauna species were limited. Many cryptic and nocturnal species would not have been identified during the survey and seasonal variation within species often requires multiple targeted surveys at a particular time of the year. 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 that of vertebrate species. |
| Flora determination | Minor | Flora determination was undertaken by the GHD ecologist in the field and at the Western Australian Herbarium. Of the 94 flora species, one flora collection could be identified to family only, two flora collections could be identified to genus only and three were tentative identifications ('?') only due to lack of flowering and fruiting material required for identification. The taxonomy and conservation status of the Western Australian flora is dynamic. This report was prepared with reliance on taxonomy and conservation current at the time issuing, but it should be noted this may change. |
| Completeness and further work which might be needed (e.g. was the relevant area fully surveyed) | Nil | Most of the survey area was surveyed during the field survey. A small section of private property in the north of the survey area was not accessed during the assessment. The survey was only conducted in a single season only. |
| Mapping reliability | Nil | The vegetation was mapped using high resolution ESRI aerial imagery, topographical features and |

| Aspect | Constraint | Comment |
|--|------------|---|
| | | field data. Data was recorded in the field using a hand-held GPS tool. Certain atmospheric factors and other sources of error can affect the accuracy of such GPS receivers. On average, the GPS units used during this field survey (Garmin GPS, Trimble Nomad or Trimble Juno units) have an accuracy to approximately ± 5 metre (m). Therefore the data points consisting of coordinates recorded from the GPS may contain small inaccuracies. |
| Timing/weather/season/cycle | Minor | <p>In the three months prior to the spring survey (June-August), Busselton weather recording station (No. 09515, BoM 2016) recorded a total of 380.1 mm of rainfall. This total is approximately 15% lower than the long term average for the same period (June-August; 445.5 mm) (BoM 2016).</p> <p>The weather conditions recorded during the field survey included (BoM 2016):</p> <ul style="list-style-type: none"> • Daily maximum temperature ranged from 17.8 °C to 18.8 °C • Daily minimum temperature ranged from 8.8 °C to 9.5 °C • Daily rainfall ranged from 6.6 mm to 0.2 mm <p>The weather conditions recorded during the survey period were considered unlikely to have impacted upon the vegetation and flora survey.</p> <p>The survey timings were considered appropriate for the flora and fauna field survey.</p> |
| Disturbances (e.g. fire, flood, accidental human intervention) | Major | No major recent disturbances were recorded during the assessment. |
| Intensity (in retrospect, was the intensity adequate) | Nil | <p>The vascular flora of the survey area was sampled in accordance with EPA (2004a) and terrestrial fauna sampled in accordance with EPA (2004b).</p> <p>The survey area was sufficiently covered by a GHD ecologist during the survey with transects walked along vegetated sections of the survey area.</p> |
| Resources | Nil | A total of two person days were spent undertaking the vegetation and flora survey and habitat assessment. |
| Access restrictions | Minor | Most of the survey area was surveyed during the field survey. A small section of private property in the north of the survey area was not accessed during the assessment. |
| Experience levels | Nil | The survey ecologist is suitably qualified and experienced, having over 11 years' experience working as an ecologist in Western Australia, including in the south west region. |

3. Desktop assessment

3.1 Regional biogeography

The survey area is located within the Perth subregion of the Swan Coastal Plain Interim Biogeographic Regionalisation of Australia (IBRA) bioregion of Western Australia. The Swan Coastal Plain IBRA region is classified as warm Mediterranean climate with rainfall ranges between 1000 and 600 mm annually. It includes urban development and is dominated by woodlands of *Banksia* and tuart on sandy soils, sheoak on outwash plains, and paperbark in swampy areas (Mitchell et al. 2002).

The Perth subregion is composed of colluvial and Aeolian sands, alluvial river flats, coastal limestone. Heath and/or Tuart woodlands occur on limestone, *Banksia* and Jarrah- *Banksia* woodlands on Quaternary marine dunes of various ages, and Marri on colluvial and alluvials. Includes a complex series of seasonal wetlands and also includes Rottneet, Carnac and Gardelslands. Rainfall ranges between 600 and 1000 mm annually and the climate is Mediterranean. The subregional area is 1,333,901 ha (Mitchell et al. 2002).

3.2 Hydrology

The survey area is a constructed watercourse, which runs into the ocean. A summary of the Department of Water (DoW) Geographic Data Atlas queries for the survey area is provided in Table 3 (DoW 2016).

Table 3 Department of Water geographic atlas queries for the survey area

| Aspect | Details | Result |
|--|---|----------------------------------|
| Groundwater areas | Groundwater areas proclaimed under the <i>Rights in Water and Irrigation Act 1914</i> (RIWI Act). | Busselton-Capel Groundwater Area |
| Surface water areas | Surface water areas proclaimed under the RIWI Act. | None present |
| Irrigation district | Irrigation Districts proclaimed under the RIWI Act. | None present |
| Rivers | Rivers proclaimed under the RIWI Act. | None present |
| Public Drinking Water Source Areas (PDWSA) | PDWSAs is a collective term used for the description of Water Reserves, Catchment Areas and Underground Pollution Control Areas declared (gazetted) under the provisions of the <i>Metropolitan Water Supply, Sewage and Drainage Act 1909</i> or the <i>Country Area Water Supply Act 1947</i> . | None present |
| Waterway Management Areas | Areas proclaimed under the <i>Waterway Conservation Act 1976</i> . | None present |

3.3 Land use

There are five conservation areas (DPaW managed lands) within 5 km of the survey area which are listed below in Table 4.

Table 4 Conservation reserves within 5 km of the survey area

| Name | Class | Location |
|---------------------------|-------|--|
| Broadwater Nature Reserve | C | 3.2 km to the west of the survey area |
| Unnamed Nature Reserve | C | 1.6 km to the west of the survey area |
| Unnamed Nature Reserve | C | Adjacent to the most northern point of the survey area |
| Unnamed Nature Reserve | C | 3.5 km north east of the survey area |
| Sabina Nature Reserve | A | 4.5 km to the north east of the survey area |

3.4 Wetlands

Seven Geomorphic Wetlands occur within the survey area (Table 5). Two Conservation Category Wetlands occur within a small section of the survey area, located between Bussell Highway and Busselton Bypass.

Approximately one quarter of the survey area is classified as Palusplain Multiple Use wetland.

Table 5 Geomorphic Wetlands within the survey area

| UFI | Wetland Category | Wetland Type | Area within survey area (ha) |
|-------|------------------|--------------------|------------------------------|
| 223 | Conservation | Estuary-Peripheral | 0.45 |
| 15809 | Multiple Use | Palusplain | 7.16 |
| 13995 | Multiple Use | Estuary-Waterbody | 0.31 |
| 222 | Multiple Use | Estuary-Peripheral | 0.22 |
| 260 | Multiple Use | Dampland | 0.045 |
| 224 | Multiple Use | Estuary-Peripheral | 0.07 |
| 13198 | Conservation | Estuary-Waterbody | 0.39 |

3.1 Environmentally sensitive areas

A search of the Government of Western Australia's map viewer identified a large Environmentally Sensitive Areas within the survey area (GoWA) 2016). This ESA is likely to be associated with the Conservation Category wetland UFI 223 and UFI 13198.

3.2 Vegetation and flora

3.2.1 Broad vegetation associations and extent

Broad scale (1:250,000) pre-European vegetation mapping of the region was completed by Smith (1973) at an association level. The mapping indicates that three vegetation associations are present within the survey area:

- Vegetation association 1000- Mosaic: Mosaic: Medium forest; jarrah-marri / Low woodland; banksia / Low forest; teatree (*Melaleuca* spp.)
- Vegetation association 27: Low woodland; paperbark (*Melaleuca* sp.)
- Vegetation association 949: Low woodland; *banksia*

The pre-European mapping has been adapted and digitised by Shepherd et al. (2002). The extent of the vegetation associations has been determined by the state-wide vegetation remaining extent calculations maintained by the DPaW (Current as of October 2016 – Government of Western Australia (GoWA) 2016). As shown in Table 6, the current extents remaining of vegetation association 1000 are less than the 30%¹ threshold level at both the State and Local Government Area (LGA) level. The remaining extent of Vegetation association 27 is below the 30% threshold at the IBRA bioregion level and LGA level. Vegetation association 949 is below the 30% threshold level at the LGA level only.

Table 6 Extents of vegetation associations mapped within the survey area (Smith 1973 and GoWA 2016)

| Vegetation association | Scale | Pre-European extent (ha) | Current extent (ha) | Remaining (%) | % Current extent in all DPaW managed lands |
|------------------------------|------------------------------------|--------------------------|---------------------|---------------|--|
| Swan Coastal Plain bioregion | | 1,501,221.93 | 578,432.17 | 38.58 | 37.85 |
| Association 1000 | State: WA | 99,835.86 | 26,570.66 | 26.61 | 18.61 |
| | IBRA bioregion: Swan Coastal Plain | 94,175.31 | 23,669.68 | 25.13 | 19.88 |
| | LGA: Shire of Busselton | 12,034.21 | 4,245.32 | 35.28 | 19.40 |
| Association 27 | State: WA | 130,384.77 | 92,795.70 | 71.17 | 83.14 |
| | IBRA bioregion: Swan Coastal Plain | 5,836.25 | 1,750.12 | 29.99 | 41.31 |
| | LGA: Shire of Busselton | 2,740.16 | 313.98 | 11.46 | 32.47 |
| Association 949 | State: WA | 218,193.94 | 123,038.57 | 56.39 | 55.80 |
| | IBRA bioregion: Swan Coastal Plain | 209,983.26 | 120,178.91 | 57.23 | 56.43 |
| | LGA: Shire of Busselton | 2,688.98 | 417.58 | 15.53 | 0.05 |

3.2.2 Conservation significant ecological communities

One TEC and two PECs and/or their buffers occur within the survey area. The EPBC Act listed Vulnerable TEC, Subtropical and Temperate Coastal Saltmarsh, occurs in the middle of the survey area and is associated with the wetland, Vasse and Wonnerup estuaries. Two DPaW listed Priority 1 PECs and/or their buffers occur within the survey area and include:

¹ The 30 per cent threshold level is the level below which species loss appears to accelerate exponentially at an ecosystem level (EPA 2000).

- *Eucalyptus rudis* (flooded gum), *Corymbia calophylla*, *Agonis flexuosa* Closed Low Forest (near Busselton)
- *Eucalyptus cornuta*, *Agonis flexuosa* and *Eucalyptus decipiens* forest on deep yellow-brown siliceous sands over limestone.

3.2.3 Flora diversity

A search of the *Naturemap* database identified 934 plant taxa, representing 102 families, which have previously been recorded within 5 km of the survey area. This total comprised 782 native taxa and 152 naturalised (non-native) flora taxa. Dominant families included Fabaceae (110 species), Proteaceae (70 species) and Myrtaceae (68 species).

3.2.4 Conservation significant flora

Desktop searches of the EPBC Act PMST database and the *NatureMap* database identified the presence/potential presence of 61 conservation significant flora taxa within 5 km of the survey area.

The desktop searches for a 5 km buffer of the survey area recorded the following:

- 24 threatened taxa (EPBC Act – Critically Endangered, Endangered, Vulnerable and WC Act – Threatened)
- Three Priority 1 taxa
- Seven Priority 2 taxa
- 16 Priority 3 taxa
- 11 Priority 4 taxa.

3.3 Fauna

3.3.1 Fauna diversity

A search of the *Naturemap* database identified 690 fauna species that have been previously recorded within 5 km of the survey area of which 680 species are native and 10 are introduced species. This total included 209 birds, 28 mammals, 25 reptiles and four amphibians. The remainder are invertebrates or misnamed species.

3.3.2 Conservation significant fauna

Desktop searches of the EPBC Act PMST database and the *Naturemap* database identified the presence/potential presence of 52 conservation significant fauna species within 5 km of the survey area, including survey area the following:

- 14 threatened taxa (EPBC Act – Critically Endangered, Endangered, Vulnerable and WC Act listed species)
- Two species listed as Vulnerable under the WC Act
- One species as Migratory under the EPBC Act and Vulnerable under the WC Act
- Two Priority 1 taxa
- Two Priority 2 taxa
- Three Priority 3 taxa
- Nine Priority 4 taxa.

- Thirteen species listed as Migratory under the EPBC Act and Schedule under the WC Act
- Six Schedule listed species under the WC Act.

This included a number of species listed as Marine under the EPBC Act that are considered to utilise marine and coastal environments only and therefore have been excluded from the desktop results. Therefore, only 11 species are considered as part of this assessment.

3.4 Review of previous survey report (GHD 2010)

The key survey results from the previous VDD flora and fauna survey (GHD 2010) included:

- Plant species diversity within the study area is considered to represent a low degree of diversity, with a total of 77 taxa from 29 families recorded
- No Declared Rare Flora or Priority Flora species were recorded from the study area during the field survey
- Five vegetation types were identified within the study area
- The vegetation ranged between *Very Good* (3) to *Completely Degraded* (6)
- A total of 39 bird, seven mammals, 11 reptile, five amphibian, two fish and one crustacean species were recorded during the reconnaissance survey within the study area
- Two significant fauna species were identified along the alignment. These species were the Western Ringtail Possum and the Quenda (Southern Brown Bandicoot).

4. Field survey results

4.1 Vegetation

4.1.1 Vegetation type




Three broad floristic formations containing six vegetation types (not including rehabilitated areas, the drain and highly disturbed areas) were identified and described from the survey area (Table 7 and Figure 3, Appendix A). The survey area consists of remnant vegetation in varying condition, historically and recently cleared areas, and existing infrastructure such as roads and tracks.




Native vegetation was located throughout the survey area in the form of *Eucalyptus* woodland on plains and damplands in the south of survey area, *Melaleuca* shrublands in the middle of the survey area, associated with the wetland and *Agonis flexuosa* tall shrublands to woodlands on dunes in the north of the survey area. The survey area in the south was dominated by *Eucalyptus* woodland, while the north of the survey area was dominated *Agonis flexuosa* shrublands and woodlands.



4.1.2 Conservation significant ecological communities

No TECs were recorded within the survey area during the time of the assessment. Two vegetation types recorded during the assessment however align with the DPaW Priority 1 listed PEC, *Eucalyptus rudis* (flooded gum), *Corymbia calophylla*, *Agonis flexuosa* Closed Low Forest (near Busselton). Vegetation types Marri and Flooded Gum woodland (VT1) and Peppermint woodland (VT2) (total of 2.88 ha) align with this PEC as the dominant overstorey are composed of the same species.

Table 7 Vegetation types present within survey area

| Vegetation association | Description | Landform, sample locations and extent (ha) | Notes | Representative photograph |
|---|---|--|---|---|
| Marri and Flooded Gum woodland (VT1) | <i>Eucalyptus rudis</i> , <i>Corymbia calophylla</i> and <i>Agonis flexuosa</i> open woodland over <i>Melaleuca raphiophylla</i> tall shrubland over * <i>Avena fatua</i> tussock grassland over * <i>Watsonia meriana</i> and * <i>Oxalis pes-caprae</i> herbland | Plain, damp areas Q1 2.41 ha | Aligns with the DPaW Priority 1 listed PEC, <i>Eucalyptus rudis</i> (flooded gum), <i>Corymbia calophylla</i> , <i>Agonis flexuosa</i> Closed Low Forest (near Busselton) |  |
| Peppermint woodland (VT2) | <i>Agonis flexuosa</i> woodland with scattered <i>Corymbia calophylla</i> trees over <i>Acacia saligna</i> and <i>Melaleuca raphiophylla</i> mid to tall shrubland over * <i>Ehrharta longifolia</i> tussock grassland over * <i>Zantedeschia aethiopica</i> , * <i>Watsonia meriana</i> and * <i>Oxalis pes-caprae</i> open herbland | Plain Q2, Q3 0.47 ha | Aligns with the DPaW Priority 1 listed PEC, <i>Eucalyptus rudis</i> (flooded gum), <i>Corymbia calophylla</i> , <i>Agonis flexuosa</i> Closed Low Forest (near Busselton) |  |
| Acacia and Peppermint shrubland (VT3 and VT4) | <i>Agonis flexuosa</i> , <i>Acacia saligna</i> and <i>Jacksonia furcellata</i> tall shrubland over Poaceae sp. tussock grassland over <i>Conostylis aculeata</i> subsp. <i>aculeata</i> open sedgeland over * <i>Pelargonium capitatum</i> , * <i>Romulea rosea</i> and * <i>Watsonia meriana</i> open herbland | Plain Q4 1.22 ha | |  |

| Vegetation association | Description | Landform, sample locations and extent (ha) | Notes | Representative photograph |
|--|---|--|--|--|
| Tall <i>Melaleuca</i> shrubland (VT5) | <i>Melaleuca cuticularis</i> , <i>M. lanceolata</i> and <i>M. raphiophylla</i> tall open shrubland over <i>Lepidosperma carphoides</i> and <i>Gahnia trifida</i> sedgeland | Dune Q8 0.74 ha | Aligns with Smith (1973) vegetation association 27 |  |
| Peppermint woodland over sedgeland (VT6) | <i>Agonis flexuosa</i> woodland over <i>Acacia littorea</i> , <i>Olearia axillaris</i> and <i>Spyridium globulosum</i> tall open shrubland over <i>Spinifex longifolius</i> and * <i>Bromus diandrus</i> tussock grassland over <i>Lepidosperma effusum</i> sedgeland over <i>Acanthocarpus preissii</i> and * <i>Fumaria capreolata</i> herbland | Dune Q6, Q7 1.57 ha | |  |
| Rehabilitated areas (RA) | Consists of areas rehabilitated with local and regional native species | 0.04 ha | |  |

| Vegetation association | Description | Landform, sample locations and extent (ha) | Notes | Representative photograph |
|------------------------|---|--|-------|---|
| Vasse Drain | | 9.60 ha | |  |
| Highly disturbed | Areas that have been cleared and include infrastructure, roads and tracks | Throughout survey area 15.83 ha | |  |

4.1.3 Vegetation condition

The vegetation condition throughout the survey area was rated as Very Good to Completely Degraded. The majority of vegetation within the survey area was rated as Degraded to Completely Degraded in condition, with little to no understorey remaining. Approximately 0.71 ha of the vegetation within the survey area was Very Good to Good in condition. In these areas the vegetation structure was significantly altered by obvious signs of disturbance, largely weeds and clearing, however retained basic vegetation structure.

Disturbances throughout the survey area included the presence of weeds at varying densities, historical clearing and vehicle tracks.

The extents of the vegetation condition ratings mapped within the survey area are detailed in Table 8 with the vegetation condition of the survey area mapped in Appendix A - Figure 4.

Table 8 Extent of vegetation condition ratings within the survey area

| Condition rating | Extent (ha) |
|---------------------------------|--------------|
| Very Good | 0.05 |
| Very Good to Good | 0.66 |
| Good to Degraded | 0.53 |
| Degraded | 0.80 |
| Degraded to Completely Degraded | 1.25 |
| Completely Degraded | 19.00 |
| Watercourse | 9.60 |
| Total | 31.89 |

4.1.4 Other significant vegetation

During the field survey the vegetation was assessed to determine whether any vegetation occurs within the survey area that may be considered as significant due to reasons defined by the EPA (2004a).

Three vegetation associations recorded within the survey area were below the 30 % threshold of their pre-European extent remaining. These vegetation associations are considered significant vegetation, as defined by the EPA (2004a). They include:

- Vegetation association 1000: Mosaic: Medium forest; jarrah-marri / Low woodland; banksia / Low forest; teatree (*Melaleuca* spp.), is below the 30 % threshold at the State and LGA level
- Vegetation association 27: Low woodland; paperbark (*Melaleuca* sp.), is below the 30 % threshold at the IBRA bioregion level and LGA level
- Vegetation association 949: Low woodland; *banksia*, is below the 30 % threshold at the LGA level only.

Vegetation association, Tall *Melaleuca* shrubland (0.74 ha) located within the Geomorphic Wetlands UFI 222, UFI 223, UFI 224, UFI 13198 and UFI 13995 in the survey area is considered riparian vegetation and significant, as it is restricted to these areas within the landscape. The Marri and Flooded Gum woodland (2.41 ha) comprises species that require a seasonally high water table. A small section of this vegetation association occurs within the Multiple Use Geomorphic Wetland UFI 15809, however

during the survey, no water was observed within this area and the vegetation in this area was in Degraded to Completely Degraded condition.

4.2 Flora

4.2.1 Flora diversity

Seventy-three flora taxa (including subspecies and varieties) representing 32 families and 62 genera were recorded from the survey area during the 2016 field survey. This total comprised 35 native taxa and 38 introduced flora taxa.

Dominant families recorded from the survey area included:

- Poaceae (12 taxa)
- Fabaceae (10 taxa)
- Myrtaceae (7 taxa)
- Asteraceae (5 taxa).

4.2.2 Conservation significant flora

No EPBC Act, WC Act or DPaW priority flora were recorded during the 2016 assessment of the survey area.

Likelihood of occurrence

A likelihood of occurrence assessment was conducted post-field survey for all conservation significant flora taxa identified in the desktop assessment (Appendix D). This assessment took into account previous records, habitat requirements, efficacy of the survey, intensity of the survey, flowering times and the cryptic nature of species.

The likelihood of occurrence assessment post-field survey concluded that seven taxa may possibly occur and the remaining 54 taxa are unlikely or highly unlikely to occur within the survey area. The taxa that may possibly within the survey area are presented in Table 9.

Table 9 Flora species possibly occurring within the survey area

| Taxon | Status | | Likelihood of occurrence |
|--|----------|--------------|--------------------------|
| | EPBC Act | WC Act /DPaW | |
| <i>Calystegia sepium</i> subsp. <i>roseata</i> | | P2 | Possible |
| <i>Johnsonia inconspicua</i> | | P3 | Possible |
| <i>Lepidium pseudotasmanicum</i> | | P4 | Possible |
| <i>Ornduffia submersa</i> | | P4 | Possible |
| <i>Schoenus benthamii</i> | | P3 | Possible |
| <i>Tetraria australiensis</i> | Vu | T | Possible |
| <i>Thysanotus glaucus</i> | | P4 | Possible |

4.2.3 Other significant flora

No other significant vegetation as defined by the EPA (2004a) was identified within the survey area during the field survey.

4.2.4 Introduced flora

Thirty-seven introduced flora taxa were recorded within the survey area. One weed species, *Zantedeschia aethiopica* (Arum Lily) (Plate 1) listed under the BAM Act was recorded throughout the southern section of the survey area. Locations of this species are presented in Appendix D. No weeds of national environmental significance were recorded within the survey area.



Plate 1 Arum Lily in the southern section of the survey area

4.3 Fauna

4.3.1 Fauna habitats

Six habitat types were recorded in the survey area. These habitat types are closely aligned with the different vegetation types described in section 4.1. The habitat types are described in Table 10 and mapped in Figure 5, Appendix A.

Overall, while large sections of the survey area have previously been disturbed, where native vegetation remains it retains some structure and provides habitat for fauna. Anthropogenic disturbances include past clearing for infrastructure (roads, tracks and building), other agricultural practices and weed encroachment.

Table 10 Fauna habitat types

| Habitat | Comment |
|--|---|
| Marri and Flooded Gum woodland (VT1) – 2.41 ha | Eucalypt woodlands are the dominant habitat type in the southern section of the survey area and are comprised largely of two species; Marri and Flooded Gum. The woodlands structural diversity generally consisted of a woodland, which was very open in sections, with a sparse understorey of native species. Typically, the leaf litter occurs around trees. Most of the ground cover was dense with weeds. Throughout this woodland there are also micro habitat features such as tree hollows which provide important habitat for birds such as Galahs and Parrots. Large, medium and small hollows were found throughout the woodland. There is extensive disturbances in this habitat type consisting of previous clearing and weed invasion with little to no remaining understorey. These woodlands provide foraging and refuge for birds, however limited habitat for reptiles and ground dwelling mammals as there is little understorey remaining. Black Cockatoos may forage within this habitat. This habitat type is well-represented in the local area and region. |

| Habitat | Comment |
|--|---|
| Peppermint woodland (VT2, VT3, VT4, VT6) – 3.26 ha | Peppermint woodlands are the dominant habitat type in the northern section of the survey area, with small sections located in the southern section. The woodlands structural diversity generally consisted of a woodland over a mid storey of shrubs over an understorey of shrubs and sedges. Typically, the leaf litter occurs around the trees, shrubs and sedges. This woodland provides microhabitat for the Western Ringtail Possum, with numerous dreys recorded in the canopy of the woodland. Sections of the woodland have been severely disturbed, in the form of clearing and weed incursion, with little to no remaining understorey. The habitat in the north of the survey area had a dense understorey of shrubs and sedges, which would provide foraging and refuge for reptiles and ground dwelling mammals as the thick understorey remaining. Black Cockatoos may forage within this habitat. Peppermint woodland forms a large proportion of habitat within the survey area and overall, the trees, shrubs and sedges provide mid to high value habitat for fauna. This habitat type is well-represented in the local area and region. |
| Tall Melaleuca shrubland (VT5) – 0.74 ha | Small sections of the tall Melaleuca shrubland are located in the middle section of the survey area, associated with the wetland. The shrublands structural diversity generally consisted of a tall shrub layer over a dense sedgeland. Minimal disturbance was recorded within this habitat, with weed incursion occurring on the edges. The tall shrubland habitat would provide foraging and refuge for bird species, while the dense sedgeland would provide foraging and refuge for reptiles and ground dwelling mammals. This habitat type is well-represented in the local area and region. |
| Rehabilitated Areas – 0.04 ha | <p>A small section of rehabilitated areas are present in the north of the survey area. The floristic and structural diversity of this habitat is low, with little to no remaining over storey and mid storey. Typically, the leaf litter is sparse around the shrubs, and the ground cover relatively negligible/sparse. Generally, the shrubs and sedges were young in age and micro-habitat features, such as tree hollows, cavities and hollow logs were not evident.</p> <p>Rehabilitated areas form a small proportion of habitat within the survey area and overall, the shrubs and sedges provide low value habitat for fauna.</p> |
| Vasse Drain – Water body – 9.6 ha | <p>The drain runs throughout the middle section of the survey area. The edges of the drain were vegetated mostly with weeds, however in the north west, native vegetation remains with Peppermint and sedges on the banks of the drain. The drain provides habitat for fish, molluscs amphibians and birds within the survey area.</p> <p>The drain forms a large proportion of habitat within the survey area and overall provide mid to high value habitat for fauna.</p> |
| Highly Disturbed Areas – 15.83 ha | Areas completely cleared of native vegetation, including infrastructure areas such as roads and tracks, as well as highly modified areas occur in sections of the survey area. These areas provide little to no value for fauna species, however in some areas the scattered trees or shrubs may provide cover for birds and reptiles, as well as foraging opportunities for small birds. |

4.3.2 Regional linkages and habitat corridors

Several habitat corridors for fauna are located adjacent to the survey area. There is a corridor in the north of the survey area running in an east west direction, associated with the wetland. Bushland adjacent to the middle of the survey area also provide corridors for fauna in the local area. In the south of the survey area, a habitat corridor extends from the survey area further south along the drain. The remaining survey area is surrounded by paddocks and crops.

The drain creates a link between the ocean and fresh water and may be suitable and important for the survival for species that may migrate, such as the Pouched Lamprey.

4.3.3 Fauna diversity

The field survey recorded a total of 37 fauna species, consisting of 22 bird species, three reptiles, eight mammals, three amphibians and one mollusc. A list of the fauna species recorded during the field survey are provided in Appendix E.

4.3.4 Introduced fauna species

Seven introduced fauna species were identified within the survey area. These are listed below:

- Cat (*Felis catus*)
- Fox (*Vulpes vulpes*)
- Dog (*Canus domesticus*)
- European Rabbit (*Oryctolagus cuniculus*)
- Cow (*Bos taurus*)
- Feral Pigeon (*Columba livia*)
- Laughing Kookaburra (*Dacelo novaeguineae*)

4.3.5 Conservation significant fauna

During the survey, evidence of four species of conservation significance were recorded within the survey area. They included:

- Western Ringtail Possum (*Pseudocheirus occidentalis*) – listed as Endangered under the EPBC and Critically Endangered under the WC Act
- Carter's Freshwater Mussel (*Westralunio carteri*) – listed as Vulnerable under the WC Act
- Quenda (*Isoodon obesulus* subsp. *fusciventer*) – listed as Priority 4 by DPaW
- Osprey (*Pandion haliaetus*) – listed under Schedule 5 of the WC Act.

Western Ringtail Assessment

The Western Ringtail Possum was recorded within the survey area during the 2016 assessment. Dreys and scats were recorded throughout (and adjacent to) the survey area during the 2016 assessment (Plate 2) and sightings of this species were recorded during the 2009 assessment. Evidence of the Western Ringtail Possum from the 2016 assessment have been mapped in Figure 5. This mapping includes evidence both within and adjacent to the survey area.

A description of the extent of habitat for this species within the survey area is summarised below and mapped in Figure 5.

- Habitat – approximately 5.67 ha of core and supportive habitat (DEWHA 2009) for the Western Ringtail Possum occurs within the survey area, comprising of Peppermint woodlands and Marri and Flooded Gum woodland. The Peppermint woodland provides high value breeding and foraging habitat for the species. One Western Ringtail Possum scat was recorded within the survey area.
- Dreys – Although no dreys were identified within the survey area, a number were identified adjacent to the survey area (Plate 2).



Plate 2 Western Ringtail Possum drey adjacent to survey area

Carters Mussel Assessment

A population of Carters Mussel was recorded within the south of survey area during the 2016 assessment (Plate 3). Approximately 38 individual mussels were recorded in this area (Figure 5, Appendix A). This species can be ‘found in freshwater streams, rivers, billabongs, ponds, wetlands and lakes inland from the coast’ (Murdoch University and SERCUL 2016) and is likely to occur throughout the remainder of the drain (9.6 ha). Livestock and impacts from urban development may cause erosion of habitat for this species, while livestock have been known to crush shells (Murdoch University and SERCUL 2016). This species is also prone to decrease levels of oxygen within the water and increased levels of salinity.



Plate 3 Carters Mussel recorded within the Vasse Diversion Drain

Quenda

The Quenda was not observed directly within the survey area, however “runs”, Quenda tunnels, were observed during the 2010 assessment and dense vegetation associated with wetlands provides the ideal habitat for this species. Quenda inhabit scrubby, often swampy, vegetation with dense cover up to 1 m high and often feed in adjacent forest and woodland (Van Dyck and Strahan 2008). This species is widely distributed in the south west of Western Australia from Guilderton, north of Perth, to east of Esperance.

Osprey

An Osprey was observed perched on a *Melaleuca* within the survey area during the 2016 assessment. This species is a migratory wetland species and is not restricted to the survey area.

Likelihood of occurrence

An assessment on the likelihood of conservation significant species occurring in the survey area was undertaken. This assessment is based on species biology, habitat requirements, the quality and availability of suitable habitat, as determined during the field survey, and records of the species in the survey area and locality. Species specific searches of the DPaW *NatureMap* database with a buffer of 5 km were also conducted in order to gather information about the broader regional occurrence of species to further inform the likelihood of occurrence assessment.

The likelihood of occurrence assessment identified four species as present within the survey area, 18 species considered as likely to occur within the survey area, with the remaining species considered either unlikely or highly unlikely to occur. Table 11 summarises the species of conservation significance present and considered as likely to occur in the survey area. The parameters of assessment for this likelihood of occurrence assessment and the full likelihood of occurrence assessment are provided in Appendix E.

Table 11 Conservation significant fauna ‘likely’ to occur in the survey area

| Species Name | EPBC Act Status | WA Status | Likelihood |
|--|-----------------|-----------|------------|
| <i>Isoodon obesulus</i> subsp. <i>fusciventer</i> (Quenda, Southern Brown Bandicoot) | | P4 | Present |
| <i>Pandion haliaetus</i> (Osprey) | MiW | | Present |
| <i>Pseudocheirus occidentalis</i> (Western Ringtail Possum) | En | CR | Present |
| <i>Westralunio carteri</i> (Carter’s Freshwater Mussel) | | Vu | Present |
| <i>Actitis hypoleucos</i> (Common Sandpiper) | MiW | IA | Likely |
| <i>Ardea ibis</i> (Cattle Egret) | | IA | Likely |
| <i>Ardea modesta</i> (Eastern Great Egret) | | IA | Likely |
| <i>Calidris acuminata</i> (Sharp-tailed Sandpiper) | MiW | IA | Likely |
| <i>Calidris ferruginea</i> (Curlew Sandpiper) | CR, MiW | Vu, IA | Likely |
| <i>Calidris subminuta</i> (Long-toed Stint) | MiW | IA | Likely |
| <i>Calidris tenuirostris</i> (Great Knot) | CR, MiW | Vu, IA | Likely |
| <i>Calyptorhynchus banksii</i> subsp. <i>naso</i> (Forest Red-tailed Black-Cockatoo) | Vu | Vu | Likely |
| <i>Calyptorhynchus baudinii</i> (Baudin’s Cockatoo) | Vu | En | Likely |

| Species Name | EPBC Act Status | WA Status | Likelihood |
|--|-----------------|-----------|------------|
| <i>Calyptorhynchus latirostris</i> (Carnaby's Black Cockatoo) | En | En | Likely |
| <i>Elapognathus minor</i> (Short-nosed Snake) | | P2 | Likely |
| <i>Falco peregrinus</i> (Peregrine Falcon) | | OS | Likely |
| <i>Geotria australis</i> (Pouched Lamprey) | | P1 | Likely |
| <i>Hydromys chrysogaster</i> (Water Rat) | | P4 | Likely |
| <i>Nannatherina balstoni</i> (Balston's Pygmy Perch) | Vu | Vu | Likely |
| <i>Phascogale tapoatafa</i> subsp. <i>wambenger</i> (Southern Brush-tailed Phascogale) | | CD | Likely |
| <i>Tringa nebularia</i> (Common Greenshank) | MiW | IA | Likely |
| <i>Tringa stagnatilis</i> (Marsh Sandpiper) | MiW | IA | Likely |

*Conservation codes are outlined in Appendix B.

Black Cockatoo Assessment

A likelihood of occurrence assessment determined that all three Black Cockatoo species were likely to occur within the survey area.

A description of the extent of habitat for these species within the survey area is summarised below and mapped in Figure 5

- **Foraging** – approximately 5.67 ha of suitable foraging habitat for Black Cockatoos within the survey area, comprising mixed woodlands and shrubs. Marri and Flooded Gum woodlands provide high value foraging habitat for the species. The Black Cockatoos may opportunistically forage within the survey area. No evidence of foraging was observed during the field survey.
- **Potential Breeding** – The habitat assessment identified 37 potential breeding trees with a suitable DBH throughout the survey area (≥ 500 mm DBH, DSEWPac 2012). These trees occur within the Marri and Flooded Gum woodland habitat. One tree contained one medium hollow and two trees contain three small hollows that could provide suitable breeding habitat in the future.
- **Roosting** – No roosting sites were recorded during the field survey. 2.41 ha of roosting habitat was recorded within the survey area in the form of Marri and Flooded Gum woodland, which was located adjacent to the drain.

5. Conclusions

5.1 Key findings

The key findings of the flora and fauna assessment for the survey area include:

- Three broad floristic formations containing six vegetation types were identified from the survey area. Of this, approximately 0.71 ha of native vegetation was in Very Good to Good condition
- No TECs were recorded within the survey area during the assessment. However, two vegetation types (totalling 2.88 ha) align with the DPaW Priority 1 listed PEC, *Eucalyptus rudis* (flooded gum), *Corymbia calophylla*, *Agonis flexuosa* Closed Low Forest (near Busselton)
- The vegetation within the survey area is considered 'other significant vegetation' as it represents native vegetation/natural areas in a highly fragmented landscape and vegetation that is poorly reserved
- Vegetation association, Tall *Melaleuca* shrubland (0.74 ha) located within the survey area is considered riparian vegetation, and is restricted to these areas within the landscape and are considered as significant
- An assessment on the likelihood of conservation significant flora species occurring in the survey area determined that seven conservation significant flora species may possibly to occur within the survey area
- Evidence of four fauna species of conservation significance were recorded within the survey area including:
 - The Western Ringtail Possum – 5.67 ha of core and supportive habitat is present and one scat was recorded within the survey area. Although no dreys were identified within the survey area, a number were identified adjacent to the survey area
 - Carters Mussel – Approximately 38 individual mussels were recorded and 9.6 ha of habitat occurs within the survey area
 - The Quenda was not observed directly within the survey area, however Quenda tunnels were observed during the 2010 assessment
 - An Osprey was observed perched on a *Melaleuca* within the survey area during the 2016 assessment. This species is a migratory wetland species and is not restricted to the survey area
- An assessment on the likelihood of conservation significant fauna species occurring in the survey area determined that 18 conservation significant fauna species are considered likely to occur within the survey area
- A Black Cockatoo assessment identified 5.67 ha of suitable foraging habitat, 2.41 ha of roosting habitat and 37 potential breeding trees with suitable DBH within the survey area. Of the potential breeding trees, one tree contained one medium hollow and two trees contain three small hollows that could provide suitable breeding habitat in the future.

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Appendices

Appendix A – Figures

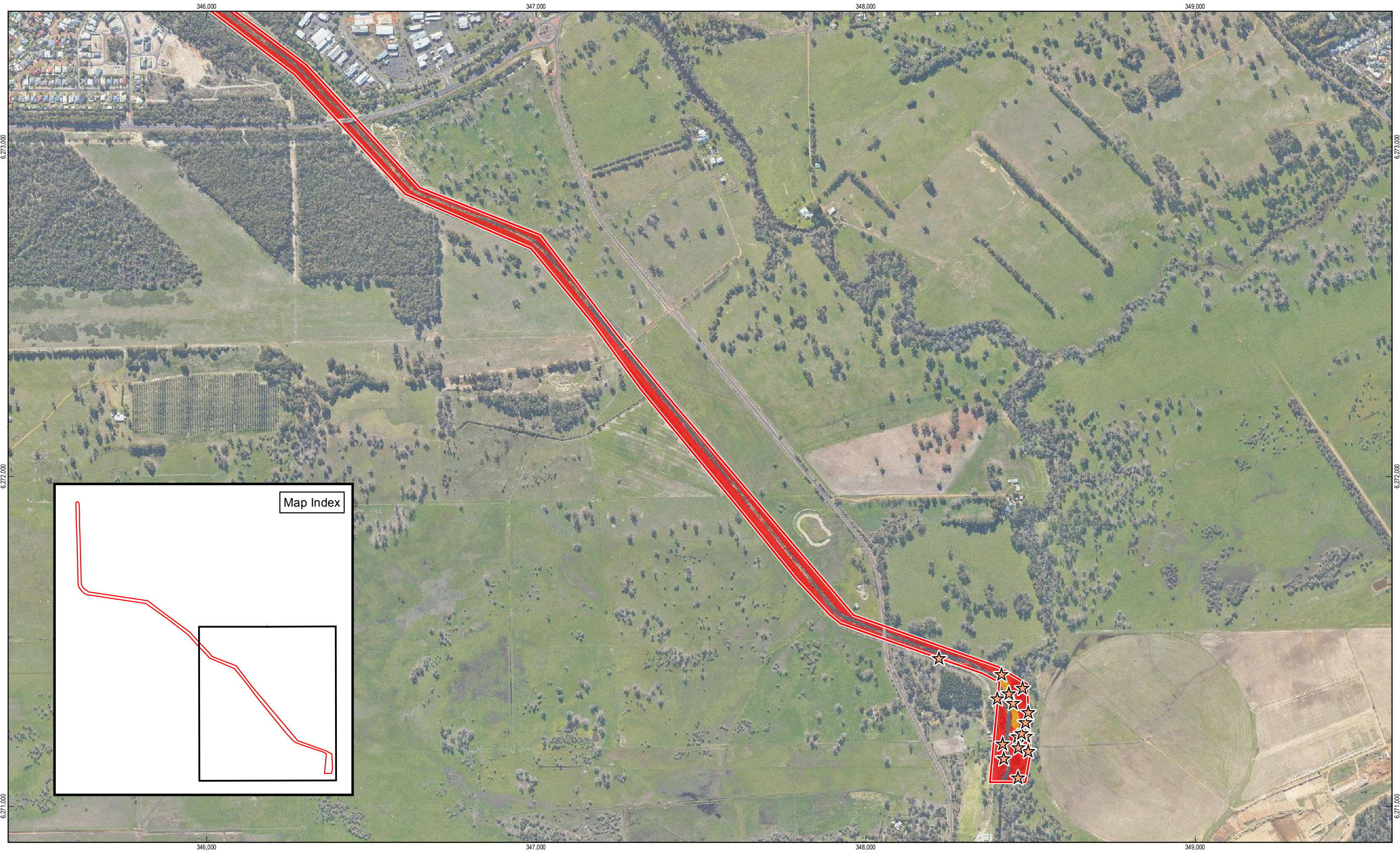
Figure 1 Locality

Figure 2 Biological constraints

Figure 3 Vegetation types and quadrat locations

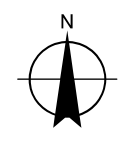
Figure 4 Vegetation condition and significant weeds

Figure 5 Fauna habitat



Map Index

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 Grid: GDA 1994 MGA Zone 50



LEGEND

Weed Species

- ★ *Asparagus asparagoides* (Bridal Creeper)
- ★ *Zantedeschia aethiopica* (Arum Lily)
- ▭ Study Area

Vegetation Condition (EPA and DPaW 2015)

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






Water Corporation
 Vasse Diversion Drain Upgrade

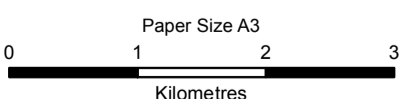
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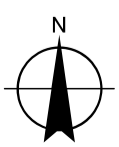


LEGEND

-  Major Road
-  Study Area
-  Waterbody



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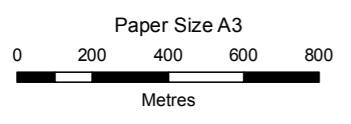
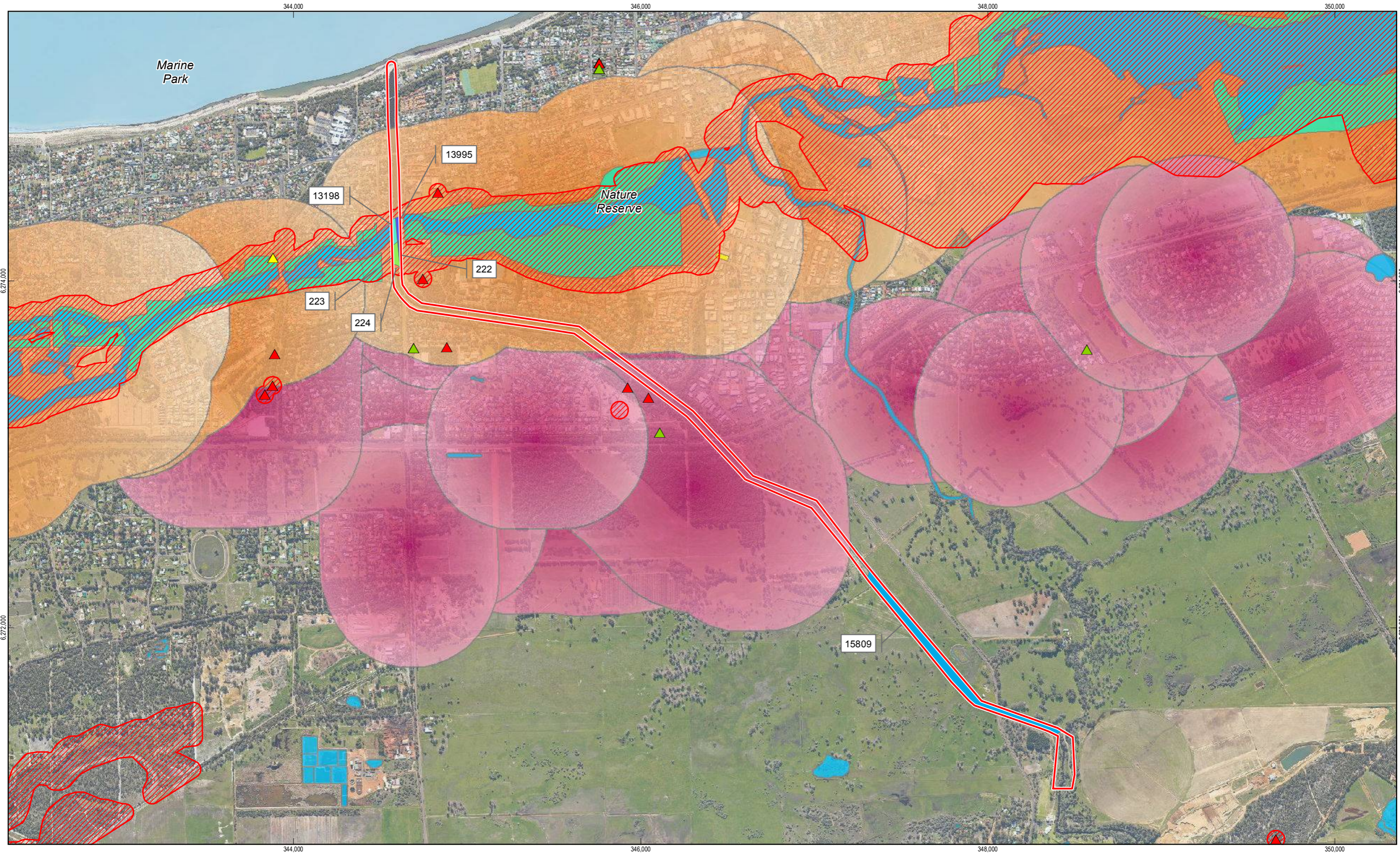


Water Corporation
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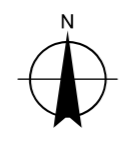
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Study Area Location

Figure 1



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50



LEGEND

- Threatened (Declared Rare) & Priority Taxa**
- ▲ Threatened Rare Flora - Extant Taxa
 - ▲ Priority Flora - P1
 - ▲ Priority Flora - P2
 - ▲ Priority Flora - P3
 - ▲ Priority Flora - Rare Taxa
- Study Area**
- Study Area
 - Environmentally Sensitive Area
 - Waterbody
 - Priority Ecological Community
 - Threatened Ecological Community

- DPaW Managed Lands**
- CALM Exec Body Freehold
 - Marine Park
 - Nature Reserve

222 Geomorphic Wetland UFI

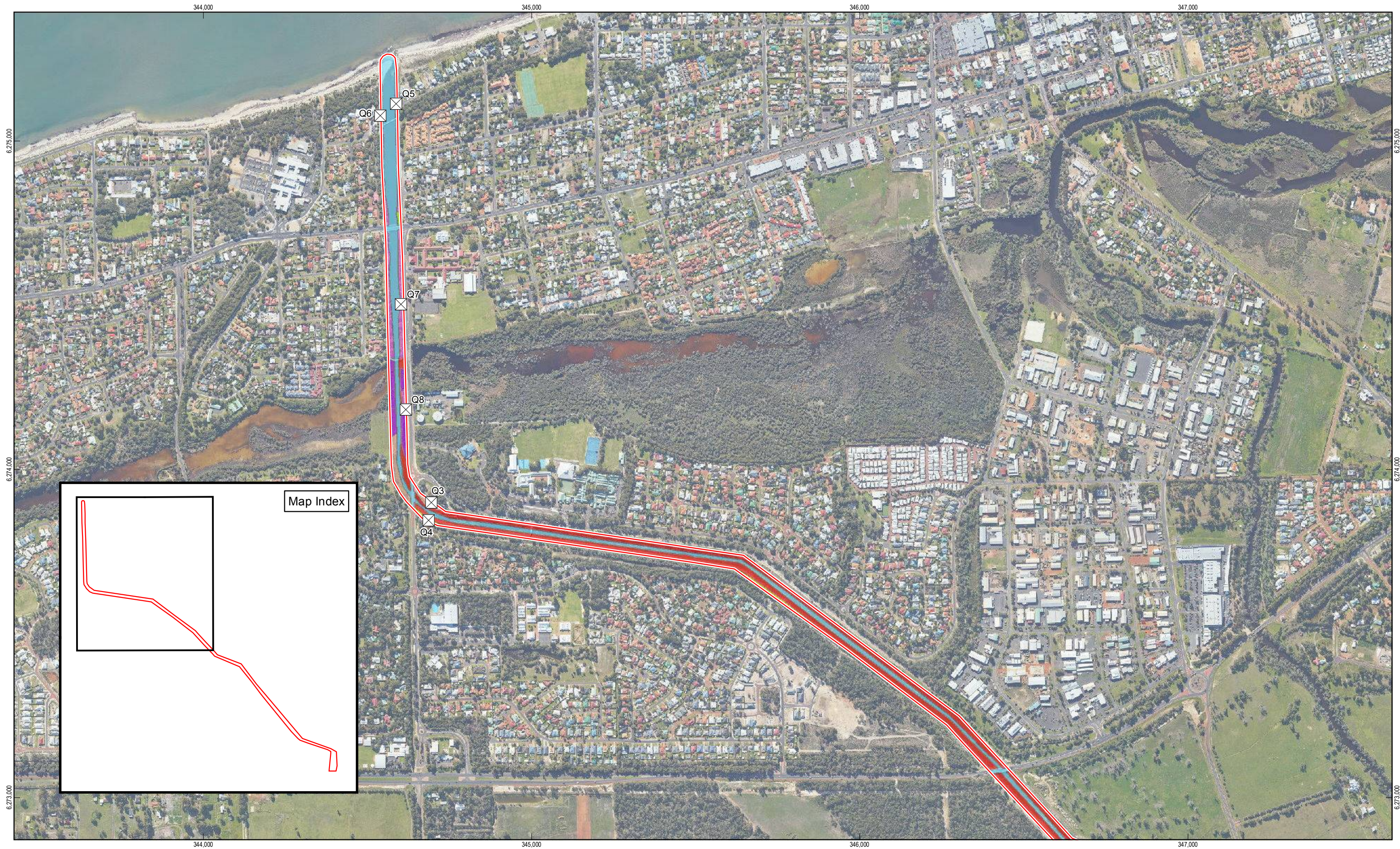


Water Corporation
Vasse Diversion Drain Upgrade

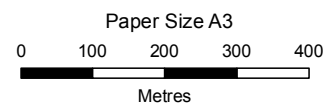
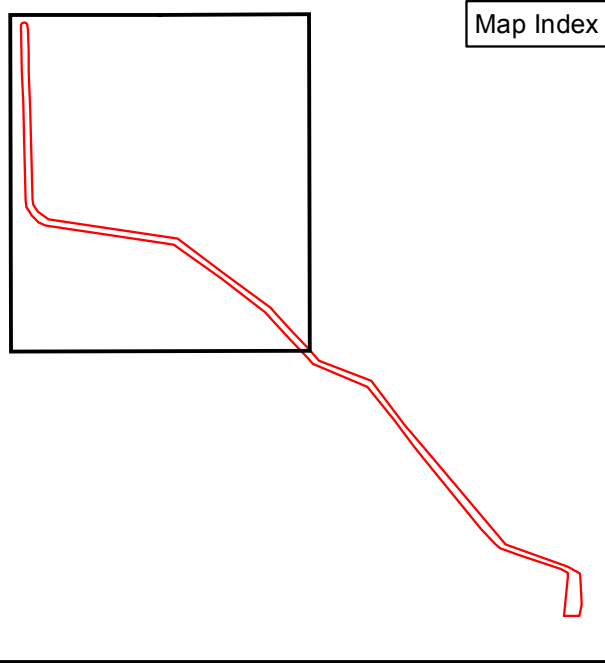
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Biological Constraints

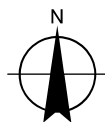
Figure 2



Map Index



Map Projection: Transverse Mercator
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Grid: GDA 1994 MGA Zone 50



LEGEND

- ⊗ Quadrat
- ▭ Study Area

Vegetation Type

- Marri and Flooded Gum woodland
- Peppermint woodland
- Acacia and Peppermint shrubland
- Tall *Melaleuca* shrubland
- Peppermint woodland over sedgeland
- Rehabilitated Areas
- Highly Disturbed
- Watercourse

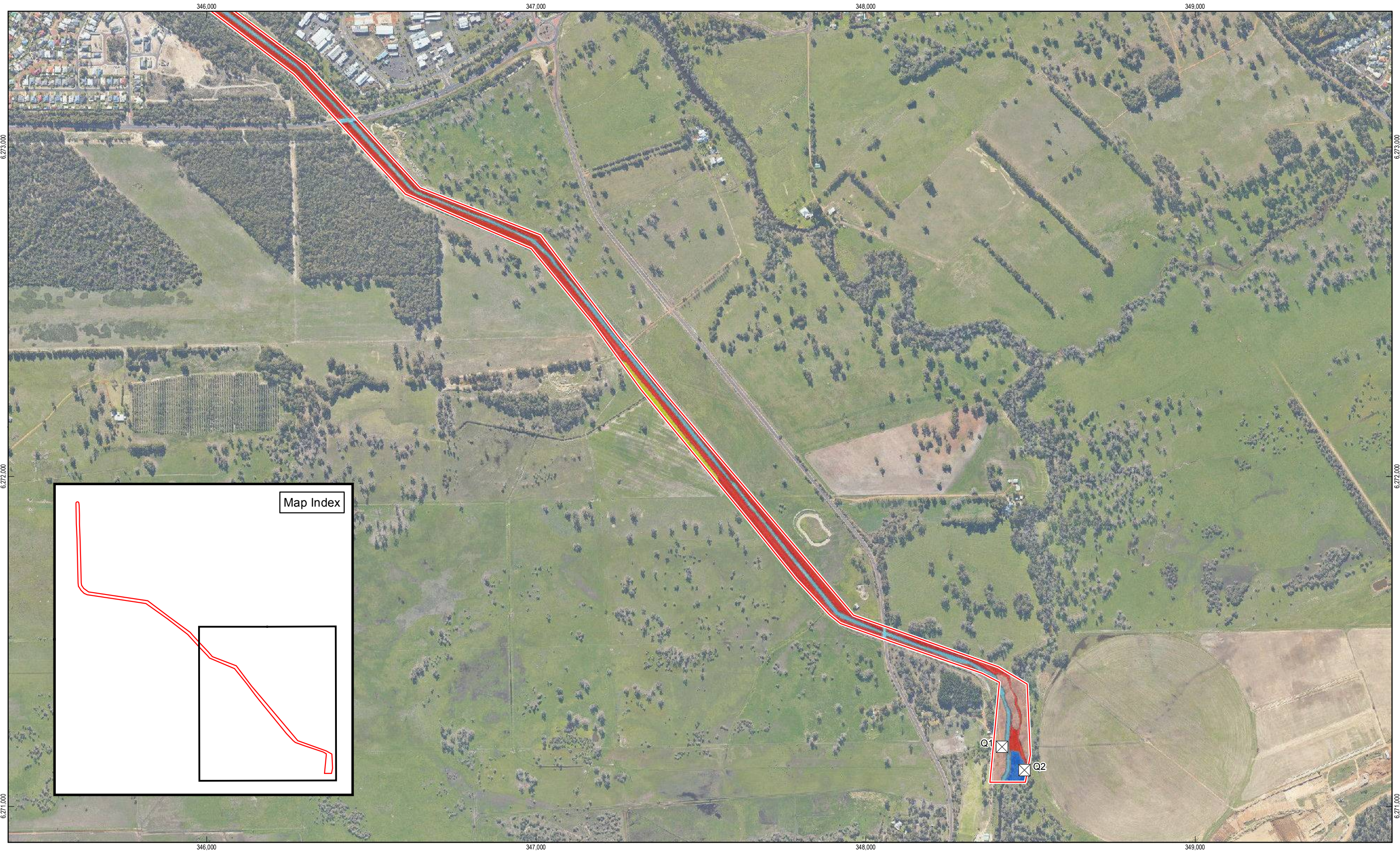


Water Corporation
Vasse Diversion Drain Upgrade

**Vegetation Units, Sample Locations
and Significant Flora Locations**

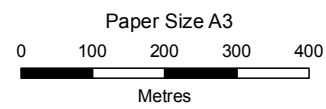
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Figure 3

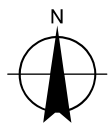


Map Index

Q1
Q2



Map Projection: Transverse Mercator
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LEGEND

- ☒ Quadrat
- ▭ Study Area

Vegetation Type

- Marri and Flooded Gum woodland
- Peppermint woodland
- Acacia and Peppermint shrubland
- Tall *Melaleuca* shrubland
- Peppermint woodland over sedgeland
- Rehabilitated Areas
- Highly Disturbed
- Watercourse

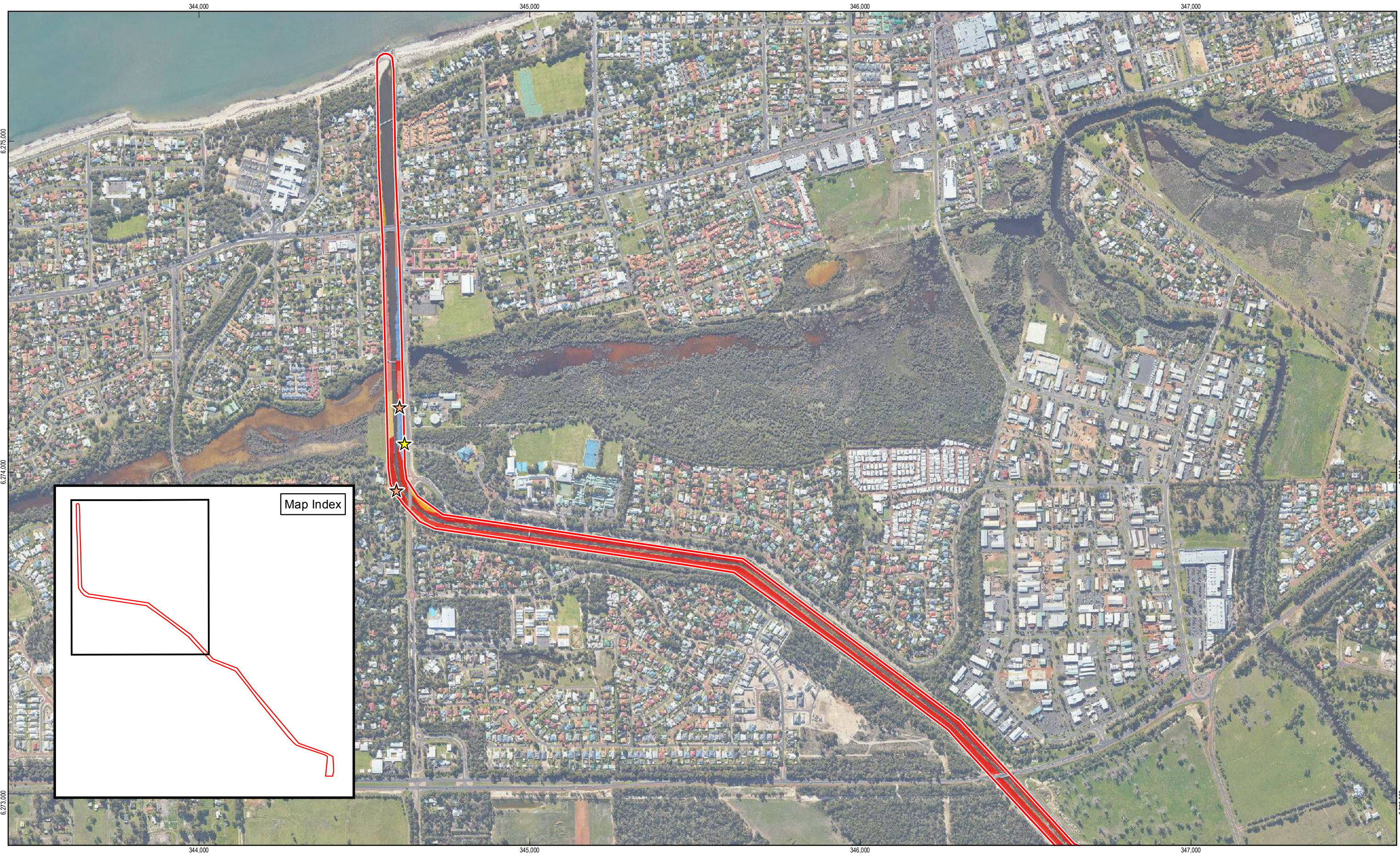


Water Corporation
Vasse Diversion Drain Upgrade

Vegetation Units, Sample Locations
and Significant Flora Locations

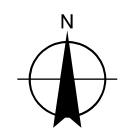
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Figure 3



Map Index

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LEGEND

- Weed Species**
- ★ *Asparagus asparagoides* (Bridal Creeper)
 - ★ *Zantedeschia aethiopica* (Arum Lily)
 - Study Area

- Vegetation Condition (EPA and DPaW 2015)**
- Excellent
 - Excellent - Very Good
 - Very Good
 - Very Good - Good

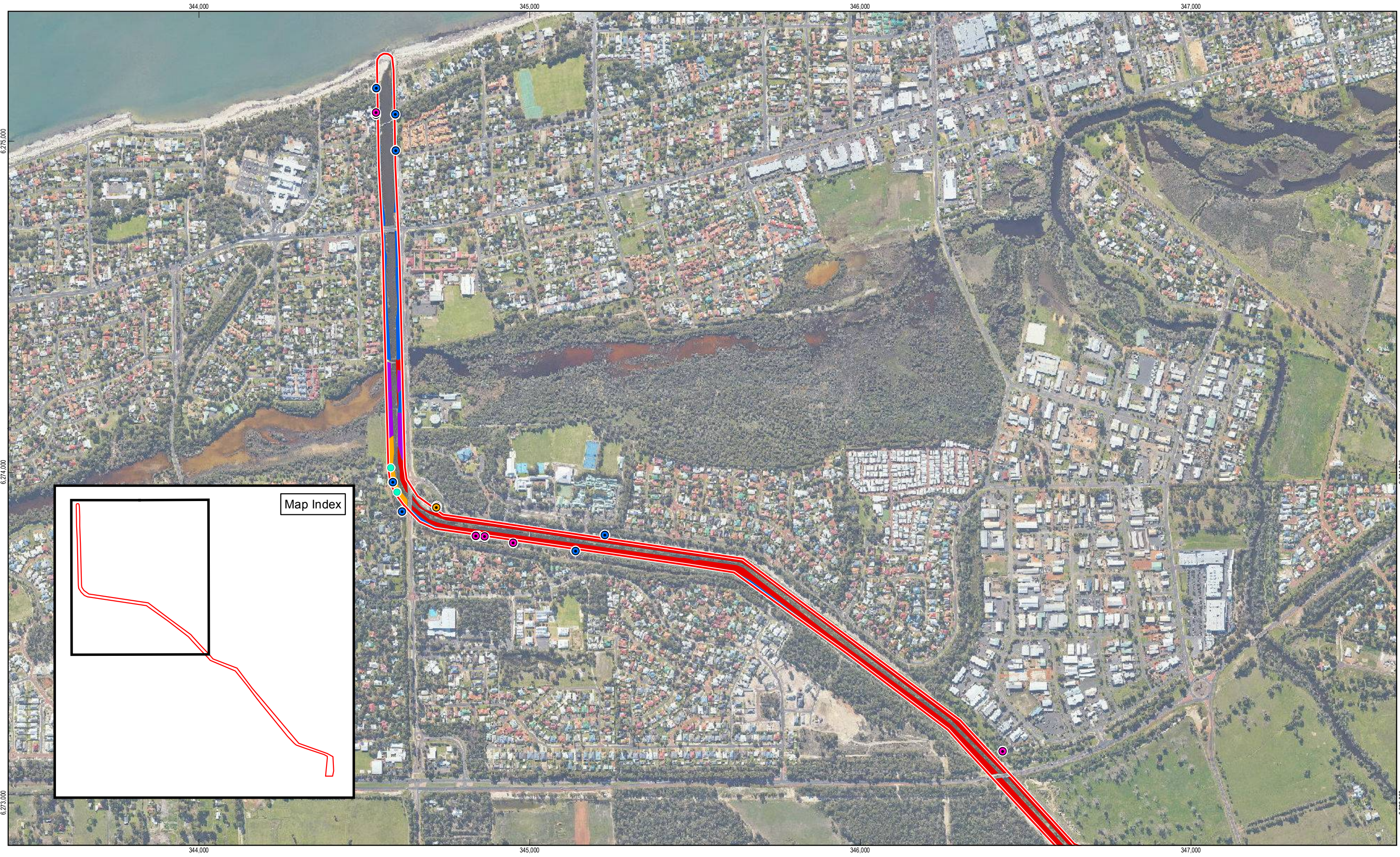
- Good
- Good - Degraded
- Degraded
- Degraded - Completely Degraded
- Completely Degraded



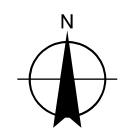
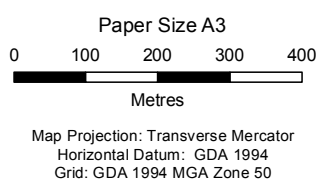
Water Corporation
 Vasse Diversion Drain Upgrade

Vegetation Condition and Significant Weeds

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Map Index



LEGEND

- Carters Mussel (*Westralunio carteri*)
- Black Cockatoo (*Calyptorhynchus latirostris*) hollows (large)
- Black Cockatoo trees with DBH > 500mm

- Ringtail Possum (*Pseudocheirus peregrinus*) Observation**
- Drey
- Drey and scat
- Scat

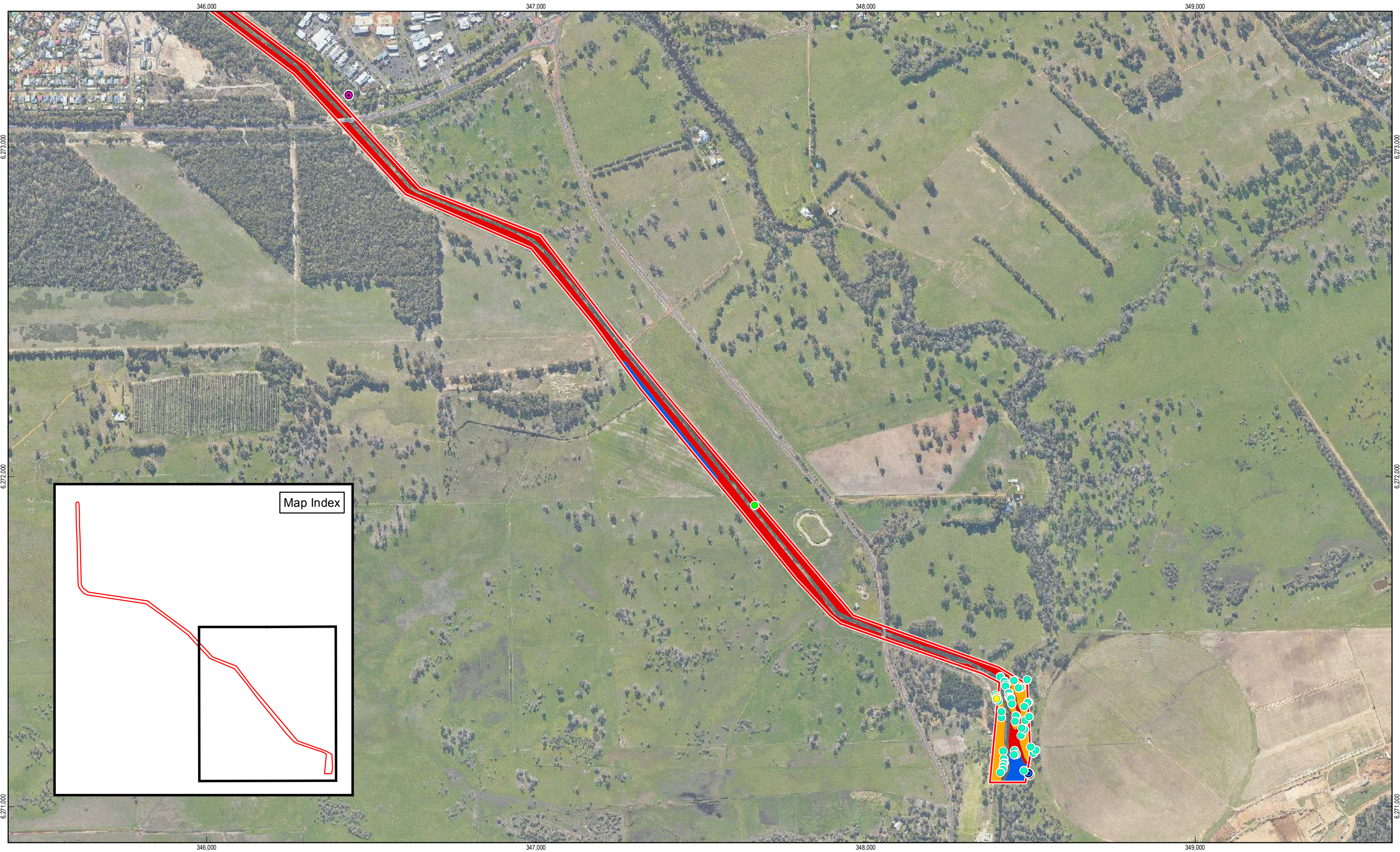
- Study Area
- Fauna Habitat**
- Flooded Gum and Marri Woodland
- Agonis* woodland
- Melaleuca* over shrubland
- Highly Disturbed



Water Corporation
Vasse Diversion Drain Upgrade

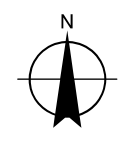
Fauna Habitat Types

Job Number | 61-34862
Revision | 0
Date | 25 Oct 2016



Map Index

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LEGEND

- Carters Mussel (*Westralunio carteri*)
- Black Cockatoo (*Calyptorhynchus latirostris*) hollows (large)
- Black Cockatoo trees with DBH > 500mm

- Ringtail Possum (*Pseudocheirus peregrinus*) Observation**
- Drey
 - Drey and scat
 - Scat

- Study Area**
- Fauna Habitat**
- Flooded Gum and Marri Woodland
 - *Agonis* woodland
 - *Melaleuca* over shrubland
 - Highly Disturbed



Water Corporation
 Vasse Diversion Drain Upgrade

Fauna Habitat Types

Job Number | 61-34862
 Revision | 0
 Date | 25 Oct 2016

Appendix B – Relevant legislation, conservation codes and background information

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 take an action that has, will have, or is likely to have a significant impact MNES, without approval from the Federal Minister for the Environment.

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 Australian Government Minister for the Environment.

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 above.

Clearing of native vegetation in Western Australia requires a permit from the Department of Environment Regulation (DER) (formerly the Department of Environment and Conservation – DEC), unless exemptions apply. Native vegetation includes aquatic and terrestrial vegetation indigenous to Western Australia, and intentionally planted vegetation declared by regulation to be native, but not vegetation planted in a plantation or planted with commercial intent.

In the EP Act Section 51A, clearing is defined as the killing or destruction of; the removal of; the severing or ringbarking of trunks or stems of; or the doing of substantial damage of some or all of the native vegetation in an area, including the flooding of land, the burning of vegetation, the grazing of stock or an act or activity that results in the above.

When making a decision to grant or refuse a permit to clear native vegetation 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.

There are a number of Environmentally Sensitive Areas (ESAs) within Western Australia where exemptions in regulations do not apply. ESAs include locations of threatened communities and species.

State *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*

ESAs are declared by a notice under Section 51B of the EP Act. The Table below outlines the aspects of areas declared as ESA (under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004 – Reg 6*).

Aspects of Environmentally Sensitive Areas

| Aspects of Environmentally Sensitive Areas |
|---|
| A declared World Heritage property as defined in Section 13 of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act). |
| An area that is registered on the Register of the National Estate (RNE), because of its natural values, under the <i>Australian Heritage Commission Act 1975</i> of the Commonwealth (the RNE was closed in 2007 and is no longer a statutory list – all references to the RNE were removed from the EPBC Act on 19 February 2012). |
| A defined wetland and the area within 50 m of the wetland. |
| The area covered by vegetation within 50 m of rare flora, to the extent to which the vegetation is continuous with the vegetation in which the rare flora is located. |
| The area covered by a TEC. |
| A Bush Forever Site. |
| The areas covered by the following policies: |
| a) The <i>Environmental Protection (Gnangara Mound Crown Land) Policy 1992</i> . |
| b) The <i>Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002</i> . |
| The areas covered by the lakes to which the <i>Environmental Protection (Swan Coastal Plain Lakes) Policy 1992</i> (SCPL) (EPP Lakes) applies. |
| Protected wetlands as defined in the <i>Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998</i> . |
| Areas of fringing native vegetation in the policy area as defined in the <i>Environmental Protection (Swan and Canning Rivers) Policy 1997</i> . |

State *Wildlife Conservation Act 1950*

The *Wildlife Conservation Act 1950* (WC Act) provides for the conservation and protection of wildlife. It is administered by the Department of Parks and Wildlife (DPaW) (formerly the DEC) 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*

Under the *Biosecurity and Agriculture Management Act 2007* (BAM Act), a Declared Pest is a prohibited organism or an organism for which a declaration under Section 22(2) is in force. The Department of Agriculture and Food Western Australia (DAFWA) maintains a list of Declared Pests for Western Australia. If a Pest is declared for the whole of the State or for particular Local Government Areas, all landholders are obliged to comply with the specific category of control. Declared plants are gazetted under categories, which define the action required. The category may apply to the whole of the State, districts, individual properties or even paddocks. Categories of control are defined below. Among the factors considered in categorising Declared Pests are:

- The impact of the plant on individuals, agricultural production and the community in general
- Whether it is already established in the area
- The feasibility and cost of possible control measures

The BAM Act replaces the repealed *Agriculture and Related Resources Protection Act 1976* (ARRP Act).

Department of Agriculture and Food (Western Australia) Categories for Declared Pests under the *Biosecurity and Agriculture Management Act 2007*

| 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 and conservation codes

Reserves and conservation areas

Bush Forever

Bush Forever, which was released in December 2000 and proclaimed in 2010, is a Government initiative aimed to retain and protect regionally significant bushland on the Swan Coastal Plain within the Perth Metropolitan Region. Bush Forever aims to protect more than 51,000 hectares of regionally significant bushland within 287 sites across the metropolitan portion of the Swan Coastal Plain (Government of Western Australia 2000). Bush Forever sites constitute ESAs as declared by a notice under Section 51B of the EP Act.

Department of Parks and Wildlife managed lands and waters

DPaW manages lands and waters throughout Western Australia to conserve ecosystems and species, and to provide for recreation and appreciation of the natural environment. DPaW managed lands and waters include national parks, conservation parks and reserves, marine parks and reserves, regional parks, nature reserves, State forest and timber reserves. DPaW managed conservation estate, is vested with the Conservation Commission of Western Australia. Access to, or through, some areas of DPaW managed lands may require a permit or could be restricted due to management activities. Proposed land use changes and development proposals that abut DPaW managed lands will generally be referred to DPaW throughout the assessment process.

Wetlands

Wetlands include not only lakes with open water, but areas of seasonally, intermittently or permanently waterlogged soil. Approximately 25 percent of the Swan Coastal Plain between Moore River and Mandurah is classified as wetland (Hill et al. 1996).

Though extensive in area, not all wetlands retain significant ecological values due to the concentration of urban and agricultural development in the region. Most wetlands have been cleared, filled or developed over, leaving only 20 percent of all the wetlands that were present on the Swan Coastal Plain prior to European settlement. Of these, an estimated 15 percent of the wetland area has retained high ecological values (Hill et al. 1996).

Ramsar Listed Wetlands

The Convention of Wetlands of International Importance was signed in 1971 at the Iranian town of Ramsar. The Convention has since been referred to as the Ramsar Convention. Ramsar Listed wetlands are “sites containing representative, rare or unique wetlands, or wetlands that are important for conserving biological diversity ... because of their ecological, botanical, zoological, limnological or hydrological importance” (DoE 2016b). Once a Ramsar Listed Wetland is designated, the country agrees to manage its conservation and ensure its wise use. Under the Convention, wise use is broadly defined as “maintaining the ecological character of a wetland” (DoE 2016b).

Nationally important wetlands

Wetlands of national significance are listed under the Directory of Important Wetlands in Australia. Nationally important wetlands are wetlands which meet at least one of the following criteria (DoE 2016a):

- It is a good example of a wetland type occurring within a biogeographic region in Australia
- It is a wetland which plays an important ecological or hydrological role in the natural functioning of a major wetland system/complex

- It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail
- The wetland supports one percent or more of the national populations of any native plant or animal taxa
- The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level
- The wetland is of outstanding historical or cultural significance

Lakes covered under the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992*

The *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* (EPP Lakes) protects the environmental values of selected lakes/wetlands on the Swan Coastal Plain.

Geomorphic wetlands

Categorisation of wetlands has been conducted by Hill et al. (1996), delineating Swan Coastal Plain wetlands into levels of protection and management categories. Conservation Category Wetlands are wetlands that support high levels of attributes and functions. Resource Enhancement Wetlands are those that have been partly modified but still support substantial functions and attributes. Multiple Use Wetlands are classified as those wetlands with few attributes that still provide important wetland functions. Multiple Use wetlands have few important ecological attributes and functions remaining.

The Geomorphic Wetlands Swan Coastal Plain dataset displays the location, boundary, geomorphic classification (wetland type) and management category of wetlands on the Swan Coastal Plain.

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) and in Environmental Protection Authority (EPA) Position Statement No. 2 on environmental protection of native vegetation in Western Australia (EPA 2000).

From a purely biodiversity perspective and taking no account of any other land degradation issues, there are a number of key criteria now being applied to the clearing of native vegetation in Western Australia (EPA 2000).

- The “threshold level” below which species loss appears to accelerate exponentially at an ecosystem level is regarded as being at a level of 30 percent of the pre-European extent of the vegetation type.
- A level of 10 percent of the original extent is regarded as being a level representing Endangered.
- Clearing which would put the threat level into the class below should be avoided.
- From a biodiversity perspective, stream reserves should generally be in the order of at least 200 metres (m) wide.

Within the Swan Coastal Plain, EPA Position Statement No. 9 (EPA 2006a) identifies vegetation complexes with 30 percent or less of their pre-clearing extent remaining in a bioregion, or 10 percent or less of their pre-clearing extent remaining in constrained areas (i.e. areas of urban development in cities and major town) on the Swan Coastal Plain, to be critical assets.

The extent of remnant native vegetation has been assessed by Shepherd et al. (2002) and the Government of Western Australia (2013), based on broadscale vegetation association mapping by Smith 1973.

It is important to note that the “remnant native vegetation mapping used in the Region is derived from dated aerial photography (in this case 1998) with limited ground-truthing. As a consequence, the percentages of ecological communities remaining are generally an overestimate of the native vegetation remaining at present and at the date of this Guidance (2006). The principal factors contributing to this overestimation are:

- The preferential mapping of treed landscapes, leading to some mapping of areas that are parkland cleared or completely degraded
- The inclusion of areas that are approved for clearing through development approvals and/or clearing permits
- Some areas that have been cleared since the time of the aerial photography

It is therefore important to bear these issues in mind when the percentage of the vegetation complexes remaining is approaching 30 percent” (EPA 2006b). Furthermore, as a result of the clearing of the Swan Coastal Plain since 1998, it is likely that the actual percentage remaining of each vegetation type is less.

Vegetation condition

The vegetation condition in the Perth IBRA bioregion can be assessed in accordance with the vegetation condition rating scale for the South West and Interzone Botanical Provinces (devised by Keighery (1994) and adapted by EPA and DPaW (2015). The scale recognises the intactness of vegetation and consists of six rating levels as outlined below.

Vegetation condition rating scale

| 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. |

| Condition | South West and Interzone Botanical Provinces description |
|---------------------|--|
| 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.

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 administered by the Department of the Environment (DotE) (formerly Department of Sustainability, Environment, Water, Population and Communities – DSEWPaC). The DPaW 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 TEC that do not meet survey criteria are added to the DPaW 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.

Conservation codes and definitions for Threatened Ecological Communities endorsed by the Western Australian Minister for the Environment and listed under the *Environment Protection and Biodiversity Conservation Act 1999*

| Western Australia conservation categories | | Federal Government Conservation Categories (EPBC Act) | |
|---|--|---|--|
| Presumed Totally Destroyed (PD) | The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future. | Critically Endangered (CR) | If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future |
| Critically Endangered (CR) | An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated | Endangered (EN) | If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future |
| 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) | If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term 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 Priority Ecological Communities as listed by the Department of Parks and Wildlife

| Category | Description |
|------------|--|
| Priority 1 | <p>Poorly known ecological communities.</p> <p>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.</p> |
| Priority 2 | <p>Poorly known ecological communities.</p> <p>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.</p> |
| Priority 3 | <p>Poorly known ecological communities.</p> <p>(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:</p> <p>(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;</p> <p>(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.</p> <p>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.</p> |
| Priority 4 | <p>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.</p> <p>(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.</p> <p>(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.</p> <p>(iii) Ecological communities that have been removed from the list of threatened communities during the past five years.</p> |

| Category | Description |
|------------|--|
| Priority 5 | <p>Conservation Dependent ecological communities.</p> <p>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.</p> |

Other significant vegetation

Vegetation may be significant for a range of reasons, other than a statutory listing as TEC or because the extent is below a threshold level. The EPA (2004) states that significant vegetation may include vegetation that includes the following:

- Scarcity
- Unusual species
- Novel combinations of species
- 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 the range of a unit (particularly, a good local and/or regional example of a unit in 'prime' habitat, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
- A restricted distribution

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).

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 DotE 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 the Conservation of Nature and Natural Resources (IUCN).

Threatened species have been published as Specially Protected under the WC Act 1950, 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. The schedules align with the categories of the EPBC Act. Threatened species are those species which have been adequately searched for and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such.

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 DPaW Priority species are considered conservation significant.

Conservation categories and definitions for Environment Protection and Biodiversity Conservation Act 1999 listed flora & fauna species

| Conservation category | Definition |
|---------------------------------------|---|
| Extinct | Taxa not definitely located in the wild during the past 50 years |
| Extinct in the Wild | Taxa known to survive only in captivity |
| Critically Endangered | Taxa facing an extremely high risk of extinction in the wild in the immediate future |
| Endangered | Taxa facing a very high risk of extinction in the wild in the near future |
| Vulnerable | Taxa facing a high risk of extinction in the wild in the medium-term |
| Near Threatened | Taxa that risk becoming Vulnerable in the wild |
| Conservation Dependent | Taxa whose survival depends upon ongoing conservation measures. Without these measures, a conservation dependent taxon would be classified as Vulnerable or more severely threatened. |
| Data Deficient (Insufficiently Known) | Taxa suspected of being Rare, Vulnerable or Endangered, but whose true status cannot be determined without more information. |
| Least Concern | Taxa that are not considered Threatened |

Conservation codes and descriptions for Western Australian flora and fauna

| Code | Conservation category | Description |
|---------------------------------------|--|---|
| <i>Wildlife Conservation Act 1950</i> | | |
| T | Threatened species | <p>Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, 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 (which may also be referred to as Declared Rare Flora).</p> <p>Threatened fauna is that subset of 'Specially Protected Fauna' declared to be 'likely to become extinct' pursuant to section 14(4) of the Wildlife Conservation Act.</p> <p>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 Wildlife Conservation Act.</p> <p>The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.</p> |
| CR | Critically endangered species | Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i> , in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora. |
| EN | Endangered species | Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i> , in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora. |
| VU | Vulnerable species | Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i> , in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora. |
| EX | Presumed extinct species | Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i> , in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora. |
| IA | Migratory birds protected under an international agreement | Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i> , in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice. |
| CD | Conservation dependent fauna | Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i> , in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice. |
| OS | Other specially protected fauna | Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i> , in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice. |

| Code | Conservation category | Description |
|----------------------|---|---|
| DPaW Priority Listed | | |
| 1 | Priority One: 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. |
| 2 | Priority Two: 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. |
| 3 | Priority Three: 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. |
| 4 | Priority Four: Rare, Near Threatened and other taxa in need of monitoring | (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy. |

Migratory species listed under the EPBC Act

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)

Other significant flora and fauna

Flora species, subspecies, varieties, hybrids and ecotypes may be significant for a range of reasons, other than as Threatened (Declared Rare) Flora or Priority Flora. The EPA (2004) states that significant flora may include taxa that have:

- A keystone role in a particular habitat for threatened species or supporting large populations representing a significant proportion of the local regional population of a species
- Relic status
- 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
- Being poorly reserved

The application of the degree of significance may apply at a range of scales.

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 (Australian Government 2014).

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Appendix C – Desktop searches

EPBC Act PMST Report (5 km buffer)

NatureMap Flora Report (5 km buffer)

NatureMap Fauna Report (5 km buffer)



EPBC Act Protected Matters Report

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

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

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

Report created: 16/08/16 12:29:36

[Summary](#)

[Details](#)

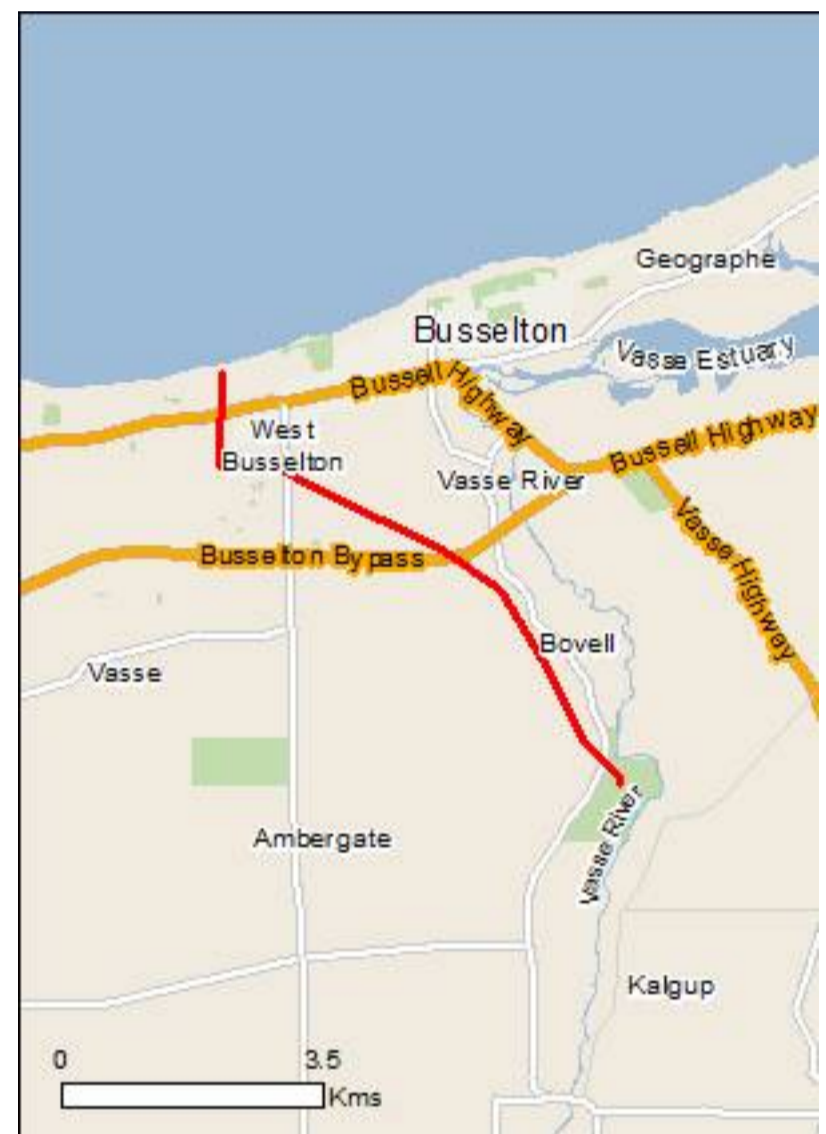
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



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

[Coordinates](#)

Buffer: 5.0Km



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: | 2 |
| Listed Threatened Species: | 59 |
| Listed Migratory Species: | 45 |

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: | 73 |
| Whales and Other Cetaceans: | 13 |
| 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: | 12 |
| Regional Forest Agreements: | 1 |
| Invasive Species: | 24 |
| Nationally Important Wetlands: | 1 |
| Key Ecological Features (Marine) | None |

Details

Matters of National Environmental Significance

| Wetlands of International Importance (Ramsar) | [Resource Information] |
|---|--------------------------|
| Name | Proximity |
| Vasse-wonnerup 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 |
|---|-----------------------|---------------------------------------|
| Claypans of the Swan Coastal Plain | Critically Endangered | Community likely to occur within area |
| Subtropical and Temperate Coastal Saltmarsh | Vulnerable | Community likely to occur within area |

Listed Threatened Species

 [Resource Information]

| Name | Status | Type of Presence |
|--|-----------------------|---|
| Birds | | |
| Anous tenuirostris melanops Australian Lesser Noddy [26000] | Vulnerable | Species or species habitat may occur within area |
| Botaurus poiciloptilus Australasian Bittern [1001] | Endangered | Species or species habitat may occur within area |
| Calidris ferruginea Curlew Sandpiper [856] | Critically Endangered | Species or species habitat known to occur within area |
| Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034] | Vulnerable | Species or species habitat known to occur within area |
| Calyptorhynchus baudinii Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-Cockatoo [769] | Vulnerable | Breeding known to occur within area |
| Calyptorhynchus latirostris Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523] | Endangered | Species or species habitat known to occur within area |
| Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879] | Endangered | Species or species habitat known to occur within area |
| Diomedea amsterdamensis Amsterdam Albatross [64405] | Endangered | Species or species habitat may occur within area |
| Diomedea dabbenena Tristan Albatross [66471] | Endangered | Species or species habitat may occur within area |
| Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072] | Vulnerable | Foraging, feeding or related behaviour likely |

| Name | Status | Type of Presence |
|--|-----------------------|--|
| Diomedea exulans (sensu lato) Wandering Albatross [1073] | Vulnerable | to occur within area Foraging, feeding or related behaviour likely to occur within area |
| Diomedea sanfordi Northern Royal Albatross [64456] | Endangered | Foraging, feeding or related behaviour likely to occur within area |
| Halobaena caerulea Blue Petrel [1059] | Vulnerable | Species or species habitat may occur within area |
| Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380] | Vulnerable | Species or species habitat may occur within area |
| Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432] | Critically Endangered | Species or species habitat may occur within area |
| Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060] | Endangered | Species or species habitat may occur within area |
| Macronectes halli Northern Giant Petrel [1061] | Vulnerable | Species or species habitat may occur within area |
| Pachyptila turtur subantarctica Fairy Prion (southern) [64445] | Vulnerable | Species or species habitat known to occur within area |
| Pezoporus occidentalis Night Parrot [59350] | Endangered | Extinct within area |
| Phoebetria fusca Sooty Albatross [1075] | Vulnerable | Species or species habitat may occur within area |
| Pterodroma mollis Soft-plumaged Petrel [1036] | Vulnerable | Species or species habitat may occur within area |
| Sternula nereis nereis Australian Fairy Tern [82950] | Vulnerable | Breeding likely 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 musculus Blue Whale [36] | Endangered | Species or species habitat likely to occur within area |

| Name | Status | Type of Presence |
|--|-----------------------|--|
| Dasyurus geoffroii Chuditch, Western Quoll [330] | Vulnerable | Species or species habitat known to occur within area |
| Eubalaena australis Southern Right Whale [40] | Endangered | Breeding known to occur within area |
| Megaptera novaeangliae Humpback Whale [38] | Vulnerable | Congregation or aggregation known to occur within area |
| Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22] | Vulnerable | Species or species habitat may occur within area |
| Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911] | Vulnerable | Breeding known to occur within area |
| Plants | | |
| Andersonia gracilis Slender Andersonia [14470] | Endangered | Species or species habitat may occur within area |
| Banksia nivea subsp. uliginosa Swamp Honeypot [82766] | Endangered | Species or species habitat likely to occur within area |
| Banksia squarrosa subsp. argillacea Whicher Range Dryandra [82769] | Vulnerable | Species or species habitat likely to occur within area |
| Brachyscias verecundus Ironstone Brachyscias [81321] | Critically Endangered | Species or species habitat may occur within area |
| Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309] | Endangered | Species or species habitat likely to occur within area |
| Caladenia procera Carbunup King Spider Orchid [68679] | Critically Endangered | Species or species habitat known to occur within area |
| Chamelaucium sp. S coastal plain (R.D.Royce 4872) Royce's Waxflower [87814] | Vulnerable | Species or species habitat known to occur within area |
| Darwinia whicherensis Abba Bell [83193] | Endangered | Species or species habitat may occur within area |
| Daviesia elongata subsp. elongata Long-leaved Daviesia [64883] | Vulnerable | Species or species habitat may occur within area |
| Diuris micrantha Dwarf Bee-orchid [55082] | Vulnerable | Species or species habitat likely to occur within area |
| Drakaea elastica Glossy-leaved Hammer-orchid, Praying Virgin [16753] | Endangered | Species or species habitat known to occur within area |
| Drakaea micrantha Dwarf Hammer-orchid [56755] | Vulnerable | Species or species habitat likely to occur within area |
| Gastrolobium papilio Butterfly-leaved Gastrolobium [78415] | Endangered | Species or species habitat may occur within area |
| Grevillea brachystylis subsp. grandis Large-flowered Short-styled Grevillea [85001] | Critically Endangered | Species or species |

| Name | Status | Type of Presence |
|---|------------|---|
| Grevillea elongata Ironstone Grevillea [64578] | Vulnerable | habitat likely to occur within area Species or species habitat may occur within area |
| Lambertia echinata subsp. occidentalis Western Prickly Honeysuckle [64528] | Endangered | Species or species habitat may occur within area |
| Petrophile latericola Laterite Petrophile [64532] | Endangered | Species or species habitat likely to occur within area |
| Tetraria australiensis Southern Tetraria [10137] | Vulnerable | Species or species habitat likely to occur within area |
| Verticordia plumosa var. vassensis Vasse Featherflower [55804] | Endangered | Species or species habitat known to occur within area |

Reptiles

| | | |
|--|------------|---|
| Caretta caretta Loggerhead Turtle [1763] | Endangered | Foraging, feeding or related behaviour known to occur within area |
| Chelonia mydas Green Turtle [1765] | Vulnerable | Foraging, feeding or related behaviour known to occur within area |
| Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768] | Endangered | Breeding likely to occur within area |
| Natator depressus Flatback Turtle [59257] | Vulnerable | Foraging, feeding or related behaviour known to occur within area |

Sharks

| | | |
|---|------------|---|
| Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752] | Vulnerable | Species or species habitat known to occur within area |
| Carcharodon carcharias Great White Shark [64470] | Vulnerable | Species or species habitat known to occur within area |
| Rhincodon typus Whale Shark [66680] | Vulnerable | Species or species habitat may occur within area |

Listed Migratory Species

[[Resource Information](#)]

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

| Name | Threatened | Type of Presence |
|--|------------|--|
| Migratory Marine Birds | | |
| Apus pacificus Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| Diomedea amsterdamensis Amsterdam Albatross [64405] | Endangered | Species or species habitat may occur within area |
| Diomedea dabbenena Tristan Albatross [66471] | Endangered | Species or species habitat may occur within area |
| Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |

| Name | Threatened | Type of Presence |
|--|-------------|--|
| Diomedea exulans (sensu lato) Wandering Albatross [1073] | 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 |
| 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 |
| Phoebastria fusca Sooty Albatross [1075] | Vulnerable | Species or species habitat may occur within area |
| Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043] | | Species or species habitat likely to occur within area |
| Sterna anaethetus Bridled Tern [814] | | Foraging, feeding or related behaviour likely to occur within area |
| Sterna caspia Caspian Tern [59467] | | 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 (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697] | 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 | | |
| Balaenoptera edeni Bryde's Whale [35] | | Species or species habitat may occur within area |
| Balaenoptera musculus Blue Whale [36] | Endangered | Species or species habitat likely to occur within area |
| Caperea marginata Pygmy Right Whale [39] | | Species or species habitat may occur within area |
| Carcharodon carcharias Great White Shark [64470] | Vulnerable | Species or species habitat known to occur within area |
| Caretta caretta Loggerhead Turtle [1763] | Endangered | Foraging, feeding or related behaviour known to occur within area |

| Name | Threatened | Type of Presence |
|--|-----------------------|---|
| Chelonia mydas Green Turtle [1765] | Vulnerable | Foraging, feeding or related behaviour known to occur within area |
| Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768] | Endangered | Breeding likely to occur within area |
| Eubalaena australis Southern Right Whale [40] | Endangered | Breeding known to occur within area |
| Lagenorhynchus obscurus Dusky Dolphin [43] | | Species or species habitat may occur within area |
| Lamna nasus Porbeagle, Mackerel Shark [83288] | | Species or species habitat may occur within area |
| Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994] | | Species or species habitat may occur within area |
| Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995] | | Species or species habitat may occur within area |
| Megaptera novaeangliae Humpback Whale [38] | Vulnerable | Congregation or aggregation known to occur within area |
| Natator depressus Flatback Turtle [59257] | Vulnerable | Foraging, feeding or related behaviour known to occur within area |
| Orcinus orca Killer Whale, Orca [46] | | Species or species habitat may occur within area |
| Rhincodon typus Whale Shark [66680] | Vulnerable | Species or species habitat may occur within area |
| Migratory Terrestrial Species | | |
| Motacilla cinerea Grey Wagtail [642] | | Species or species habitat may occur within area |
| Migratory Wetlands Species | | |
| Calidris acuminata Sharp-tailed Sandpiper [874] | | Species or species habitat known to occur within area |
| Calidris ferruginea Curlew Sandpiper [856] | Critically Endangered | Species or species habitat known to occur within area |
| Calidris ruficollis Red-necked Stint [860] | | Species or species habitat known to occur within area |
| Calidris subminuta Long-toed Stint [861] | | Species or species habitat known to occur within area |
| Charadrius bicinctus Double-banded Plover [895] | | Species or species habitat known to occur within area |
| Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879] | Endangered | Species or species habitat known to occur within area |

| Name | Threatened | Type of Presence |
|--|------------|---|
| Limosa lapponica Bar-tailed Godwit [844] | | Species or species habitat known to occur within area |
| Pandion haliaetus Osprey [952] | | Species or species habitat known to occur within area |
| Tringa glareola Wood Sandpiper [829] | | Species or species habitat known to occur within area |
| Tringa nebularia Common Greenshank, Greenshank [832] | | Species or species habitat known to occur within area |
| Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833] | | 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 | | |
| Anous tenuirostris melanops Australian Lesser Noddy [26000] | Vulnerable | Species or species habitat may occur within area |
| Apus pacificus Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| Ardea alba Great Egret, White Egret [59541] | | Breeding known to occur within area |
| Ardea ibis Cattle Egret [59542] | | Species or species habitat may occur within area |
| Calidris acuminata Sharp-tailed Sandpiper [874] | | Species or species habitat known to occur within area |
| Calidris ferruginea Curlew Sandpiper [856] | Critically Endangered | Species or species habitat known to occur within area |
| Calidris ruficollis Red-necked Stint [860] | | Species or species habitat known to occur within area |
| Calidris subminuta Long-toed Stint [861] | | Species or species habitat known to occur within area |
| Catharacta skua Great Skua [59472] | | Species or species habitat may occur within |

| Name | Threatened | Type of Presence area |
|--|------------|--|
| Charadrius bicinctus Double-banded Plover [895] | | Species or species habitat known to occur within area |
| Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879] | Endangered | Species or species habitat known to occur within area |
| Charadrius ruficapillus Red-capped Plover [881] | | Species or species habitat known to occur within area |
| Diomedea amsterdamensis Amsterdam Albatross [64405] | Endangered | Species or species habitat may occur within area |
| Diomedea dabbenena Tristan Albatross [66471] | Endangered | Species or species habitat may occur within area |
| Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Diomedea exulans (sensu lato) Wandering Albatross [1073] | Vulnerable | Foraging, feeding or related behaviour likely to occur within area |
| Diomedea sanfordi Northern Royal Albatross [64456] | Endangered | Foraging, feeding or related behaviour likely to occur within area |
| Haliaeetus leucogaster White-bellied Sea-Eagle [943] | | Species or species habitat known to occur within area |
| Halobaena caerulea Blue Petrel [1059] | Vulnerable | Species or species habitat may occur within area |
| Himantopus himantopus Black-winged Stilt [870] | | Species or species habitat known to occur within area |
| Limosa lapponica Bar-tailed Godwit [844] | | Species or species habitat known to occur within area |
| Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060] | Endangered | Species or species habitat may occur within area |
| Macronectes halli Northern Giant Petrel [1061] | Vulnerable | Species or species habitat may occur within area |
| Merops ornatus Rainbow Bee-eater [670] | | Species or species habitat may occur within area |
| Motacilla cinerea Grey Wagtail [642] | | Species or species habitat may occur within area |
| Pachyptila turtur Fairy Prion [1066] | | Species or species habitat known to occur within area |
| Pandion haliaetus Osprey [952] | | Species or species habitat known to occur within area |

| Name | Threatened | Type of Presence |
|--|-------------|--|
| Phoebastria fusca Sooty Albatross [1075] | Vulnerable | Species or species habitat may occur within area |
| Pterodroma mollis Soft-plumaged Petrel [1036] | Vulnerable | Species or species habitat may occur within area |
| Puffinus assimilis Little Shearwater [59363] | | Foraging, feeding or related behaviour known to occur within area |
| Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043] | | Species or species habitat likely 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] | | 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 (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697] | 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] | | Species or species habitat may occur within area |
| Tringa glareola Wood Sandpiper [829] | | Species or species habitat known to occur within area |
| Tringa nebularia Common Greenshank, Greenshank [832] | | Species or species habitat known to occur within area |
| Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833] | | 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 |

| Name | Threatened | Type of Presence |
|--|------------|---|
| Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227] | | Species or species habitat may occur within area |
| Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234] | | Species or species habitat may occur within area |
| Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235] | | Species or species habitat may occur within area |
| Hippocampus subelongatus West Australian Seahorse [66722] | | Species or species habitat may occur within area |
| Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243] | | Species or species habitat may occur within area |
| Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249] | | Species or species habitat may occur within area |
| Lissocampus fatiloquus Prophet's Pipefish [66250] | | Species or species habitat may occur within area |
| Lissocampus runa Javelin Pipefish [66251] | | Species or species habitat may occur within area |
| Maroubra perserrata Sawtooth Pipefish [66252] | | Species or species habitat may occur within area |
| Mitotichthys meraculus Western Crested Pipefish [66259] | | Species or species habitat may occur within area |
| Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264] | | Species or species habitat may occur within area |
| Phycodurus eques Leafy Seadragon [66267] | | Species or species habitat may occur within area |
| Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268] | | Species or species habitat may occur within area |
| Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269] | | Species or species habitat may occur within area |
| Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273] | | Species or species habitat may occur within area |
| Stigmatopora argus Spotted Pipefish, Gulf Pipefish [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 |

| Name | Threatened | Type of Presence |
|---|------------|---|
| Urocampus carinirostris Hairy Pipefish [66282] | | Species or species habitat may occur within area |
| Vanacampus margaritifer Mother-of-pearl Pipefish [66283] | | Species or species habitat may occur within area |
| Vanacampus phillipi Port Phillip Pipefish [66284] | | Species or species habitat may occur within area |
| Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285] | | Species or species habitat may occur within area |
| Mammals | | |
| Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20] | | Species or species habitat may occur within area |
| Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22] | Vulnerable | Species or species habitat may occur within area |
| Reptiles | | |
| Caretta caretta Loggerhead Turtle [1763] | Endangered | Foraging, feeding or related behaviour known to occur within area |
| Chelonia mydas Green Turtle [1765] | Vulnerable | Foraging, feeding or related behaviour known to occur within area |
| Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768] | Endangered | Breeding likely to occur within area |
| Natator depressus Flatback Turtle [59257] | Vulnerable | Foraging, feeding or related behaviour known to occur within area |
| Whales and other Cetaceans | | [Resource Information] |
| Name | Status | Type of Presence |
| Mammals | | |
| Balaenoptera acutorostrata Minke Whale [33] | | Species or species habitat may occur within area |
| Balaenoptera edeni Bryde's Whale [35] | | Species or species habitat may occur within area |
| Balaenoptera musculus Blue Whale [36] | Endangered | Species or species habitat likely to occur within area |
| Caperea marginata Pygmy Right Whale [39] | | Species or species habitat may occur within area |
| Delphinus delphis Common 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 |

| Name | Status | Type of Presence |
|---|------------|--|
| Lagenorhynchus obscurus Dusky Dolphin [43] | | Species or species habitat may occur within area |
| Megaptera novaeangliae Humpback Whale [38] | Vulnerable | Congregation or aggregation known to occur within area |
| Orcinus orca Killer Whale, Orca [46] | | Species or species habitat may occur within area |
| Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51] | | Species or species habitat may occur within area |
| Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418] | | Species or species habitat likely to occur within area |
| Tursiops truncatus s. str. Bottlenose Dolphin [68417] | | Species or species habitat may occur within area |

Extra Information

| State and Territory Reserves | [Resource Information] |
|------------------------------|--------------------------|
| Name | State |
| Broadwater | WA |
| Fish Road | WA |
| Sabina | WA |
| Unnamed WA25836 | WA |
| Unnamed WA26620 | WA |
| Unnamed WA41568 | WA |
| Unnamed WA41597 | WA |
| Unnamed WA42879 | WA |
| Unnamed WA48837 | WA |
| Unnamed WA49385 | WA |
| Unnamed WA50017 | WA |
| Unnamed WA50270 | WA |

| Regional Forest Agreements | [Resource Information] |
|----------------------------|--------------------------|
|----------------------------|--------------------------|

Note that all areas with completed RFAs have been included.

| Name | State |
|-----------------------------------|-------------------|
| South West WA RFA | Western Australia |

| Invasive Species | [Resource Information] |
|------------------|--------------------------|
|------------------|--------------------------|

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

| Name | Status | Type of Presence |
|--|--------|--|
| 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 |

| Name | Status | Type of Presence |
|---|--------|--|
| 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 | | |
| Bos taurus Domestic Cattle [16] | | Species or species habitat likely to occur within area |
| Canis lupus familiaris Domestic Dog [82654] | | Species or species habitat likely to occur within area |
| Felis catus Cat, House Cat, Domestic Cat [19] | | Species or species habitat likely to occur within area |
| Feral deer Feral deer species in Australia [85733] | | Species or species habitat likely to occur within area |
| Mus musculus House Mouse [120] | | Species or species habitat likely to occur within area |
| Oryctolagus cuniculus Rabbit, European Rabbit [128] | | Species or species habitat likely to occur within area |
| Rattus rattus Black Rat, Ship Rat [84] | | Species or species habitat likely to occur within area |
| Sus scrofa Pig [6] | | Species or species habitat likely to occur within area |
| Vulpes vulpes Red Fox, Fox [18] | | Species or species habitat likely to occur within area |
| Plants | | |
| Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473] | | Species or species habitat likely to occur within area |
| Brachiaria mutica Para Grass [5879] | | Species or species habitat may occur within area |
| Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213] | | Species or species habitat may occur within area |
| Chrysanthemoides monilifera Bitou Bush, Boneseed [18983] | | Species or species habitat may occur within area |
| Chrysanthemoides monilifera subsp. monilifera Boneseed [16905] | | Species or species habitat likely to occur within area |
| Genista sp. X Genista monspessulana Broom [67538] | | Species or species habitat may occur within area |
| Lycium ferocissimum African Boxthorn, Boxthorn [19235] | | Species or species habitat likely to occur |

| Name | Status | Type of Presence within area |
|--|--------|--|
| Olea europaea Olive, Common Olive [9160] | | Species or species habitat may occur within area |
| Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780] | | Species or species habitat may occur within area |
| Rubus fruticosus aggregate Blackberry, European Blackberry [68406] | | Species or species habitat likely to occur within area |
| Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018] | | Species or species habitat likely to occur within area |

Nationally Important Wetlands [\[Resource Information \]](#)

| Name | State |
|---|-------|
| Vasse-Wonnerup Wetland System | 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.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

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

-33.65333 115.316971,-33.662617 115.316542,-33.662379 115.322693,-33.664879 115.328844,-33.670951 115.343149,-33.674999 115.350159,-33.682379 115.355881,-33.689759 115.360172,-33.693806 115.36475,-33.694282 115.364607,-33.694282 115.364607

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](#)
- [-Parks and Wildlife Commission NT, Northern Territory Government](#)
- [-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, Atherton and Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- 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.

NatureMap Species Report

Created By Guest user on 16/08/2016

Kingdom Plantae
Current Names Only Yes
Core Datasets Only Yes
Method 'By Line'
Vertices 33° 39' 03" S,115° 19' 24" E 33° 39' 48" S,115° 19' 27" E 33° 39' 50" S,115° 19' 58" E 33° 40'
Group By 04" S,115° 20' 19" E 33° 40' 16" S,115° 20' 34" E 33° 40' 29" S,115° 20' 58" E 33° 40' 55"
 S,115° 21' 23" E 33° 41' 25" S,115° 21' 51" E 33° 41' 25" S,115° 21' 51" E
 Family

| Family | Species | Records |
|-------------------|---------|---------|
| Aizoaceae | 1 | 1 |
| Amaranthaceae | 5 | 6 |
| Anarthriaceae | 6 | 13 |
| Apiaceae | 10 | 16 |
| Apodanthaceae | 1 | 1 |
| Araceae | 2 | 2 |
| Araliaceae | 6 | 10 |
| Asparagaceae | 17 | 25 |
| Asphodelaceae | 2 | 2 |
| Asteraceae | 58 | 100 |
| Aytoniaceae | 1 | 1 |
| Bonnemaisoniaceae | 1 | 1 |
| Boraginaceae | 1 | 3 |
| Brassicaceae | 11 | 15 |
| Bryaceae | 1 | 1 |
| Campanulaceae | 7 | 9 |
| Caprifoliaceae | 2 | 2 |
| Caryophyllaceae | 7 | 9 |
| Casuarinaceae | 2 | 3 |
| Celastraceae | 2 | 5 |
| Centrolepidaceae | 5 | 9 |
| Chenopodiaceae | 15 | 16 |
| Codiaceae | 2 | 5 |
| Colchicaceae | 3 | 7 |
| Commelinaceae | 1 | 1 |
| Convolvulaceae | 4 | 8 |
| Coralliaceae | 1 | 1 |
| Crassulaceae | 3 | 4 |
| Cymodoceaceae | 2 | 4 |
| Cyperaceae | 41 | 61 |
| Dasyopogonaceae | 3 | 11 |
| Delesseriaceae | 1 | 1 |
| Dilleniaceae | 15 | 44 |
| Droseraceae | 12 | 19 |
| Elaeocarpaceae | 4 | 21 |
| Ericaceae | 30 | 55 |
| Euphorbiaceae | 8 | 12 |
| Fabaceae | 110 | 244 |
| Fossombroniaceae | 1 | 1 |
| Funariaceae | 1 | 1 |
| Gentianaceae | 1 | 1 |
| Geraniaceae | 5 | 6 |
| Goodeniaceae | 17 | 449 |
| Gracilariaceae | 1 | 1 |
| Haemodoraceae | 11 | 19 |
| Haloragaceae | 5 | 8 |
| Hemerocallidaceae | 10 | 25 |
| Hydatellaceae | 1 | 1 |
| Hypericaceae | 1 | 1 |
| Hypoxidaceae | 1 | 1 |
| Iridaceae | 11 | 18 |
| Juncaceae | 5 | 10 |
| Juncaginaceae | 6 | 12 |
| Lamiaceae | 11 | 21 |
| Lauraceae | 3 | 4 |
| Lentibulariaceae | 2 | 2 |
| Loganiaceae | 2 | 2 |
| Loranthaceae | 1 | 1 |
| Malvaceae | 4 | 9 |
| Melanthaceae | 1 | 1 |
| Menyanthaceae | 4 | 11 |
| Myrtaceae | 68 | 219 |
| Nymphaeaceae | 1 | 1 |
| Oleaceae | 1 | 1 |
| Onagraceae | 3 | 5 |
| Orchidaceae | 66 | 125 |
| Orobanchaceae | 4 | 7 |
| Oxalidaceae | 3 | 6 |
| Papaveraceae | 2 | 3 |
| Philydraceae | 1 | 1 |
| Phyllanthaceae | 4 | 6 |
| Pittosporaceae | 3 | 5 |
| Plantaginaceae | 3 | 3 |
| Poaceae | 62 | 81 |



| | | |
|------------------|------------|-------------|
| Podocarpaceae | 1 | 3 |
| Polygalaceae | 4 | 7 |
| Polygonaceae | 5 | 7 |
| Posidoniaceae | 2 | 3 |
| Potamogetonaceae | 2 | 3 |
| Pottiaceae | 2 | 2 |
| Primulaceae | 3 | 5 |
| Proteaceae | 70 | 190 |
| Pteridaceae | 1 | 1 |
| Ranunculaceae | 3 | 6 |
| Restionaceae | 26 | 56 |
| Rhamnaceae | 4 | 11 |
| Rhodomelaceae | 8 | 12 |
| Rosaceae | 1 | 1 |
| Rubiaceae | 6 | 7 |
| Rutaceae | 14 | 29 |
| Santalaceae | 6 | 26 |
| Sapindaceae | 2 | 2 |
| Scrophulariaceae | 5 | 7 |
| Sematophyllaceae | 1 | 3 |
| Siphonocladaceae | 1 | 1 |
| Solanaceae | 5 | 12 |
| Stylidiaceae | 13 | 18 |
| Thymelaeaceae | 16 | 34 |
| Urticaceae | 1 | 1 |
| Violaceae | 1 | 3 |
| Xyridaceae | 1 | 1 |
| Zygophyllaceae | 1 | 2 |
| TOTAL | 934 | 2269 |

| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|----------------------|---|-------------|-------------------|------------------------------------|
| Aizoaceae | | | | |
| 1. | 2820 <i>Tetragonia decumbens</i> (Sea Spinach) | Y | | |
| Amaranthaceae | | | | |
| 2. | 2648 <i>Alternanthera denticulata</i> (Lesser Joyweed) | | | |
| 3. | 11260 <i>Ptilotus drummondii</i> var. <i>drummondii</i> (Pussytail) | | | |
| 4. | 2742 <i>Ptilotus manglesii</i> (Pom Poms, Mulamula) | | | |
| 5. | 15856 <i>Ptilotus sericostachyus</i> subsp. <i>sericostachyus</i> | | | |
| 6. | <i>Ptilotus</i> sp. | | | |
| Anarthriaceae | | | | |
| 7. | 1058 <i>Anarthria gracilis</i> | | | |
| 8. | 1060 <i>Anarthria laevis</i> | | | |
| 9. | 1062 <i>Anarthria prolifera</i> | | | |
| 10. | 1063 <i>Anarthria scabra</i> | | | |
| 11. | 1097 <i>Lyginia barbata</i> | | | |
| 12. | 18049 <i>Lyginia imberbis</i> | | | |
| Apiaceae | | | | |
| 13. | 12040 <i>Apium prostratum</i> var. <i>prostratum</i> (Sea Celery) | | | |
| 14. | 6214 <i>Centella asiatica</i> | | | |
| 15. | 6218 <i>Daucus glochidiatus</i> (Australian Carrot) | | | |
| 16. | 6219 <i>Eryngium pinnatifidum</i> (Blue Devils) | | | |
| 17. | <i>Platysace</i> sp. | | | |
| 18. | 6259 <i>Platysace tenuissima</i> | | | |
| 19. | 6263 <i>Schoenolaena juncea</i> | | | |
| 20. | 6285 <i>Xanthosia ciliata</i> | | | |
| 21. | <i>Xanthosia</i> sp. | | | |
| 22. | 19330 <i>Xanthosia tasmanica</i> | | | |
| Apodanthaceae | | | | |
| 23. | 2408 <i>Pilostyles hamiltonii</i> | | | |
| Araceae | | | | |
| 24. | 1051 <i>Lemna disperma</i> (Duckweed) | | | |
| 25. | 1049 <i>Zantedeschia aethiopica</i> (Arum Lily) | Y | | |
| Araliaceae | | | | |
| 26. | 6223 <i>Hydrocotyle alata</i> | | | |
| 27. | 6224 <i>Hydrocotyle blepharocarpa</i> | | | |
| 28. | 6226 <i>Hydrocotyle callicarpa</i> (Small Pennywort) | | | |
| 29. | 6229 <i>Hydrocotyle diantha</i> | | | |
| 30. | 6266 <i>Trachymene coerulea</i> (Blue Lace Flower) | | | |
| 31. | 6280 <i>Trachymene pilosa</i> (Native Parsnip) | | | |
| Asparagaceae | | | | |
| 32. | 1208 <i>Acanthocarpus preissii</i> | | | |
| 33. | 43820 <i>Albuca flaccida</i> | Y | | |
| 34. | 11299 <i>Chamaescilla corymbosa</i> var. <i>corymbosa</i> | | | |
| 35. | 1287 <i>Dichopogon capillipes</i> | | | |
| 36. | 1304 <i>Laxmannia minor</i> | | | |
| 37. | 11464 <i>Laxmannia sessiliflora</i> subsp. <i>australis</i> | | | |
| 38. | 1229 <i>Lomandra integra</i> | | | |
| 39. | 1232 <i>Lomandra micrantha</i> (Small-flower Mat-rush) | | | |
| 40. | 14542 <i>Lomandra micrantha</i> subsp. <i>micrantha</i> | | | |
| 41. | 1234 <i>Lomandra nigricans</i> | | | |
| 42. | 1372 <i>Ornithogalum arabicum</i> (Lesser Cape Lily) | Y | | |
| 43. | 1312 <i>Sowerbaea laxiflora</i> (Purple Tassels) | | | |
| 44. | 1319 <i>Thysanotus arenarius</i> | | | |
| 45. | 1334 <i>Thysanotus glaucus</i> | | P4 | |
| 46. | 1343 <i>Thysanotus patersonii</i> | | | |
| 47. | <i>Thysanotus</i> sp. | | | |
| 48. | 1354 <i>Thysanotus tenellus</i> | | | |
| Asphodelaceae | | | | |
| 49. | 1366 <i>Bulbine semibarbata</i> (Leek Lily) | | | |
| 50. | 1368 <i>Trachyandra divaricata</i> | Y | | |
| Asteraceae | | | | |
| 51. | 7821 <i>Ambrosia psilostachya</i> (Perennial Ragweed) | Y | | |
| 52. | 7833 <i>Angianthus preissianus</i> | | | |
| 53. | 7838 <i>Arctotheca calendula</i> (Cape Weed) | Y | | |



| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|--------------------------|---|-------------|-------------------|------------------------------------|
| 54. | 7851 <i>Asteridea pulverulenta</i> (Common Bristle Daisy) | | | |
| 55. | 7878 <i>Brachyscome iberidifolia</i> | | | |
| 56. | 7916 <i>Centaurea melitensis</i> (Maltese Cockspur) | Y | | |
| 57. | 7918 <i>Centipeda cunninghamii</i> (Common Sneezewood) | | | |
| 58. | 11900 <i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i> | Y | | |
| 59. | 7935 <i>Cichorium intybus</i> (Chicory) | Y | | |
| 60. | 7940 <i>Coryza canadensis</i> (Canadian Fleabane) | Y | | |
| 61. | 7941 <i>Coryza parva</i> | Y | | |
| 62. | 7943 <i>Cotula australis</i> (Common Cotula) | | | |
| 63. | 7945 <i>Cotula coronopifolia</i> (Waterbuttons) | Y | | |
| 64. | 7946 <i>Cotula cotuloides</i> (Smooth Cotula) | | | |
| 65. | 7947 <i>Cotula turbinata</i> (Funnel Weed) | Y | | |
| 66. | <i>Craspedia</i> sp. | | | |
| 67. | 13354 <i>Craspedia variabilis</i> | | | |
| 68. | 19893 <i>Cynara cardunculus</i> subsp. <i>flavescens</i> (Artichoke Thistle, Wild Artichoke, Cardoon) | Y | | |
| 69. | 7961 <i>Dittrichia graveolens</i> (Stinkwort) | Y | | |
| 70. | 15137 <i>Euchiton sphaericus</i> | | | |
| 71. | 7976 <i>Galinsoga parviflora</i> (Potato Weed) | Y | | |
| 72. | 20346 <i>Gamochaeta coarctata</i> | Y | | |
| 73. | 16311 <i>Gazania linearis</i> | Y | | |
| 74. | 8002 <i>Gnephosis tenuissima</i> | | | |
| 75. | 29594 <i>Helichrysum luteoalbum</i> (Jersey Cudweed) | | | |
| 76. | 12741 <i>Hyalosperma cotula</i> | | | |
| 77. | 12717 <i>Hyalosperma pusillum</i> | | | |
| 78. | 16758 <i>Hyalosperma simplex</i> subsp. <i>graniticola</i> | | | |
| 79. | 8086 <i>Hypochoeris glabra</i> (Smooth Catsear) | Y | | |
| 80. | 9352 <i>Hypochoeris radicata</i> (Flat Weed) | Y | | |
| 81. | 18585 <i>Lagenophora huegelii</i> | | | |
| 82. | 44490 <i>Leontodon rhagadioloides</i> | Y | | |
| 83. | 8099 <i>Leontodon saxatilis</i> (Hairy Hawkbit) | Y | | |
| 84. | 8105 <i>Millotia myosotidifolia</i> | | | |
| 85. | 8117 <i>Myriocephalus helichrysoides</i> | | | |
| 86. | 14187 <i>Myriocephalus occidentalis</i> | | | |
| 87. | <i>Myriocephalus</i> sp. | | | |
| 88. | 8133 <i>Olearia elaeophila</i> | | | |
| 89. | 8143 <i>Olearia paucidentata</i> (Autumn Scrub Daisy) | | | |
| 90. | 42281 <i>Pithocarpa cordata</i> | | | |
| 91. | 8175 <i>Podolepis gracilis</i> (Slender Podolepis) | | | |
| 92. | 8177 <i>Podolepis lessonii</i> | | | |
| 93. | 8182 <i>Podotheca angustifolia</i> (Sticky Longheads) | | | |
| 94. | 8188 <i>Pogonolepis stricta</i> | | | |
| 95. | 13241 <i>Rhodanthe chlorocephala</i> subsp. <i>rosea</i> | | | |
| 96. | 13300 <i>Rhodanthe citrina</i> | | | |
| 97. | 15035 <i>Rhodanthe corymbosa</i> | | | |
| 98. | 13246 <i>Rhodanthe humboldtiana</i> | | | |
| 99. | 13234 <i>Rhodanthe manglesii</i> | | | |
| 100. | 25878 <i>Senecio condylus</i> | | | |
| 101. | <i>Senecio</i> sp. | | | |
| 102. | 45036 <i>Solidago chilensis</i> | Y | | |
| 103. | 9367 <i>Sonchus hydrophilus</i> (Native Sowthistle) | | | |
| 104. | 25902 <i>Symphytichum squamatum</i> (Bushy Starwort) | Y | | |
| 105. | 8257 <i>Vellereophyton dealbatum</i> (White Cudweed) | Y | | |
| 106. | 8282 <i>Waitzia suaveolens</i> (Fragrant Waitzia) | | | |
| 107. | 19938 <i>Xerochrysum bracteatum</i> | | | |
| 108. | <i>Xerochrysum</i> sp. | | | |
| Aytoniaceae | | | | |
| 109. | <i>Asterella drummondii</i> | | | |
| Bonnemaisoniaceae | | | | |
| 110. | <i>Delisea</i> sp. | | | |
| Boraginaceae | | | | |
| 111. | 6675 <i>Buglossoides arvensis</i> (Corn Gromwell) | Y | | |
| Brassicaceae | | | | |
| 112. | 3002 <i>Cakile maritima</i> (Sea Rocket) | Y | | |
| 113. | 3004 <i>Capsella bursa-pastoris</i> (Shepherd's Purse) | Y | | |
| 114. | 3005 <i>Cardamine hirsuta</i> (Common Bittercress) | Y | | |
| 115. | <i>Cardamine</i> sp. | | | |
| 116. | 3011 <i>Diplotaxis muralis</i> (Wall Rocket) | Y | | |
| 117. | 3016 <i>Heliophila pusilla</i> | Y | | |



| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|---------|--|-------------|-------------------|------------------------------------|
| 118. | 19989 <i>Lepidium didymum</i> | Y | | |
| 119. | 3040 <i>Lepidium pseudohyssopifolium</i> | | P1 | |
| 120. | 3042 <i>Lepidium pseudotasmanicum</i> | | P4 | |
| 121. | 3048 <i>Lobularia maritima</i> (Sweet Alyssum) | Y | | |
| 122. | 3080 <i>Stenopetalum robustum</i> | | | |

Bryaceae

| | | | | |
|------|------------------------|--|--|--|
| 123. | <i>Bryum pachythea</i> | | | |
|------|------------------------|--|--|--|

Campanulaceae

| | | | | |
|------|--|--|--|--|
| 124. | 7396 <i>Isotoma hypocrateriformis</i> (Woodbridge Poison) | | | |
| 125. | 7399 <i>Isotoma scapigera</i> (Long-scaped Isotome) | | | |
| 126. | 9289 <i>Lobelia anceps</i> (Angled Lobelia) | | | |
| 127. | 36863 <i>Lobelia heterophylla</i> subsp. <i>heterophylla</i> | | | |
| 128. | 7406 <i>Lobelia rhombifolia</i> (Tufted Lobelia) | | | |
| 129. | 36840 <i>Lobelia tenuior</i> subsp. <i>tenuior</i> | | | |
| 130. | 7386 <i>Wahlenbergia gracilentia</i> (Annual Bluebell) | | | |

Caprifoliaceae

| | | | | |
|------|--|---|--|--|
| 131. | 7366 <i>Centranthus macrosiphon</i> | Y | | |
| 132. | 35322 <i>Centranthus ruber</i> subsp. <i>ruber</i> | Y | | |

Caryophyllaceae

| | | | | |
|------|--|---|--|---|
| 133. | 2889 <i>Cerastium glomeratum</i> (Mouse Ear Chickweed) | Y | | |
| 134. | 13120 <i>Cerastium vulgare</i> | Y | | Y |
| 135. | 2894 <i>Moenchia erecta</i> (Erect Chickweed) | Y | | |
| 136. | 19825 <i>Petrohragia dubia</i> | Y | | |
| 137. | 2910 <i>Silene nocturna</i> (Mediterranean Catchfly) | Y | | |
| 138. | 2912 <i>Spergula arvensis</i> (Corn Spurry) | Y | | |
| 139. | 2918 <i>Stellaria media</i> (Chickweed) | Y | | |

Casuarinaceae

| | | | | |
|------|---|--|--|--|
| 140. | 1728 <i>Allocasuarina fraseriana</i> (Sheoak, Kondil) | | | |
| 141. | 1732 <i>Allocasuarina humilis</i> (Dwarf Sheoak) | | | |

Celastraceae

| | | | | |
|------|--|--|--|--|
| 142. | <i>Stackhousia</i> sp. | | | |
| 143. | 4737 <i>Tripterococcus brunonis</i> (Winged Stackhousia) | | | |

Centrolepidaceae

| | | | | |
|------|--|--|--|--|
| 144. | 1117 <i>Aphelia cyperoides</i> | | | |
| 145. | 1118 <i>Aphelia drummondii</i> | | | |
| 146. | 1120 <i>Centrolepis alepyroides</i> | | | |
| 147. | 1121 <i>Centrolepis aristata</i> (Pointed Centrolepis) | | | |
| 148. | 1125 <i>Centrolepis drummondiana</i> | | | |

Chenopodiaceae

| | | | | |
|------|--|---|--|--|
| 149. | 2451 <i>Atriplex bunburyana</i> (Silver Saltbush) | | | |
| 150. | 2452 <i>Atriplex cinerea</i> (Grey Saltbush) | | | |
| 151. | 2462 <i>Atriplex hypoleuca</i> | | | |
| 152. | 11525 <i>Atriplex paludosa</i> subsp. <i>baudinii</i> | | | |
| 153. | 2471 <i>Atriplex prostrata</i> (Hastate Orache) | Y | | |
| 154. | 2490 <i>Chenopodium glaucum</i> (Glaucous Goosefoot) | Y | | |
| 155. | 2491 <i>Chenopodium macrospermum</i> | Y | | |
| 156. | 2494 <i>Chenopodium murale</i> (Nettle-leaf Goosefoot) | Y | | |
| 157. | 33517 <i>Dysphania multifida</i> (Scented Goosefoot) | Y | | |
| 158. | 11341 <i>Rhagodia baccata</i> subsp. <i>baccata</i> | | | |
| 159. | 2593 <i>Sarcocornia quinqueflora</i> (Beaded Samphire) | | | |
| 160. | 14281 <i>Sarcocornia quinqueflora</i> subsp. <i>quinqueflora</i> (Bearded Glasswort) | | | |
| 161. | 2639 <i>Suaeda australis</i> (Seablite) | | | |
| 162. | 31716 <i>Tecticornia syncarpa</i> | | | |
| 163. | 2644 <i>Threlkeldia diffusa</i> (Coast Bonefruit) | | | |

Codiaceae

| | | | | |
|------|--------------------------------|--|--|--|
| 164. | 26677 <i>Codium mamillosum</i> | | | |
| 165. | 26683 <i>Codium spongiosum</i> | | | |

Colchicaceae

| | | | | |
|------|--|--|--|--|
| 166. | 1385 <i>Burchardia multiflora</i> (Dwarf Burchardia) | | | |
| 167. | 12072 <i>Wurmbea dioica</i> subsp. <i>alba</i> | | | |
| 168. | 1403 <i>Wurmbea tenella</i> (Eight Nancy) | | | |

Commelinaceae

| | | | | |
|------|-------------------------------------|---|--|--|
| 169. | 31595 <i>Commelina benghalensis</i> | Y | | |
|------|-------------------------------------|---|--|--|

Convolvulaceae



| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|---------|--|-------------|-------------------|------------------------------------|
| 170. | 43142 <i>Calystegia sepium</i> subsp. <i>roseata</i> | | | Y |
| 171. | 6663 <i>Cuscuta epithymum</i> (Lesser Dodder, Greater Dodder) | Y | | |
| 172. | 6658 <i>Wilsonia backhousei</i> (Narrow-leaf <i>Wilsonia</i>) | | | |
| 173. | 6659 <i>Wilsonia humilis</i> (Silky <i>Wilsonia</i>) | | | |

Corallinaceae

174. 26984 *Jania affinis*

Crassulaceae

175. 11563 *Crassula colorata* var. *colorata*

176. 3140 *Crassula glomerata*

177. 3142 *Crassula natans*

Cymodoceaceae

178. 126 *Amphibolis antarctica* (Sea Nymph)

179. 127 *Amphibolis griffithii*

Cyperaceae

180. 741 *Baumea articulata* (Jointed Rush)

181. 743 *Baumea juncea* (Bare Twigrush)

182. *Baumea* sp.

183. 749 *Bolboschoenus caldwellii* (Marsh Club-rush)

184. 753 *Carex appressa* (Tall Sedge)

185. 754 *Carex divisa* (Divided Sedge)

186. 762 *Chorizandra cymbaria* (Heron Bristle Rush)

187. 763 *Chorizandra enodis* (Black Bristlerush)

188. 783 *Cyperus congestus* (Dense Flat-sedge)

189. 792 *Cyperus eragrostis* (Umbrella Sedge)

190. 794 *Cyperus gymnocaulos* (Spiny Flat-sedge)

191. 834 *Evandra aristata*

192. 20216 *Ficinia nodosa* (Knotted Club Rush)

193. 907 *Gahnia trifida* (Coast Saw-sedge)

194. 910 *Isolepis cernua* (Nodding Club-rush)

195. 917 *Isolepis marginata* (Coarse Club-rush)

196. 921 *Isolepis producta*

197. 925 *Lepidosperma angustatum*

198. 932 *Lepidosperma effusum* (Spreading Sword-sedge)

199. 933 *Lepidosperma gladiatum* (Coast Sword-sedge, Kerbin)

200. 937 *Lepidosperma longitudinale* (Pithy Sword-sedge)

201. *Lepidosperma sieberi*

202. 29141 *Lepidosperma* sp. *Gosnellis* (A. Markey 1145)

203. 29150 *Lepidosperma* sp. *Margaret River* (B.J. Lepschi 1841)

204. 945 *Lepidosperma squamatum*

205. 946 *Lepidosperma striatum*

206. 953 *Mesomelaena graciliceps*

207. 11473 *Mesomelaena stygia* subsp. *stygia*

208. 957 *Mesomelaena tetragona* (Semaphore Sedge)

209. 973 *Schoenus asperocarpus* (Poison Sedge)

210. 974 *Schoenus benthamii*

211. 975 *Schoenus bifidus*

212. 978 *Schoenus brevisetis*

213. 984 *Schoenus curvifolius*

214. 986 *Schoenus efoliatus*

215. 987 *Schoenus elegans*

216. 996 *Schoenus laevigatus*

217. 1005 *Schoenus obtusifolius*

218. 1011 *Schoenus rigens*

219. 1017 *Schoenus subbulbosus*

220. 1033 *Tetraria australiensis*

Dasypogonaceae

221. 19309 *Calectasia narragara*

222. 1218 *Dasypogon bromeliifolius* (Pineapple Bush)

223. 1219 *Dasypogon hookeri* (Pineapple Bush)

Delesseriaceae

224. 27055 *Martensia australis*

Dilleniaceae

225. 5109 *Hibbertia amplexicaulis*

226. 5112 *Hibbertia aurea*

227. 5114 *Hibbertia commutata*

228. 5117 *Hibbertia cuneiformis* (Cutleaf *Hibbertia*)

229. 20051 *Hibbertia diamesogenos*



| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|-----------------------|---|-------------|-------------------|------------------------------------|
| 230. | 5125 <i>Hibbertia ferruginea</i> | | | |
| 231. | 5126 <i>Hibbertia furfuracea</i> | | | |
| 232. | 5129 <i>Hibbertia glomerata</i> | | | |
| 233. | 19777 <i>Hibbertia glomerata</i> subsp. <i>glomerata</i> | | | |
| 234. | 5135 <i>Hibbertia hypericoides</i> (Yellow Buttercups) | | | |
| 235. | 5161 <i>Hibbertia quadricolor</i> | | | |
| 236. | 5162 <i>Hibbertia racemosa</i> (Stalked Guinea Flower) | | | |
| 237. | <i>Hibbertia</i> sp. <i>Bankstown</i> (R.T.Miller & C.P.Gibson s.n. 18/10/06) | | | |
| 238. | 5172 <i>Hibbertia stellaris</i> (Orange Stars) | | | |
| 239. | 5176 <i>Hibbertia vaginata</i> | | | |
| Droseraceae | | | | |
| 240. | 13200 <i>Drosera enodes</i> | | | |
| 241. | 3095 <i>Drosera erythrorhiza</i> (Red Ink Sundew) | | | |
| 242. | 3097 <i>Drosera gigantea</i> (Giant Sundew) | | | |
| 243. | 15453 <i>Drosera gigantea</i> subsp. <i>gigantea</i> | | | |
| 244. | 3106 <i>Drosera macrantha</i> (Bridal Rainbow) | | | |
| 245. | 14298 <i>Drosera macrantha</i> subsp. <i>macrantha</i> | | | |
| 246. | 3109 <i>Drosera menziesii</i> (Pink Rainbow) | | | |
| 247. | 13216 <i>Drosera menziesii</i> subsp. <i>penicillaris</i> | | | |
| 248. | 11768 <i>Drosera neesii</i> subsp. <i>neesii</i> | | | |
| 249. | 3118 <i>Drosera pallida</i> (Pale Rainbow) | | | |
| 250. | <i>Drosera</i> sp. | | | |
| 251. | 13385 <i>Drosera stelliflora</i> | | | |
| Elaeocarpaceae | | | | |
| 252. | 4524 <i>Platytheca galioides</i> | | | |
| 253. | 4535 <i>Tetratheca hirsuta</i> (Black Eyed Susan) | | | |
| 254. | 4544 <i>Tetratheca setigera</i> | | | |
| 255. | 4548 <i>Tremandra stelligera</i> | | | |
| Ericaceae | | | | |
| 256. | 6306 <i>Andersonia caerulea</i> (Foxtails) | | | |
| 257. | 6311 <i>Andersonia heterophylla</i> | | | |
| 258. | 6317 <i>Andersonia micrantha</i> | | | |
| 259. | 6322 <i>Astroloma baxteri</i> | | | |
| 260. | 6323 <i>Astroloma ciliatum</i> (Candle Cranberry) | | | |
| 261. | 6334 <i>Astroloma pallidum</i> (Kick Bush) | | | |
| 262. | 6348 <i>Conostephium pendulum</i> (Pearl Flower) | | | |
| 263. | <i>Conostephium</i> sp. | | | |
| 264. | 6360 <i>Leucopogon australis</i> (Spiked Beard-heath) | | | |
| 265. | 6367 <i>Leucopogon capitellatus</i> | | | |
| 266. | 6374 <i>Leucopogon conostephioides</i> | | | |
| 267. | 6389 <i>Leucopogon elatior</i> | | | |
| 268. | 6396 <i>Leucopogon glabellus</i> | | | |
| 269. | 6402 <i>Leucopogon hirsutus</i> | | | |
| 270. | 41260 <i>Leucopogon microcarpus</i> | | | |
| 271. | 6427 <i>Leucopogon parviflorus</i> (Coast Beard-heath) | | | |
| 272. | 6428 <i>Leucopogon pendulus</i> | | | |
| 273. | 6436 <i>Leucopogon propinquus</i> | | | |
| 274. | 6439 <i>Leucopogon pulchellus</i> (Beard-heath) | | | |
| 275. | <i>Leucopogon</i> sp. | | | |
| 276. | 29492 <i>Leucopogon</i> sp. <i>Busselton</i> (D. Cooper 243) | | P2 | |
| 277. | 6451 <i>Leucopogon tenuis</i> | | | |
| 278. | 6454 <i>Leucopogon verticillatus</i> (Tassel Flower) | | | |
| 279. | 6456 <i>Lysinema ciliatum</i> (Curry Flower) | | | |
| 280. | 34736 <i>Lysinema pentapetalum</i> | | | |
| 281. | <i>Lysinema</i> sp. | | | |
| 282. | 6464 <i>Needhamiella pumilio</i> | | | |
| 283. | 31931 <i>Sphenotoma capitata</i> | | | |
| 284. | <i>Sphenotoma</i> sp. | | | |
| 285. | <i>Styphelia tenuifolia</i> | | | |
| Euphorbiaceae | | | | |
| 286. | 4586 <i>Amperea micrantha</i> | | P2 | |
| 287. | 16493 <i>Calycopeplus oligandrus</i> | | | |
| 288. | 4638 <i>Euphorbia peplus</i> (Petty Spurge) | Y | | |
| 289. | 4648 <i>Euphorbia terracina</i> (Geraldton Carnation Weed) | Y | | |
| 290. | 4662 <i>Monotaxis grandiflora</i> (Diamond of the Desert) | | | |
| 291. | 4666 <i>Monotaxis occidentalis</i> | | | |
| 292. | 4695 <i>Ricinocarpos glaucus</i> | | | |
| 293. | 19942 <i>Ricinocarpos undulatus</i> | | | |



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|---------|--|-------------|-------------------|------------------------------------|
| 294. | 15429 <i>Acacia alata</i> var. <i>alata</i> | | | |
| 295. | 11731 <i>Acacia browniana</i> var. <i>browniana</i> | | | |
| 296. | 3262 <i>Acacia cochlearis</i> (Rigid Wattle) | | | |
| 297. | 3282 <i>Acacia cyclops</i> (Coastal Wattle) | | | |
| 298. | 16975 <i>Acacia decurrens</i> | Y | | |
| 299. | 3331 <i>Acacia extensa</i> (Wiry Wattle) | | | |
| 300. | 3339 <i>Acacia flagelliformis</i> | | P4 | |
| 301. | 14117 <i>Acacia heteroclita</i> subsp. <i>valida</i> | | P2 | |
| 302. | 3374 <i>Acacia huegelii</i> | | | |
| 303. | 3383 <i>Acacia incurva</i> | | | |
| 304. | 3410 <i>Acacia lateriticola</i> | | | |
| 305. | 14930 <i>Acacia lateriticola</i> glabrous variant (B.R. Maslin 6765) | | P3 | |
| 306. | 3424 <i>Acacia littorea</i> | | | |
| 307. | 3448 <i>Acacia mooreana</i> | | | |
| 308. | 3454 <i>Acacia nervosa</i> (Rib Wattle) | | | |
| 309. | 3464 <i>Acacia obovata</i> | | | |
| 310. | 3496 <i>Acacia preissiana</i> | | | |
| 311. | 15481 <i>Acacia pulchella</i> var. <i>glaberrima</i> | | | |
| 312. | 15483 <i>Acacia pulchella</i> var. <i>pulchella</i> | | | |
| 313. | 3504 <i>Acacia pycnantha</i> (Golden Wattle) | Y | | |
| 314. | 30036 <i>Acacia saligna</i> subsp. <i>stolonifera</i> | | | |
| 315. | 3537 <i>Acacia semitrullata</i> | | P4 | |
| 316. | <i>Acacia</i> sp. | | | |
| 317. | 3557 <i>Acacia stenoptera</i> (Narrow Winged Wattle) | | | |
| 318. | 3576 <i>Acacia tetragonocarpa</i> | | | |
| 319. | 3688 <i>Aotus gracillima</i> | | | |
| 320. | 14396 <i>Bossiaea aquifolium</i> subsp. <i>aquifolium</i> | | | |
| 321. | 3708 <i>Bossiaea disticha</i> | | P4 | |
| 322. | 3710 <i>Bossiaea eriocarpa</i> (Common Brown Pea) | | | |
| 323. | 3713 <i>Bossiaea linophylla</i> | | | |
| 324. | 3714 <i>Bossiaea ornata</i> (Broad Leaved Brown Pea) | | | |
| 325. | 3717 <i>Bossiaea pulchella</i> | | | |
| 326. | 10861 <i>Callistachys lanceolata</i> (Wonnich) | | | |
| 327. | 13112 <i>Chorizema aciculare</i> subsp. <i>aciculare</i> | | | |
| 328. | 13111 <i>Chorizema aciculare</i> subsp. <i>laxum</i> | | | |
| 329. | 13113 <i>Chorizema carinatum</i> | | P3 | |
| 330. | 8971 <i>Chorizema cordatum</i> | | | |
| 331. | 3754 <i>Chorizema diversifolium</i> | | | |
| 332. | 3757 <i>Chorizema glycinifolium</i> | | | |
| 333. | 12765 <i>Chorizema nanum</i> | | | |
| 334. | 3760 <i>Chorizema reticulatum</i> (Showy Flame Pea) | | | |
| 335. | 14586 <i>Chorizema spathulatum</i> | | | |
| 336. | 3793 <i>Daviesia angulata</i> | | | |
| 337. | 3799 <i>Daviesia cordata</i> (Bookleaf) | | | |
| 338. | 3805 <i>Daviesia decurrens</i> (Prickly Bitter-pea) | | | |
| 339. | 3816 <i>Daviesia incrassata</i> | | | |
| 340. | 3817 <i>Daviesia inflata</i> | | | |
| 341. | 3819 <i>Daviesia longifolia</i> | | | |
| 342. | 3832 <i>Daviesia physodes</i> | | | |
| 343. | <i>Daviesia</i> sp. | | | |
| 344. | <i>Dillwynia</i> sp. | | | |
| 345. | 3867 <i>Dipogon lignosus</i> (Dolichos Pea) | Y | | |
| 346. | 3872 <i>Euchilopsis linearis</i> (Swamp Pea) | | | |
| 347. | 20214 <i>Eutaxia myrtifolia</i> | | | |
| 348. | 3880 <i>Eutaxia virgata</i> | | | |
| 349. | 3895 <i>Gastrolobium calycinum</i> (York Road Poison) | | | |
| 350. | 20475 <i>Gastrolobium capitatum</i> | | | |
| 351. | 20473 <i>Gastrolobium ebracteolatum</i> | | | |
| 352. | 20512 <i>Gastrolobium praemorsum</i> | | | |
| 353. | 3920 <i>Gastrolobium pyramidale</i> | | | |
| 354. | 30453 <i>Gastrolobium</i> sp. <i>Yoongarillup</i> (S.Dilkes s.n. 1/9/1969) | | P1 | |
| 355. | 3948 <i>Gompholobium capitatum</i> | | | |
| 356. | 10909 <i>Gompholobium confertum</i> | | | |
| 357. | 3950 <i>Gompholobium knightianum</i> | | | |
| 358. | 3951 <i>Gompholobium marginatum</i> | | | |
| 359. | 3953 <i>Gompholobium ovatum</i> | | | |
| 360. | 3954 <i>Gompholobium polymorphum</i> | | | |
| 361. | 11083 <i>Gompholobium scabrum</i> | | | |
| 362. | 3957 <i>Gompholobium tomentosum</i> (Hairy Yellow Pea) | | | |



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|---------|--|-------------|-------------------|------------------------------------|
| 363. | 11115 <i>Gompholobium villosum</i> | | | |
| 364. | 3961 <i>Hardenbergia comptoniana</i> (Native Wisteria) | | | |
| 365. | <i>Hardenbergia</i> sp. | | | |
| 366. | 3964 <i>Hovea chorizemifolia</i> (Holly-leaved Hovea) | | | |
| 367. | 3965 <i>Hovea elliptica</i> (Tree Hovea) | | | |
| 368. | 3967 <i>Hovea stricta</i> | | | |
| 369. | 3968 <i>Hovea trisperma</i> (Common Hovea) | | | |
| 370. | 3992 <i>Isotropis cuneifolia</i> (Granny Bonnets) | | | |
| 371. | 19700 <i>Isotropis cuneifolia</i> subsp. <i>cuneifolia</i> | | | |
| 372. | 4012 <i>Jacksonia furcellata</i> (Grey Stinkwood) | | | |
| 373. | 20462 <i>Jacksonia gracillima</i> | | P3 | |
| 374. | 4017 <i>Jacksonia horrida</i> | | | |
| 375. | 4036 <i>Kennedia carinata</i> | | | |
| 376. | 4037 <i>Kennedia coccinea</i> (Coral Vine) | | | |
| 377. | 37940 <i>Kennedia coccinea</i> subsp. <i>coccinea</i> | | | |
| 378. | 33518 <i>Kennedia lateritia</i> (Augusta Kennedia) | | T | |
| 379. | 4041 <i>Kennedia microphylla</i> | | | |
| 380. | <i>Kennedia parviflora</i> | | | |
| 381. | 4044 <i>Kennedia prostrata</i> (Scarlet Runner) | | | |
| 382. | 4045 <i>Kennedia stirlingii</i> (Bushy Kennedia) | | | |
| 383. | 3669 <i>Labichea punctata</i> (Lance-leaved Cassia) | | | |
| 384. | 4052 <i>Latrobea tenella</i> | | | |
| 385. | 4073 <i>Medicago intertexta</i> (Calvary Medic) | Y | | |
| 386. | 4085 <i>Mellilotus indicus</i> | Y | | |
| 387. | 4090 <i>Mirbelia dilatata</i> (Holly-leaved Mirbelia) | | | |
| 388. | 3618 <i>Paraserianthes lophantha</i> (Albizia) | | | |
| 389. | 20195 <i>Pultenaea brachytropis</i> | | | |
| 390. | 4179 <i>Pultenaea pinifolia</i> | | P3 | |
| 391. | 4180 <i>Pultenaea radiata</i> | | | |
| 392. | 20302 <i>Sphaerolobium hygrophilum</i> | | | |
| 393. | 4206 <i>Sphaerolobium macranthum</i> | | | |
| 394. | 4207 <i>Sphaerolobium medium</i> | | | |
| 395. | 4210 <i>Sphaerolobium scabriusculum</i> | | | |
| 396. | 4256 <i>Templetonia retusa</i> (Cockies Tongues) | | | |
| 397. | 4297 <i>Trifolium glomeratum</i> (Cluster Clover) | Y | | |
| 398. | 4298 <i>Trifolium hirtum</i> (Rose Clover) | Y | | |
| 399. | 15659 <i>Trifolium lappaceum</i> var. <i>lappaceum</i> | Y | | |
| 400. | 17115 <i>Trifolium repens</i> var. <i>repens</i> | Y | | |
| 401. | 14738 <i>Trifolium resupinatum</i> var. <i>resupinatum</i> | Y | | |
| 402. | 4319 <i>Vicia benghalensis</i> (Purple Vetch) | Y | | |
| 403. | 4325 <i>Viminaria juncea</i> (Swishbush, Koweda) | | | |

Fossombroniaceae

404. *Fossombronia alata*

Funariaceae

405. 32370 *Funaria hygrometrica*

Gentianaceae

406. 6543 *Cicendia filiformis* (Slender Cicendia) Y

Geraniaceae

407. 4333 *Erodium cicutarium* (Common Storksbill) Y

408. 4339 *Geranium molle* (Dove's Foot Cranesbill) Y

409. 4343 *Pelargonium capitatum* (Rose Pelargonium) Y

410. 4346 *Pelargonium littorale*

411. *Pelargonium* sp.

Goodeniaceae

412. 12724 *Anthotium junciforme*

413. 7444 *Dampiera hederacea* (Karri Dampiera)

414. 7452 *Dampiera leptoclada* (Slender-shooted Dampiera)

415. 7454 *Dampiera linearis* (Common Dampiera)

416. *Dampiera* sp.

417. 7484 *Dampiera trigona* (Angled-stem Dampiera)

418. 7487 *Diaspasis filifolia* (Thread-leaved Diaspasis)

419. 7523 *Goodenia leptoclada* (Thin-stemmed Goodenia)

420. 7568 *Lechenaultia biloba* (Blue Leschenaultia)

421. 7572 *Lechenaultia expansa*

422. 7595 *Scaevola anchusifolia*

423. 7602 *Scaevola calliptera*

424. 7606 *Scaevola crassifolia* (Thick-leaved Fan-flower)

425. 7614 *Scaevola globulifera*



| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|--------------------------|---|-------------|-------------------|------------------------------------|
| 426. | 7619 <i>Scaevola lanceolata</i> (Long-leaved Scaevola) | | | |
| 427. | 7626 <i>Scaevola nitida</i> (Shining Fanflower) | | | |
| 428. | 7665 <i>Velleia trinervis</i> | | | |
| Gracilariaceae | | | | |
| 429. | 26712 <i>Curdiea obesa</i> | | | |
| Haemodoraceae | | | | |
| 430. | 1407 <i>Anigozanthos flavidus</i> (Tall Kangaroo Paw) | | | |
| 431. | 1409 <i>Anigozanthos humilis</i> (Catspaw) | | | |
| 432. | 1411 <i>Anigozanthos manglesii</i> (Mangles Kangaroo Paw, Kurulbrang) | | | |
| 433. | 11261 <i>Anigozanthos manglesii</i> subsp. <i>manglesii</i> | | | |
| 434. | 1416 <i>Anigozanthos viridis</i> (Green Kangaroo Paw, Kurulbardang) | | | |
| 435. | 11566 <i>Anigozanthos viridis</i> subsp. <i>viridis</i> | | | |
| 436. | 11826 <i>Conostylis aculeata</i> subsp. <i>aculeata</i> | | | |
| 437. | 12109 <i>Conostylis aculeata</i> subsp. <i>preissii</i> | | | |
| 438. | 11597 <i>Conostylis setigera</i> subsp. <i>setigera</i> | | | |
| 439. | 1481 <i>Tribonanthes australis</i> | | | |
| 440. | 1486 <i>Wachendorfia paniculata</i> | Y | | |
| Haloragaceae | | | | |
| 441. | 33620 <i>Glischrocaryon angustifolium</i> | | | |
| 442. | 34676 <i>Meionectes brownii</i> (Swamp Raspwort) | | | |
| 443. | 6185 <i>Myriophyllum aquaticum</i> (Brazilian Water Milfoil) | Y | | |
| 444. | 6198 <i>Myriophyllum salsugineum</i> | | | |
| 445. | <i>Myriophyllum</i> sp. | | | |
| Hemerocallidaceae | | | | |
| 446. | 23474 <i>Agrostocrinum hirsutum</i> | | | |
| 447. | 1261 <i>Agrostocrinum scabrum</i> (Blue Grass Lily) | | | |
| 448. | 1276 <i>Caesia micrantha</i> (Pale Grass Lily) | | | |
| 449. | 1277 <i>Caesia occidentalis</i> | | | |
| 450. | 1294 <i>Hodgsoniola junciformis</i> | | | |
| 451. | 1296 <i>Johnsonia inconspicua</i> | | P3 | |
| 452. | 1297 <i>Johnsonia lupulina</i> (Hooded Lily) | | | |
| 453. | 1260 <i>Stypandra glauca</i> (Blind Grass) | | | |
| 454. | 1361 <i>Tricoryne elatior</i> (Yellow Autumn Lily) | | | |
| 455. | 1362 <i>Tricoryne humilis</i> | | | |
| Hydatellaceae | | | | |
| 456. | 1139 <i>Trithuria bibracteata</i> | | | |
| Hypericaceae | | | | |
| 457. | 5181 <i>Hypericum japonicum</i> (Matted St John's Wort) | | | |
| Hypoxidaceae | | | | |
| 458. | 43762 <i>Pauridia occidentalis</i> var. <i>quadriloba</i> | | | |
| Iridaceae | | | | |
| 459. | 18280 <i>Babiana nana</i> | Y | | |
| 460. | 1513 <i>Chasmanthe floribunda</i> (African Cornflag) | Y | | |
| 461. | 19177 <i>Moraea setifolia</i> | Y | | |
| 462. | 1537 <i>Orthrosanthus laxus</i> (Morning Iris) | | | |
| 463. | 1546 <i>Patersonia juncea</i> (Rush Leaved Patersonia) | | | |
| 464. | 1550 <i>Patersonia occidentalis</i> (Purple Flag, Koma) | | | |
| 465. | <i>Patersonia</i> sp. | | | |
| 466. | 1553 <i>Patersonia umbrosa</i> (Yellow Flags) | | | |
| 467. | 11550 <i>Patersonia umbrosa</i> var. <i>xanthina</i> (Yellow Flags) | | | |
| 468. | 14485 <i>Romulea flava</i> var. <i>minor</i> | Y | | |
| 469. | 1558 <i>Sparaxis bulbifera</i> | Y | | |
| Juncaceae | | | | |
| 470. | 1178 <i>Juncus bufonius</i> (Toad Rush) | Y | | |
| 471. | 1184 <i>Juncus holoschoenus</i> (Jointleaf Rush) | | | |
| 472. | 11922 <i>Juncus kraussii</i> subsp. <i>australiensis</i> | | | |
| 473. | 1188 <i>Juncus pallidus</i> (Pale Rush) | | | |
| 474. | 1195 <i>Juncus subsecundus</i> (Finger Rush) | | | |
| Juncaginaceae | | | | |
| 475. | 146 <i>Triglochin minutissima</i> | | | |
| 476. | 147 <i>Triglochin mucronata</i> | | | |
| 477. | 148 <i>Triglochin muelleri</i> | | | |
| 478. | 18587 <i>Triglochin nana</i> | | | |
| 479. | <i>Triglochin</i> sp. | | | |
| 480. | 152 <i>Triglochin trichophora</i> | | | |



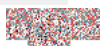
| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|-------------------------|--|-------------|-------------------|------------------------------------|
| Lamiaceae | | | | |
| 481. | 6837 <i>Hemiandra leiantha</i> | | | |
| 482. | 6839 <i>Hemiandra pungens</i> (Snakebush) | | | |
| 483. | <i>Hemiandra</i> sp. Jurien (B.J.Conn 3885 & M.E.Tozer) | | | |
| 484. | 6856 <i>Hemigenia incana</i> (Silky Hemigenia) | | | |
| 485. | <i>Hemigenia</i> sp. | | | |
| 486. | 41020 <i>Hemiphora bartlingii</i> (Woolly Dragon) | | | |
| 487. | 6880 <i>Leonotis leonurus</i> (Lion's Ear) | Y | | |
| 488. | 6883 <i>Mentha pulegium</i> (Pennyroyal) | Y | | |
| 489. | 6886 <i>Mentha x piperita</i> | Y | | |
| 490. | 15994 <i>Mentha x piperita</i> var. <i>citrata</i> | Y | | |
| 491. | 6906 <i>Moluccella laevis</i> (Molucca Balm) | Y | | |
| Lauraceae | | | | |
| 492. | 2956 <i>Cassytha pomiformis</i> (Dodder Laurel) | | | |
| 493. | 2957 <i>Cassytha racemosa</i> (Dodder Laurel) | | | |
| 494. | 11799 <i>Cassytha racemosa</i> forma <i>racemosa</i> | | | |
| Lentibulariaceae | | | | |
| 495. | 7138 <i>Utricularia inaequalis</i> | | | |
| 496. | 7145 <i>Utricularia menziesii</i> (Redcoats) | | | |
| Loganiaceae | | | | |
| 497. | 13128 <i>Logania serpyllifolia</i> subsp. <i>angustifolia</i> | | | |
| 498. | 6515 <i>Logania vaginalis</i> (White Spray) | | | |
| Loranthaceae | | | | |
| 499. | 2380 <i>Amyema miquelii</i> (Stalked Mistletoe) | | | |
| Malvaceae | | | | |
| 500. | 40863 <i>Commersonia corylifolia</i> (Hazel-leaved Rulingia) | | | |
| 501. | 45084 <i>Lasiopetalum laxiflorum</i> | | P3 | |
| 502. | 36522 <i>Malva pseudolavatera</i> | Y | | |
| 503. | 5084 <i>Thomasia grandiflora</i> (Large Flowered Thomasia) | | | |
| Melanthaceae | | | | |
| 504. | 4785 <i>Melianthus major</i> | Y | | |
| Menyanthaceae | | | | |
| 505. | 36160 <i>Liparophyllum capitatum</i> | | | |
| 506. | 36178 <i>Liparophyllum lasiospermum</i> | | | |
| 507. | 36181 <i>Ornduffia parnassifolia</i> | | | |
| 508. | 36200 <i>Ornduffia submersa</i> | | P4 | |
| Myrtaceae | | | | |
| 509. | 5315 <i>Actinodium cunninghamii</i> (Albany Daisy) | | | |
| 510. | 5316 <i>Agonis flexuosa</i> (Peppermint, Wonil) | | | |
| 511. | 17202 <i>Agonis flexuosa</i> var. <i>flexuosa</i> | | | |
| 512. | 5392 <i>Beaufortia sparsa</i> (Swamp Bottlebrush) | | | |
| 513. | 5394 <i>Callistemon glaucus</i> | | | |
| 514. | 5415 <i>Calothamnus lateralis</i> | | | |
| 515. | 5426 <i>Calothamnus quadrifidus</i> (One-sided Bottlebrush, Kwowdjard) | | | |
| 516. | 35796 <i>Calothamnus quadrifidus</i> subsp. <i>teretifolius</i> | | P4 | |
| 517. | 5429 <i>Calothamnus sanguineus</i> (Silky-leaved Blood flower, Pindak) | | | |
| 518. | 5458 <i>Calytrix flavescens</i> (Summer Starflower) | | | |
| 519. | 5465 <i>Calytrix leschenaultii</i> | | | |
| 520. | 5482 <i>Calytrix tenuiramea</i> | | | |
| 521. | 5491 <i>Chamelaucium ciliatum</i> | | | |
| 522. | 43980 <i>Chamelaucium</i> sp. S coastal plain (R.D.Royce 4872) | | T | |
| 523. | 35657 <i>Chamelaucium</i> sp. Yoongarillup (G.J. Keighery 3635) | | P4 | |
| 524. | 17104 <i>Corymbia calophylla</i> (Marri) | | | |
| 525. | 5508 <i>Darwinia citriodora</i> (Lemon-scented Darwinia) | | | |
| 526. | 5533 <i>Darwinia vestita</i> (Pom-pom Darwinia) | | | |
| 527. | 5605 <i>Eucalyptus cornuta</i> (Yate, Yeid) | | | |
| 528. | 5615 <i>Eucalyptus decipiens</i> (Limestone Marlock, Moit) | | | |
| 529. | 5625 <i>Eucalyptus diversicolor</i> (Karri) | | | |
| 530. | 5659 <i>Eucalyptus gomphocephala</i> (Tuart, Duart) | | | |
| 531. | 5708 <i>Eucalyptus marginata</i> (Jarrah, Djara) | | | |
| 532. | 13547 <i>Eucalyptus marginata</i> subsp. <i>marginata</i> (Jarrah) | | | |
| 533. | 5817 <i>Hypocalymma angustifolium</i> (White Myrtle, Kudjid) | | | |
| 534. | 35070 <i>Hypocalymma angustifolium</i> subsp. Swan Coastal Plain (G.J. Keighery 16777) | | | |
| 535. | 5818 <i>Hypocalymma cordifolium</i> | | | |
| 536. | 5819 <i>Hypocalymma ericifolium</i> | | | |
| 537. | 5825 <i>Hypocalymma robustum</i> (Swan River Myrtle) | | | |



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|---------------------|--|-------------|-------------------|------------------------------------|
| 538. | <i>Hypocalymma</i> sp. | | | |
| 539. | 5835 <i>Kunzea micrantha</i> | | | |
| 540. | 17508 <i>Kunzea micrantha</i> subsp. <i>oligandra</i> | | | |
| 541. | 17505 <i>Kunzea praestans</i> | | | |
| 542. | 5841 <i>Kunzea recurva</i> | | | |
| 543. | 14776 <i>Kunzea rostrata</i> | | | |
| 544. | <i>Leptospermum</i> sp. | | | |
| 545. | 37580 <i>Melaleuca acutifolia</i> | | | |
| 546. | 5900 <i>Melaleuca cuticularis</i> (Saltwater Paperbark) | | | |
| 547. | 13273 <i>Melaleuca incana</i> subsp. <i>incana</i> | | | |
| 548. | 5922 <i>Melaleuca lanceolata</i> (Rottnest Teatree, Moonah) | | | |
| 549. | 5926 <i>Melaleuca lateritia</i> (Robin Redbreast Bush) | | | |
| 550. | 5930 <i>Melaleuca leiopyxis</i> | | | |
| 551. | 20297 <i>Melaleuca osullivanii</i> | | | |
| 552. | 18394 <i>Melaleuca parviceps</i> | | | |
| 553. | 5946 <i>Melaleuca pauciflora</i> | | | |
| 554. | 5959 <i>Melaleuca raphiophylla</i> (Swamp Paperbark) | | | |
| 555. | <i>Melaleuca</i> sp. | | | |
| 556. | 18598 <i>Melaleuca systema</i> | | | |
| 557. | 5980 <i>Melaleuca thymoides</i> | | | |
| 558. | 5984 <i>Melaleuca uncinata</i> (Broom Bush, Kwidjard) | | | |
| 559. | 5987 <i>Melaleuca viminea</i> (Mohan) | | | |
| 560. | 13280 <i>Melaleuca viminea</i> subsp. <i>viminea</i> | | | |
| 561. | 6006 <i>Pericalymma ellipticum</i> (Swamp Teatree) | | | |
| 562. | 16477 <i>Pericalymma ellipticum</i> var. <i>ellipticum</i> | | | |
| 563. | 16478 <i>Pericalymma ellipticum</i> var. <i>floridum</i> | | | |
| 564. | <i>Pericalymma</i> sp. | | | |
| 565. | 20135 <i>Taxandria linearifolia</i> | | | |
| 566. | 20133 <i>Taxandria parviceps</i> | | | |
| 567. | 12392 <i>Verticordia attenuata</i> | | P3 | |
| 568. | 12411 <i>Verticordia densiflora</i> var. <i>cespitosa</i> | | | |
| 569. | 15432 <i>Verticordia densiflora</i> var. <i>densiflora</i> | | | |
| 570. | 12412 <i>Verticordia densiflora</i> var. <i>pedunculata</i> | | T | |
| 571. | 6084 <i>Verticordia habrantha</i> (Hidden Featherflower) | | | |
| 572. | 6093 <i>Verticordia lehmannii</i> | | P4 | |
| 573. | 6110 <i>Verticordia plumosa</i> (Plumed Featherflower) | | | |
| 574. | 12448 <i>Verticordia plumosa</i> var. <i>ananeotes</i> | | T | |
| 575. | 15618 <i>Verticordia plumosa</i> var. <i>plumosa</i> | | | |
| 576. | 12453 <i>Verticordia plumosa</i> var. <i>vassensis</i> | | T | |
| Nymphaeaceae | | | | |
| 577. | 2922 <i>Nymphaea mexicana</i> (Yellow Waterlily) | Y | | |
| Oleaceae | | | | |
| 578. | 11937 <i>Olea europaea</i> subsp. <i>europaea</i> | Y | | |
| Onagraceae | | | | |
| 579. | 11992 <i>Epilobium billardioreanum</i> subsp. <i>intermedium</i> | | | |
| 580. | <i>Epilobium</i> sp. | | | |
| 581. | 16390 <i>Oenothera drummondii</i> subsp. <i>drummondii</i> | Y | | |
| Orchidaceae | | | | |
| 582. | 13853 <i>Caladenia arrecta</i> | | | |
| 583. | 18035 <i>Caladenia bicallata</i> subsp. <i>bicallata</i> | | | |
| 584. | 15579 <i>Caladenia chapmanii</i> | | | |
| 585. | 15341 <i>Caladenia citrina</i> | | | |
| 586. | 15354 <i>Caladenia hirta</i> subsp. <i>hirta</i> | | | |
| 587. | 1596 <i>Caladenia huegelii</i> (Grand Spider Orchid) | | T | |
| 588. | 1599 <i>Caladenia latifolia</i> (Pink Fairy Orchid) | | | |
| 589. | 15365 <i>Caladenia longicauda</i> subsp. <i>longicauda</i> | | | |
| 590. | 1604 <i>Caladenia macrostylis</i> (Leaping Spider Orchid) | | | |
| 591. | 1605 <i>Caladenia marginata</i> (White Fairy Orchid) | | | |
| 592. | 1608 <i>Caladenia nana</i> (Pink Fan Orchid) | | | |
| 593. | 15372 <i>Caladenia nana</i> subsp. <i>unita</i> | | | |
| 594. | 15503 <i>Caladenia paludosa</i> | | | |
| 595. | 1609 <i>Caladenia pectinata</i> (King Spider Orchid) | | | |
| 596. | 1610 <i>Caladenia plicata</i> (Crab-lipped Spider Orchid) | | | |
| 597. | 18038 <i>Caladenia procera</i> | | T | |
| 598. | <i>Caladenia</i> sp. | | | |
| 599. | 18040 <i>Caladenia thinicola</i> | | | |
| 600. | <i>Caladenia versicolor</i> | | | |
| 601. | 1624 <i>Corybas despectans</i> | | | |



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|-----------------------|---|-------------|-------------------|------------------------------------|
| 602. | 15114 <i>Cyanicula gemmata</i> | | | |
| 603. | 15404 <i>Cyanicula sericea</i> | | | |
| 604. | 11049 <i>Diuris corymbosa</i> | | | |
| 605. | 1633 <i>Diuris laevis</i> (Nannygoat Orchid) | | | |
| 606. | 1634 <i>Diuris laxiflora</i> (Bee Orchid) | | | |
| 607. | 1637 <i>Diuris purdiei</i> (Purdie's Donkey Orchid) | | T | |
| 608. | 1638 <i>Diuris setacea</i> (Bristly Donkey Orchid) | | | |
| 609. | <i>Diuris</i> sp. | | | |
| 610. | 1639 <i>Drakaea elastica</i> (Glossy-leaved Hammer Orchid) | | T | |
| 611. | 1640 <i>Drakaea glyptodon</i> (King-in-his-carriage) | | | |
| 612. | 1643 <i>Elythranthera brunonis</i> (Purple Enamel Orchid) | | | |
| 613. | 1644 <i>Elythranthera emarginata</i> (Pink Enamel Orchid) | | | |
| 614. | <i>Elythranthera</i> sp. | | | |
| 615. | 15410 <i>Eriochilus dilatatus</i> subsp. <i>dilatatus</i> | | | |
| 616. | 15412 <i>Eriochilus dilatatus</i> subsp. <i>multiflorus</i> | | | |
| 617. | 1647 <i>Eriochilus scaber</i> (Pink Bunny Orchid) | | | |
| 618. | 15415 <i>Eriochilus scaber</i> subsp. <i>scaber</i> | | | |
| 619. | 15418 <i>Leptoceras menziesii</i> | | | |
| 620. | 1656 <i>Lyperanthus serratus</i> (Rattle Beak Orchid) | | | |
| 621. | 1657 <i>Microtis alba</i> (White Mignonette Orchid) | | | |
| 622. | 1658 <i>Microtis atrata</i> (Swamp Mignonette Orchid) | | | |
| 623. | 10954 <i>Microtis media</i> (Tall Mignonette Orchid) | | | |
| 624. | 15419 <i>Microtis media</i> subsp. <i>media</i> | | | |
| 625. | 15424 <i>Praecoxanthus aphyllus</i> | | | |
| 626. | 1668 <i>Prasophyllum brownii</i> | | | |
| 627. | 1670 <i>Prasophyllum drummondii</i> (Swamp Leek Orchid) | | | |
| 628. | 1674 <i>Prasophyllum giganteum</i> (Bronze Leek Orchid) | | | |
| 629. | 1676 <i>Prasophyllum hians</i> (Yawning Leek Orchid) | | | |
| 630. | 1680 <i>Prasophyllum parvifolium</i> (Autumn Leek Orchid) | | | |
| 631. | 15426 <i>Pterostylis aspera</i> | | | |
| 632. | 1693 <i>Pterostylis recurva</i> (Jug Orchid) | | | |
| 633. | 1694 <i>Pterostylis rogersii</i> (Curled-tongue Shell Orchid) | | | |
| 634. | 12217 <i>Pterostylis sanguinea</i> | | | |
| 635. | <i>Pterostylis</i> sp. | | | |
| 636. | 1698 <i>Pterostylis vittata</i> (Banded Greenhood) | | | |
| 637. | 1701 <i>Thelymitra antennifera</i> (Vanilla Orchid) | | | |
| 638. | 10856 <i>Thelymitra benthamiana</i> (Leopard Orchid) | | | |
| 639. | 1702 <i>Thelymitra campanulata</i> (Shirt Orchid) | | | |
| 640. | 1704 <i>Thelymitra cornicina</i> (Lilac Sun Orchid) | | | |
| 641. | 1705 <i>Thelymitra crinita</i> (Blue Lady Orchid) | | | |
| 642. | 1707 <i>Thelymitra flexuosa</i> (Twisted Sun Orchid) | | | |
| 643. | 11143 <i>Thelymitra graminea</i> | | | |
| 644. | 1715 <i>Thelymitra spiralis</i> (Curlylocks) | | | |
| 645. | 1717 <i>Thelymitra variegata</i> (Queen of Sheba) | | P2 | |
| 646. | 1718 <i>Thelymitra villosa</i> (Custard Orchid) | | | |
| 647. | 20731 <i>Thelymitra vulgaris</i> | | | |
| Orobanchaceae | | | | |
| 648. | 15037 <i>Bartsia trixago</i> | Y | | |
| 649. | <i>Orobanche cernua</i> var. <i>australiana</i> | | | |
| 650. | 7122 <i>Orobanche minor</i> (Lesser Broomrape) | Y | | |
| 651. | 7089 <i>Parentucellia latifolia</i> (Common Bartsia) | Y | | |
| Oxalidaceae | | | | |
| 652. | 17212 <i>Oxalis depressa</i> | Y | | Y |
| 653. | 4354 <i>Oxalis incarnata</i> | Y | | |
| 654. | <i>Oxalis</i> sp. | | | |
| Papaveraceae | | | | |
| 655. | 2969 <i>Fumaria capreolata</i> (Whiteflower Fumitory) | Y | | |
| 656. | 2971 <i>Fumaria muralis</i> (Wall Fumitory) | Y | | |
| Philydraceae | | | | |
| 657. | 1173 <i>Philydrella pygmaea</i> (Butterfly Flowers) | | | |
| Phyllanthaceae | | | | |
| 658. | 4675 <i>Phyllanthus calycinus</i> (False Boronia) | | | |
| 659. | <i>Phyllanthus gunnii</i> | | | Y |
| 660. | 17794 <i>Phyllanthus tenellus</i> | Y | | |
| 661. | 4690 <i>Poranthera huegelii</i> | | | |
| Pittosporaceae | | | | |
| 662. | 3157 <i>Billardiera floribunda</i> (White-flowered Billardiera) | | | |



| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|-----------------------|--|-------------|-------------------|------------------------------------|
| 663. | 25796 <i>Billardiera heterophylla</i> (Australian Bluebell) | | | |
| 664. | 3165 <i>Billardiera variifolia</i> | | | |
| Plantaginaceae | | | | |
| 665. | 4717 <i>Callitriche stagnalis</i> (Common Starwort) | Y | | |
| 666. | 14282 <i>Gratiola pubescens</i> | | | |
| 667. | 7299 <i>Plantago debilis</i> | | | |
| Poaceae | | | | |
| 668. | 177 <i>Agrostis capillaris</i> | Y | | |
| 669. | 185 <i>Aira cupaniana</i> (Silvery Hairgrass) | Y | | |
| 670. | 35159 <i>Ammophila arenaria</i> subsp. <i>arenaria</i> | Y | | |
| 671. | 13380 <i>Amphibromus nervosus</i> | | | |
| 672. | 197 <i>Amphipogon debilis</i> | | | |
| 673. | 198 <i>Amphipogon laguroides</i> | | | |
| 674. | 17233 <i>Austrostipa campylachne</i> | | | |
| 675. | 17240 <i>Austrostipa flavescens</i> | | | |
| 676. | 17253 <i>Austrostipa semibarbata</i> | | | |
| 677. | 37421 <i>Austrostipa</i> sp. <i>Marchagee</i> (B.R. Maslin 1407) | | | |
| 678. | 17254 <i>Austrostipa tenuifolia</i> | | | |
| 679. | 233 <i>Avena barbata</i> (Bearded Oat) | Y | | |
| 680. | 234 <i>Avena fatua</i> (Wild Oat) | Y | | |
| 681. | 245 <i>Briza minor</i> (Shivery Grass) | Y | | |
| 682. | 250 <i>Bromus hordeaceus</i> (Soft Brome) | Y | | |
| 683. | 252 <i>Bromus madritensis</i> (Madrid Brome) | Y | | |
| 684. | <i>Bromus</i> sp. | | | |
| 685. | 13685 <i>Catapodium rigidum</i> (Rigid Fescue) | Y | | |
| 686. | 41564 <i>Cenchrus clandestinus</i> (Kikuyu Grass) | Y | | |
| 687. | 277 <i>Cortaderia selloana</i> (Pampas Grass) | Y | | |
| 688. | 283 <i>Cynodon dactylon</i> (Couch) | Y | | |
| 689. | 299 <i>Deyeuxia quadriseta</i> (Reed Bentgrass) | | | |
| 690. | 311 <i>Digitaria ciliaris</i> (Summer Grass) | Y | | |
| 691. | 338 <i>Echinochloa telmatophila</i> (Swamp Barnyard Grass) | Y | | |
| 692. | 351 <i>Ehrharta villosa</i> (Pyp Grass) | Y | | |
| 693. | 352 <i>Eleusine coracana</i> | Y | | |
| 694. | <i>Eragrostis</i> sp. | | | |
| 695. | 17043 <i>Glyceria declinata</i> | Y | | |
| 696. | 438 <i>Hainardia cylindrica</i> (Common Barbgrass) | Y | | |
| 697. | 439 <i>Hemarthria uncinata</i> (Matgrass) | | | |
| 698. | 11451 <i>Hemarthria uncinata</i> var. <i>uncinata</i> | | | |
| 699. | 444 <i>Holcus lanatus</i> (Yorkshire Fog) | Y | | |
| 700. | 450 <i>Hordeum marinum</i> | Y | | |
| 701. | 20019 <i>Lachnagrostis filiformis</i> | | | |
| 702. | 19955 <i>Lachnagrostis plebeia</i> | | | |
| 703. | 467 <i>Lagurus ovatus</i> (Hare's Tail Grass) | Y | | |
| 704. | 8682 <i>Lolium loliaceum</i> (Stiff Ryegrass) | Y | | |
| 705. | 11766 <i>Lolium temulentum</i> forma <i>arvense</i> | Y | | |
| 706. | 485 <i>Microlaena stipoides</i> (Weeping Grass) | | | |
| 707. | 516 <i>Parapholis incurva</i> (Coast Barbgrass) | Y | | |
| 708. | 19681 <i>Phalaris arundinacea</i> var. <i>picta</i> | Y | | Y |
| 709. | 551 <i>Phalaris minor</i> (Lesser Canary Grass) | Y | | |
| 710. | 571 <i>Poa annua</i> (Winter Grass) | Y | | |
| 711. | 573 <i>Poa drummondiana</i> (Knotted Poa) | | | |
| 712. | 577 <i>Poa poliformis</i> (Coastal Poa) | | | |
| 713. | 578 <i>Poa porphyroclados</i> | | | |
| 714. | 579 <i>Poa pratensis</i> (Kentucky Bluegrass) | Y | | |
| 715. | <i>Polypogon lutosus</i> | | | Y |
| 716. | 582 <i>Polypogon monspeliensis</i> (Annual Beardgrass) | Y | | |
| 717. | 583 <i>Polypogon tenellus</i> | | | |
| 718. | 31673 <i>Puccinellia vassica</i> | | P1 | |
| 719. | 40431 <i>Rytidosperma acerosum</i> | | | |
| 720. | 40425 <i>Rytidosperma caespitosum</i> | | | |
| 721. | 40430 <i>Rytidosperma pilosum</i> | | | |
| 722. | 625 <i>Spinifex longifolius</i> (Beach Spinifex) | | | |
| 723. | 626 <i>Spinifex sericeus</i> | Y | | |
| 724. | 627 <i>Spinifex x alterniflorus</i> | | | |
| 725. | 635 <i>Sporobolus virginicus</i> (Marine Couch) | | | |
| 726. | 636 <i>Stenotaphrum secundatum</i> (Buffalo Grass) | Y | | |
| 727. | 11137 <i>Vulpia fasciculata</i> | Y | | |
| 728. | 12052 <i>Vulpia myuros</i> forma <i>megalura</i> | Y | | |
| 729. | 33101 <i>Vulpia myuros</i> forma <i>myuros</i> | Y | | |



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|-------------------------|---|-------------|-------------------|------------------------------------|
| Podocarpaceae | | | | |
| 730. | 86 <i>Podocarpus drouynianus</i> (Wild Plum, Kula) | | | |
| Polygalaceae | | | | |
| 731. | 4552 <i>Comesperma confertum</i> | | | |
| 732. | 4554 <i>Comesperma flavum</i> | | | |
| 733. | 4564 <i>Comesperma virgatum</i> (Milkwort) | | | |
| 734. | 8395 <i>Polygala myrtifolia</i> (Myrtleleaf Milkwort) | Y | | |
| Polygonaceae | | | | |
| 735. | 14934 <i>Persicaria orientalis</i> | Y | | |
| 736. | 11052 <i>Persicaria prostrata</i> | | | |
| 737. | 2419 <i>Polygonum aviculare</i> (Wireweed) | Y | | |
| 738. | 2430 <i>Rumex brownii</i> (Swamp Dock) | Y | | |
| 739. | 11541 <i>Rumex dumosus</i> var. <i>dumosus</i> | | | |
| Posidoniaceae | | | | |
| 740. | 123 <i>Posidonia australis</i> (Fibreball Weed) | | | |
| 741. | 125 <i>Posidonia sinuosa</i> | | | |
| Potamogetonaceae | | | | |
| 742. | 110 <i>Potamogeton drummondii</i> | | | |
| 743. | 111 <i>Potamogeton ochreateus</i> (Blunt Pondweed) | | | |
| Pottiaceae | | | | |
| 744. | 32345 <i>Didymodon australasiae</i> | | | |
| 745. | 32445 <i>Tortula muralis</i> | | | |
| Primulaceae | | | | |
| 746. | 6483 <i>Samolus junceus</i> | | | |
| 747. | 6484 <i>Samolus repens</i> (Creeping Brookweed) | | | |
| 748. | 6485 <i>Samolus valerandi</i> (Water Pimpernel) | Y | | |
| Proteaceae | | | | |
| 749. | 14970 <i>Adenanthos barbiger</i> | | | |
| 750. | 1790 <i>Adenanthos meisneri</i> | | | |
| 751. | 1791 <i>Adenanthos obovatus</i> (Basket Flower) | | | |
| 752. | <i>Adenanthos</i> sp. | | | |
| 753. | 28281 <i>Adenanthos</i> sp. <i>Whicher Range</i> (G.J. Keighery 9736) | | | |
| 754. | 32676 <i>Banksia biterax</i> | | | |
| 755. | 1822 <i>Banksia ilicifolia</i> (Holly-leaved Banksia) | | | |
| 756. | 32202 <i>Banksia nivea</i> (Honeypot Dryandra, Pudjarn) | | | |
| 757. | 32204 <i>Banksia nivea</i> subsp. <i>uliginosa</i> | | | T |
| 758. | 1848 <i>Banksia seminuda</i> (River Banksia) | | | |
| 759. | 32078 <i>Banksia sessilis</i> var. <i>cordata</i> | | | P4 |
| 760. | <i>Banksia</i> sp. | | | |
| 761. | 15607 <i>Conospermum acerosum</i> subsp. <i>acerosum</i> | | | |
| 762. | 1862 <i>Conospermum caeruleum</i> (Blue Brother) | | | |
| 763. | 16875 <i>Conospermum caeruleum</i> subsp. <i>debile</i> | | | |
| 764. | 15609 <i>Conospermum caeruleum</i> subsp. <i>marginatum</i> | | | |
| 765. | 1872 <i>Conospermum flexuosum</i> (Tangled Smokebush) | | | |
| 766. | 16850 <i>Conospermum flexuosum</i> subsp. <i>laevigatum</i> | | | |
| 767. | 16847 <i>Conospermum paniculatum</i> | | | P3 |
| 768. | 1883 <i>Conospermum teretifolium</i> (Spider Smokebush) | | | |
| 769. | 1945 <i>Franklandia triaristata</i> (Lanoline Bush) | | | P4 |
| 770. | 1967 <i>Grevillea brachystylis</i> (Short-styled Grevillea) | | | |
| 771. | 14011 <i>Grevillea brachystylis</i> subsp. <i>brachystylis</i> | | | P3 |
| 772. | 12219 <i>Grevillea bronwenae</i> | | | P3 |
| 773. | 14526 <i>Grevillea elongata</i> | | | T |
| 774. | 2029 <i>Grevillea leptobotrys</i> | | | |
| 775. | 13427 <i>Grevillea manglesioides</i> subsp. <i>manglesioides</i> | | | |
| 776. | 2078 <i>Grevillea pulchella</i> (Beautiful Grevillea) | | | |
| 777. | 2080 <i>Grevillea quercifolia</i> (Oak-leaf Grevillea) | | | |
| 778. | 2112 <i>Grevillea trifida</i> | | | |
| 779. | 12824 <i>Grevillea vestita</i> subsp. <i>vestita</i> | | | |
| 780. | 2128 <i>Hakea amplexicaulis</i> (Prickly Hakea) | | | |
| 781. | 2137 <i>Hakea ceratophylla</i> (Horned Leaf Hakea) | | | |
| 782. | 2152 <i>Hakea cyclocarpa</i> (Ramshorn) | | | |
| 783. | <i>Hakea cycloptera</i> | | | |
| 784. | 2190 <i>Hakea oldfieldii</i> | | | P3 |
| 785. | 2194 <i>Hakea petiolaris</i> (Sea Urchin Hakea) | | | |
| 786. | 2203 <i>Hakea ruscifolia</i> (Candle Hakea) | | | |
| 787. | 2206 <i>Hakea stenocarpa</i> (Narrow-fruited Hakea) | | | |



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| 788. | 2212 <i>Hakea sulcata</i> (Furrowed Hakea) | | | |
| 789. | 2217 <i>Hakea verrucosa</i> | | | |
| 790. | 2223 <i>Isopogon axillaris</i> | | | |
| 791. | 8844 <i>Isopogon crithmifolius</i> | | | |
| 792. | 2230 <i>Isopogon formosus</i> (Rose Coneflower) | | | |
| 793. | 16522 <i>Isopogon formosus</i> subsp. <i>dasylepis</i> | | P3 | |
| 794. | <i>Isopogon</i> sp. | | | |
| 795. | 2237 <i>Isopogon sphaerocephalus</i> (Drumstick Isopogon) | | | |
| 796. | 17734 <i>Lambertia echinata</i> subsp. <i>occidentalis</i> | | T | |
| 797. | 19186 <i>Lambertia orbifolia</i> subsp. <i>Scott River Plains</i> (L.W. Sage 684) | | T | |
| 798. | 2267 <i>Persoonia longifolia</i> (Snottygobble) | | | |
| 799. | 2283 <i>Petrophile anceps</i> | | | |
| 800. | 2293 <i>Petrophile diversifolia</i> | | | |
| 801. | 14395 <i>Petrophile glauca</i> | | | |
| 802. | 2299 <i>Petrophile linearis</i> (Pixie Mops) | | | |
| 803. | 2302 <i>Petrophile media</i> | | | |
| 804. | 2309 <i>Petrophile serruriae</i> | | | |
| 805. | <i>Petrophile</i> sp. | | | |
| 806. | 2311 <i>Petrophile squamata</i> | | | |
| 807. | 17765 <i>Petrophile squamata</i> subsp. <i>squamata</i> | | | |
| 808. | 2316 <i>Stirlingia latifolia</i> (Blueboy) | | | |
| 809. | 2317 <i>Stirlingia simplex</i> | | | |
| 810. | 2320 <i>Strangea stenocarpoides</i> | | | |
| 811. | 15529 <i>Synaphea floribunda</i> | | | |
| 812. | 16769 <i>Synaphea hians</i> | | P3 | |
| 813. | 2324 <i>Synaphea petiolaris</i> (<i>Synaphea</i>) | | | |
| 814. | 16864 <i>Synaphea petiolaris</i> subsp. <i>petiolaris</i> | | | |
| 815. | 16862 <i>Synaphea petiolaris</i> subsp. <i>simplex</i> | | P2 | |
| 816. | 16863 <i>Synaphea petiolaris</i> subsp. <i>triloba</i> | | | |
| 817. | 15535 <i>Synaphea whicherensis</i> | | | |
| 818. | 2331 <i>Xylomelum occidentale</i> (Woody Pear, Djandin) | | | |

Pteridaceae

819. 8462 *Cheilanthes tenuifolia* (Rock Fern)

Ranunculaceae

820. 2929 *Clematis pubescens* (Common Clematis)
 821. 2932 *Ranunculus colonorum* (Common Buttercup)
 822. 2933 *Ranunculus muricatus* (Sharp Buttercup) Y

Restionaceae

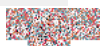
823. 17685 *Chaetanthes aristatus*
 824. 1065 *Chaetanthes leptocarpoides*
 825. 17687 *Chaetanthes tenellus*
 826. 17688 *Chordifex amblycoleus*
 827. 17689 *Chordifex laxus*
 828. 17692 *Cytogonidium leptocarpoides*
 829. 15831 *Desmocladus castaneus*
 830. 17846 *Desmocladus parthenicus*
 831. 1070 *Hypolaena exsulca*
 832. 17841 *Hypolaena pubescens*
 833. 16836 *Hypolaena viridis*
 834. 15556 *Leptocarpus elegans*
 835. *Leptocarpus elegans* MS
 836. 1085 *Lepyrodia glauca*
 837. 1090 *Lepyrodia muirii*
 838. 1092 *Loxocarya cinerea*
 839. 13779 *Loxocarya magna* P3
 840. 17679 *Meeboldina coangustata*
 841. 17747 *Meeboldina decipiens*
 842. 1098 *Meeboldina denmarkica*
 843. 17677 *Meeboldina roycei*
 844. *Meeboldina roycei* MS
 845. 17694 *Meeboldina scariosa*
 846. 17682 *Melanostachya ustulata*
 847. 18381 *Stenotalis ramosissima*
 848. 17684 *Tremulina tremula*

Rhamnaceae

849. 13484 *Cryptandra arbutiflora* var. *tubulosa*
 850. 4809 *Cryptandra pungens*
 851. 4828 *Spyridium globulosum* (Basket Bush)



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|-------------------------|---|-------------|-------------------|------------------------------------|
| 852. | 13479 <i>Trymalium ledifolium</i> var. <i>rosmarinifolium</i> | | | |
| Rhodomelaceae | | | | |
| 853. | 26663 <i>Cladurus elatus</i> | | | |
| 854. | 26998 <i>Laurencia brongniartii</i> | | | |
| 855. | 26999 <i>Laurencia clavata</i> | | | |
| 856. | 27001 <i>Laurencia filiformis</i> | | | |
| 857. | 27107 <i>Osmundaria prolifera</i> | | | |
| 858. | 27162 <i>Pollexfenia pedicellata</i> | | | |
| 859. | 27190 <i>Protokuetzia australasica</i> | | | |
| 860. | 27360 <i>Vidalia spiralis</i> | | | |
| Rosaceae | | | | |
| 861. | 20506 <i>Rubus anglocandicans</i> | Y | | |
| Rubiaceae | | | | |
| 862. | 29283 <i>Coprosma repens</i> | Y | | |
| 863. | 17348 <i>Galium aparine</i> (Goosegrass) | Y | | |
| 864. | 7323 <i>Galium murale</i> (Small Goosegrass) | Y | | |
| 865. | 25797 <i>Galium spurium</i> | Y | | |
| 866. | 18254 <i>Opercularia apiciflora</i> | | | |
| 867. | 18256 <i>Opercularia spermacocea</i> | | | |
| Rutaceae | | | | |
| 868. | 4406 <i>Boronia busselliana</i> | | | |
| 869. | 17653 <i>Boronia crenulata</i> subsp. <i>pubescens</i> | | | |
| 870. | 4417 <i>Boronia dichotoma</i> | | | |
| 871. | 4423 <i>Boronia heterophylla</i> (Kalgan Boronia) | | | |
| 872. | 4428 <i>Boronia megastigma</i> (Scented Boronia) | | | |
| 873. | 4429 <i>Boronia molloyae</i> (Tall Boronia) | | | |
| 874. | 4436 <i>Boronia pulchella</i> (Pink Boronia) | | | |
| 875. | 17665 <i>Boronia purdieana</i> subsp. <i>purdieana</i> | | | |
| 876. | 4441 <i>Boronia spathulata</i> (Boronia) | | | |
| 877. | 20392 <i>Boronia tenuior</i> | | | |
| 878. | 4448 <i>Chorilaena quercifolia</i> (Chorilaena) | | | |
| 879. | 4454 <i>Diplolaena dampieri</i> (Southern Diplolaena) | | | |
| 880. | 18529 <i>Philotheca spicata</i> (Pepper and Salt) | | | |
| 881. | 18547 <i>Rhadinothamnus anceps</i> | | | |
| Santalaceae | | | | |
| 882. | 10907 <i>Exocarpos odoratus</i> (Scented Ballart) | | | |
| 883. | 10765 <i>Exocarpos sparteus</i> (Broom Ballart, Djuk) | | | |
| 884. | 17703 <i>Leptomeria ellytes</i> | | | |
| 885. | 17702 <i>Leptomeria furtiva</i> | | P2 | |
| 886. | 2355 <i>Leptomeria squarrolosa</i> | | | |
| 887. | 2356 <i>Santalum acuminatum</i> (Quandong, Warrga) | | | |
| Sapindaceae | | | | |
| 888. | 4757 <i>Dodonaea ceratocarpa</i> | | | |
| 889. | 17338 <i>Dodonaea viscosa</i> subsp. <i>viscosa</i> | Y | | |
| Scrophulariaceae | | | | |
| 890. | 7054 <i>Dischisma arenarium</i> | Y | | |
| 891. | 17175 <i>Eremophila glabra</i> subsp. <i>albicans</i> | | | |
| 892. | 7292 <i>Myoporum oppositifolium</i> (Twin-leaf Myoporum) | | | |
| 893. | <i>Myoporum</i> sp. | | | |
| 894. | 7107 <i>Verbascum virgatum</i> (Twiggy Mullein) | Y | | |
| Sematophyllaceae | | | | |
| 895. | 32433 <i>Sematophyllum homomallum</i> | | | |
| Siphonocladaceae | | | | |
| 896. | 26770 <i>Dictyosphaeria sericea</i> | | | |
| Solanaceae | | | | |
| 897. | 6949 <i>Anthocercis littorea</i> (Yellow Tailflower) | | | |
| 898. | 6965 <i>Datura wrightii</i> (Hairy Thornapple) | Y | | |
| 899. | 6970 <i>Nicandra physalodes</i> (Apple of Peru) | Y | | |
| 900. | 7022 <i>Solanum nigrum</i> (Black Berry Nightshade) | Y | | |
| 901. | 7037 <i>Solanum symonii</i> | | | |
| Stylidiaceae | | | | |
| 902. | 7673 <i>Levenhookia pauciflora</i> (Deceptive Stylewort) | | | |
| 903. | 7676 <i>Levenhookia pusilla</i> (Midget Stylewort) | | | |
| 904. | 7684 <i>Stylidium amoenum</i> (Lovely Triggerplant) | | | |
| 905. | 30278 <i>Stylidium androsaceum</i> | | | |



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|---------|--|-------------|-------------------|------------------------------------|
| 906. | 7708 <i>Stylidium crassifolium</i> (Thick-leaved Triggerplant) | | | |
| 907. | 7718 <i>Stylidium diversifolium</i> (Touch-me-not) | | | |
| 908. | 7719 <i>Stylidium ecome</i> (Foot Triggerplant) | | | |
| 909. | 7745 <i>Stylidium junceum</i> (Reed Triggerplant) | | | |
| 910. | 19248 <i>Stylidium megacarpum</i> | | | |
| 911. | 25829 <i>Stylidium neurophyllum</i> (Coastal Plain Triggerplant) | | | |
| 912. | 7772 <i>Stylidium perpusillum</i> (Tiny Triggerplant) | | | |
| 913. | 7774 <i>Stylidium piliferum</i> (Common Butterfly Triggerplant) | | | |
| 914. | 7796 <i>Stylidium scandens</i> (Climbing Triggerplant) | | | |

Thymelaeaceae

| | | | | |
|------|--|--|----|--|
| 915. | 5231 <i>Pimelea angustifolia</i> (Narrow-leaved Pimelea) | | | |
| 916. | 5232 <i>Pimelea argentea</i> (Silvery Leaved Pimelea) | | | |
| 917. | 12077 <i>Pimelea ciliata</i> subsp. <i>longituba</i> | | P3 | |
| 918. | 5243 <i>Pimelea ferruginea</i> | | | |
| 919. | 5249 <i>Pimelea hispida</i> (Bristly Pimelea) | | | |
| 920. | 11402 <i>Pimelea imbricata</i> var. <i>piligera</i> | | | |
| 921. | 5252 <i>Pimelea lanata</i> | | | |
| 922. | 5253 <i>Pimelea lehmanniana</i> | | | |
| 923. | 11182 <i>Pimelea lehmanniana</i> subsp. <i>nervosa</i> | | | |
| 924. | 5259 <i>Pimelea preissii</i> | | | |
| 925. | 5261 <i>Pimelea rosea</i> (Rose Banjine) | | | |
| 926. | 18117 <i>Pimelea rosea</i> subsp. <i>rosea</i> | | | |
| 927. | 5264 <i>Pimelea spectabilis</i> (Banjong) | | | |
| 928. | 5266 <i>Pimelea suaveolens</i> (Scented Banjine) | | | |
| 929. | 12041 <i>Pimelea suaveolens</i> subsp. <i>suaveolens</i> | | | |
| 930. | 5269 <i>Pimelea sylvestris</i> | | | |

Urticaceae

| | | | | |
|------|--|---|--|--|
| 931. | 1765 <i>Soleirolia soleiroliae</i> (Babys Tears) | Y | | |
|------|--|---|--|--|

Violaceae

| | | | | |
|------|---|--|--|--|
| 932. | 5216 <i>Hybanthus calycinus</i> (Wild Violet) | | | |
|------|---|--|--|--|

Xyridaceae

| | | | | |
|------|-----------------------------|--|--|--|
| 933. | 1151 <i>Xyris laxiflora</i> | | | |
|------|-----------------------------|--|--|--|

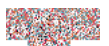
Zygophyllaceae

| | | | | |
|------|---|---|--|--|
| 934. | 4383 <i>Tribulus terrestris</i> (Caltrop) | Y | | |
|------|---|---|--|--|

Conservation Codes

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

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



NatureMap Species Report

Created By Guest user on 16/08/2016

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Line'
Vertices 33° 39' 04" S,115° 19' 25" E 33° 39' 44" S,115° 19' 28" E 33° 39' 53" S,115° 20' 06" E 33° 40'
Group By 03" S,115° 20' 21" E 33° 40' 30" S,115° 20' 46" E 33° 40' 32" S,115° 20' 58" E 33° 40' 54"
 S,115° 21' 23" E 33° 41' 13" S,115° 21' 39" E 33° 41' 33" S,115° 21' 55" E
 Family

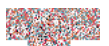
| Family | Species | Records |
|------------------|---------|---------|
| Acanthizidae | 7 | 84 |
| Acariformes | 1 | 3 |
| Accipitridae | 11 | 93 |
| Actinopodidae | 2 | 3 |
| Adeonidae | 1 | 1 |
| Aeshnidae | 1 | 2 |
| Amphiuridae | 1 | 1 |
| Amphithoidae | 1 | 1 |
| Anatidae | 16 | 693 |
| Anhingidae | 2 | 88 |
| Antedonidae | 1 | 1 |
| Antennariidae | 2 | 2 |
| Anthiidae | 1 | 1 |
| Apidae | 5 | 51 |
| Aplodactylidae | 1 | 1 |
| Apogonidae | 2 | 2 |
| Araneidae | 5 | 6 |
| Arctiidae | 3 | 3 |
| Ardeidae | 7 | 197 |
| Artamidae | 2 | 14 |
| Asterinidae | 1 | 1 |
| Atherinidae | 1 | 2 |
| Atopomelidae | 1 | 1 |
| Balaenopteridae | 1 | 2 |
| Blenniidae | 3 | 3 |
| Bovidae | 1 | 1 |
| Bramidae | 1 | 1 |
| Buccinidae | 4 | 10 |
| Bullidae | 1 | 2 |
| Buprestidae | 3 | 4 |
| Burramyidae | 1 | 1 |
| Cacatuidae | 1 | 69 |
| Callionymidae | 1 | 1 |
| Calliostomatidae | 1 | 3 |
| Campephagidae | 1 | 66 |
| Cancellariidae | 1 | 1 |
| Canidae | 1 | 1 |
| Caprimulgidae | 1 | 1 |
| Carabidae | 5 | 11 |
| Carangidae | 2 | 2 |
| Carcharhinidae | 1 | 1 |
| Cardiidae | 1 | 1 |
| Carditidae | 2 | 2 |
| Carybdeidae | 1 | 2 |
| Cerambycidae | 1 | 1 |
| Certhiidae | 2 | 6 |
| Cetorhinidae | 1 | 1 |
| Chaetodontidae | 1 | 1 |
| Chamidae | 2 | 3 |
| Charadriidae | 7 | 86 |
| Cheilodactylidae | 2 | 3 |
| Cheloniidae | 1 | 1 |
| Cheluidae | 1 | 2 |
| Chromodorididae | 2 | 3 |
| Clavulariidae | 1 | 1 |
| Clinidae | 4 | 10 |
| Coccinellidae | 1 | 1 |
| Coenagrionidae | 1 | 1 |
| Colletidae | 12 | 42 |
| Columbellidae | 6 | 17 |
| Columbidae | 6 | 238 |
| Congridae | 1 | 1 |
| Conidae | 2 | 5 |
| Corvidae | 5 | 150 |
| Costellariidae | 2 | 2 |
| Cracticidae | 5 | 142 |
| Crambidae | 1 | 2 |
| Cuculidae | 1 | 2 |
| Curculionidae | 4 | 8 |
| Cynoglossidae | 1 | 2 |
| Cypraeidae | 8 | 20 |
| Cyprinidae | 1 | 1 |
| Cystiscidae | 1 | 4 |
| Dasyuridae | 3 | 13 |



| | | |
|-------------------|----|-----|
| Delphinidae | 5 | 30 |
| Dendrodorididae | 1 | 1 |
| Dermochelyidae | 1 | 1 |
| Dicaeidae | 1 | 1 |
| Dicruridae | 6 | 233 |
| Diodontidae | 1 | 2 |
| Diomedelidae | 5 | 7 |
| Dolichopodidae | 1 | 3 |
| Donacidae | 1 | 5 |
| Dytiscidae | 1 | 1 |
| Echeneidae | 1 | 2 |
| Elapidae | 9 | 47 |
| Ellobiidae | 1 | 1 |
| Elopidae | 1 | 2 |
| Epitoniidae | 1 | 3 |
| Falconidae | 4 | 22 |
| Fasciolariidae | 2 | 5 |
| Felidae | 1 | 3 |
| Fergusoninidae | 1 | 4 |
| Fissurellidae | 4 | 5 |
| Formicidae | 7 | 26 |
| Galaxiidae | 1 | 1 |
| Galeommatidae | 1 | 2 |
| Garypidae | 1 | 2 |
| Gekkonidae | 1 | 2 |
| Geometridae | 5 | 5 |
| Gerreidae | 1 | 1 |
| Glaciorbidae | 1 | 1 |
| Glycymerididae | 2 | 2 |
| Gobiidae | 2 | 5 |
| Gonorynchidae | 1 | 1 |
| Gorgonocephalidae | 1 | 1 |
| Haematopodidae | 1 | 7 |
| Halcyonidae | 4 | 37 |
| Halictidae | 4 | 24 |
| Haliotidae | 4 | 5 |
| Helicidae | 1 | 1 |
| Hemiramphidae | 1 | 1 |
| Hersiliidae | 1 | 1 |
| Hesperidae | 3 | 15 |
| Heterodontidae | 1 | 1 |
| Hipponicidae | 3 | 3 |
| Hirundinidae | 3 | 135 |
| Hydrophilidae | 2 | 3 |
| Hygromiidae | 1 | 1 |
| Hylidae | 1 | 5 |
| Hymenosomatidae | 1 | 1 |
| Hypnidae | 1 | 1 |
| Hyriidae | 1 | 11 |
| Istiophoridae | 1 | 1 |
| Kalliapseudidae | 1 | 1 |
| Labridae | 9 | 24 |
| Lamponidae | 1 | 4 |
| Laridae | 8 | 220 |
| Leporidae | 1 | 1 |
| Lestidae | 1 | 6 |
| Limidae | 1 | 2 |
| Limnodynastidae | 1 | 3 |
| Limnoriidae | 2 | 5 |
| Lottiidae | 3 | 8 |
| Lucinidae | 3 | 4 |
| Lumbrineridae | 1 | 1 |
| Lycosidae | 4 | 5 |
| Macropodidae | 2 | 2 |
| Macluridae | 1 | 1 |
| Maeridae | 1 | 5 |
| Maturidae | 3 | 39 |
| Marginellidae | 3 | 4 |
| Megachilidae | 8 | 65 |
| Megapodagrionidae | 2 | 2 |
| Meliphagidae | 12 | 334 |
| Melitidae | 1 | 2 |
| Meropidae | 2 | 20 |
| Mesodesmatidae | 1 | 4 |
| Microcanthidae | 1 | 1 |
| Miturgidae | 1 | 1 |
| Molidae | 1 | 1 |
| Monacanthidae | 9 | 17 |
| Monocentridae | 1 | 4 |
| Moridae | 1 | 1 |
| Muricidae | 3 | 3 |
| Muridae | 3 | 15 |
| Myobatrachidae | 2 | 10 |
| Myrmeleontidae | 1 | 1 |
| Mytilidae | 1 | 3 |
| Nannoperidae | 1 | 7 |
| Nassariidae | 2 | 9 |
| Naticidae | 3 | 9 |
| Nemesiidae | 1 | 2 |
| Neobalaenidae | 1 | 1 |
| Neosebastidae | 1 | 1 |
| Neosittidae | 2 | 2 |
| Neotylenchidae | 1 | 2 |
| Nephilidae | 1 | 3 |
| Nereididae | 1 | 1 |
| Neritidae | 1 | 1 |
| Noctuidae | 7 | 8 |
| Notodontidae | 2 | 2 |
| Nymphalidae | 1 | 12 |
| Octopodidae | 2 | 4 |
| Olivellidae | 1 | 2 |
| Olividae | 2 | 3 |
| Ophichthidae | 3 | 4 |
| Ophidiidae | 2 | 3 |
| Ophiocornidae | 2 | 2 |

| | | |
|-------------------|------------|-------------|
| Ophiodermatidae | 1 | 1 |
| Ophionereididae | 1 | 2 |
| Ostraciidae | 5 | 8 |
| Pachycephalidae | 6 | 26 |
| Palaemonidae | 1 | 1 |
| Paradoxosomatidae | 1 | 2 |
| Paralichthyidae | 1 | 1 |
| Parascylliidae | 1 | 1 |
| Parastacidae | 1 | 1 |
| Pardalotidae | 2 | 16 |
| Patellidae | 1 | 1 |
| Pectinidae | 2 | 5 |
| Pelecyanidae | 1 | 56 |
| Pentacerothidae | 1 | 1 |
| Peramelidae | 2 | 16 |
| Percichthyidae | 2 | 9 |
| Petroicidae | 4 | 4 |
| Phaethontidae | 1 | 2 |
| Phalacrocoracidae | 5 | 262 |
| Phalangeridae | 2 | 9 |
| Phasianidae | 2 | 4 |
| Pinguipedidae | 1 | 2 |
| Platycephalidae | 2 | 2 |
| Plesiopidae | 1 | 1 |
| Pleurobranchidae | 1 | 1 |
| Pleuronectidae | 1 | 1 |
| Podargidae | 2 | 2 |
| Podicipedidae | 2 | 63 |
| Polyclinidae | 1 | 1 |
| Polynoidae | 1 | 1 |
| Pomacentridae | 2 | 2 |
| Pontogeneiidae | 1 | 1 |
| Pristiophoridae | 2 | 2 |
| Procellariidae | 11 | 126 |
| Pseudocheiridae | 1 | 3822 |
| Psittacidae | 16 | 208 |
| Pygopodidae | 3 | 7 |
| Rachycentridae | 1 | 1 |
| Rallidae | 9 | 240 |
| Ranellidae | 3 | 3 |
| Raspailiidae | 1 | 6 |
| Recurvirostridae | 4 | 94 |
| Regalecidae | 1 | 3 |
| Rhinobatidae | 1 | 1 |
| Rissoidae | 2 | 2 |
| Scarabaeidae | 4 | 5 |
| Scincidae | 10 | 15 |
| Scolopacidae | 10 | 90 |
| Scolopendridae | 1 | 4 |
| Scombridae | 3 | 4 |
| Sepiadariidae | 2 | 2 |
| Sepiidae | 3 | 5 |
| Serranidae | 1 | 1 |
| Sillaginidae | 2 | 3 |
| Soleidae | 1 | 1 |
| Sparassidae | 1 | 1 |
| Sparidae | 1 | 1 |
| Spheniscidae | 1 | 1 |
| Sphingidae | 1 | 1 |
| Spondyliidae | 1 | 1 |
| Squatinae | 1 | 1 |
| Staphylinidae | 14 | 16 |
| Stichasteridae | 1 | 1 |
| Stichopodidae | 1 | 1 |
| Sylviidae | 3 | 16 |
| Syngnathidae | 7 | 19 |
| Tarsipedidae | 1 | 6 |
| Tellinidae | 1 | 3 |
| Tenebrionidae | 1 | 8 |
| Terebellidae | 3 | 3 |
| Terebridae | 1 | 1 |
| Tetraodontidae | 4 | 6 |
| Tetrarogidae | 1 | 1 |
| Tetragonidae | 2 | 3 |
| Theridiidae | 1 | 1 |
| Thomisidae | 1 | 1 |
| Threskiornithidae | 4 | 262 |
| Tortricidae | 1 | 2 |
| Triglidae | 3 | 8 |
| Tripterygiidae | 1 | 2 |
| Triviidae | 1 | 2 |
| Trochidae | 22 | 44 |
| Turbinidae | 7 | 19 |
| Turridae | 1 | 1 |
| Tytonidae | 1 | 1 |
| Uranoscopidae | 1 | 1 |
| Urodacidae | 1 | 5 |
| Veneridae | 5 | 10 |
| Verrellidae | 1 | 1 |
| Vermetidae | 1 | 1 |
| Vespertilionidae | 2 | 4 |
| Volutidae | 1 | 1 |
| Volutomitridae | 1 | 1 |
| Ziphiidae | 1 | 2 |
| Zosteropidae | 2 | 133 |
| Zygaenidae | 1 | 2 |
| TOTAL | 690 | 9526 |

| Name ID | Species Name | Naturalised | Conservation Code | Endemic To Query Area |
|----------------------|---|-------------|-------------------|-----------------------|
| Acanthizidae | | | | |
| 1. | <i>Acanthiza (Acanthiza) apicalis subsp. apicalis</i> | | | |
| 2. | 24260 <i>Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)</i> | | | |
| 3. | 24261 <i>Acanthiza chrysorrhoa (Yellow-rumped Thornbill)</i> | | | |
| 4. | 24262 <i>Acanthiza inornata (Western Thornbill)</i> | | | |
| 5. | 25530 <i>Gerygone fusca (Western Gerygone)</i> | | | |
| 6. | 25534 <i>Sericornis frontalis (White-browed Scrubwren)</i> | | | |
| 7. | 30948 <i>Smicronis brevirostris (Weebill)</i> | | | |
| Acariformes | | | | |
| 8. | <i>Acarina sp.</i> | | | |
| Accipitridae | | | | |
| 9. | <i>Accipiter (Leucospiza) fasciatus subsp. fasciatus</i> | | | |
| 10. | 24281 <i>Accipiter cirrocephalus subsp. cirrocephalus (Collared Sparrowhawk)</i> | | | |
| 11. | 25536 <i>Accipiter fasciatus (Brown Goshawk)</i> | | | |
| 12. | 24285 <i>Aquila audax (Wedge-tailed Eagle)</i> | | | |
| 13. | 24288 <i>Circus approximans (Swamp Harrier)</i> | | | |
| 14. | <i>Elanus axillaris</i> | | | |
| 15. | 24290 <i>Elanus caeruleus subsp. axillaris (Australian Black-shouldered Kite)</i> | | | |
| 16. | 24293 <i>Haliaeetus leucogaster (White-bellied Sea-Eagle)</i> | | IA | |
| 17. | 24295 <i>Haliastur sphenurus (Whistling Kite)</i> | | | |
| 18. | 25542 <i>Milvus migrans (Black Kite)</i> | | | |
| 19. | <i>Pandion cristatus</i> | | | |
| Actinopodidae | | | | |
| 20. | <i>Missulena granulosa</i> | | | |
| 21. | <i>Missulena occatoria</i> | | | |
| Adeonidae | | | | |
| 22. | <i>Adeonellopsis sp.</i> | | | |
| Aeshnidae | | | | |
| 23. | <i>Adversaeschna brevistyla</i> | | | |
| Amphiuridae | | | | |
| 24. | <i>Amphiura (Amphiura) stictacantha</i> | | | |
| Ampithoidae | | | | |
| 25. | <i>Cymadusa sp.</i> | | | |
| Anatidae | | | | |
| 26. | 24310 <i>Anas castanea (Chestnut Teal)</i> | | | |
| 27. | 24312 <i>Anas gracilis (Grey Teal)</i> | | | |
| 28. | 24313 <i>Anas platyrhynchos (Mallard)</i> | | | |
| 29. | 24315 <i>Anas rhynchotis (Australasian Shoveler)</i> | | | |
| 30. | <i>Anas sp.</i> | | | |
| 31. | 24316 <i>Anas superciliosa (Pacific Black Duck)</i> | | | |
| 32. | <i>Anser sp.</i> | | | |
| 33. | 24318 <i>Aythya australis (Hardhead)</i> | | | |
| 34. | 24319 <i>Biziura lobata (Musk Duck)</i> | | | |
| 35. | <i>Cairina moschata</i> | | | |
| 36. | 24321 <i>Chenonetta jubata (Australian Wood Duck, Wood Duck)</i> | | | |
| 37. | 24322 <i>Cygnus atratus (Black Swan)</i> | | | |
| 38. | 24326 <i>Malacorhynchus membranaceus (Pink-eared Duck)</i> | | | |
| 39. | 24328 <i>Oxyura australis (Blue-billed Duck)</i> | | P4 | |
| 40. | 24329 <i>Stictonetta naevosa (Freckled Duck)</i> | | | |
| 41. | 24331 <i>Tadorna tadornoides (Australian Shelduck, Mountain Duck)</i> | | | |
| Anhingidae | | | | |
| 42. | 25553 <i>Anhinga melanogaster (Darter)</i> | | | |
| 43. | <i>Anhinga novaehollandiae</i> | | | |
| Antedonidae | | | | |
| 44. | <i>Antedon incommoda</i> | | | |
| Antennariidae | | | | |
| 45. | <i>Phyllophryne scortea</i> | | | |
| 46. | <i>Rhycherus gloveri</i> | | | |
| Anthicidae | | | | |
| 47. | <i>Anthicus imitator</i> | | | Y |
| Apidae | | | | |



| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|------------------------|---|-------------|-------------------|------------------------------------|
| 48. | <i>Amegilla (asaropoda)</i> | | | |
| 49. | <i>Exoneura (Exoneura) bicolor</i> | | | |
| 50. | <i>Exoneura (Exoneura) pictifrons</i> | | | |
| 51. | <i>Exoneura (Exoneura) robusta</i> | | | |
| 52. | <i>Exoneura nigrescens</i> | | | |
| Aplodactylidae | | | | |
| 53. | <i>Aplodactylus westralis</i> | | | |
| Apogonidae | | | | |
| 54. | <i>Siphamia cephalotes</i> | | | |
| 55. | <i>Vincentia punctata</i> | | | |
| Araneidae | | | | |
| 56. | <i>Arkys walckenaeri</i> | | | |
| 57. | <i>Austracantha minax</i> | | | |
| 58. | <i>Cyclosa fuliginata</i> | | | |
| 59. | <i>Dolophones turrigera</i> | | | Y |
| 60. | <i>Eriophora biapicata</i> | | | |
| Arctiidae | | | | |
| 61. | <i>Arrhythmica semifusca</i> | | | |
| 62. | <i>Philenora elegans</i> | | | Y |
| 63. | <i>Scoliacma xuthopis</i> | | | Y |
| Ardeidae | | | | |
| 64. | 25558 <i>Ardea ibis (Cattle Egret)</i> | | IA | |
| 65. | 41324 <i>Ardea modesta (Eastern Great Egret)</i> | | IA | |
| 66. | 24341 <i>Ardea pacifica (White-necked Heron)</i> | | | |
| 67. | <i>Egretta garzetta</i> | | | |
| 68. | <i>Egretta novaehollandiae</i> | | | |
| 69. | 24347 <i>Ixobrychus flavicollis subsp. australis (Australian Black Bittern)</i> | | P1 | |
| 70. | 25564 <i>Nycticorax caledonicus (Rufous Night Heron)</i> | | | |
| Artamidae | | | | |
| 71. | 25566 <i>Artamus cinereus (Black-faced Woodswallow)</i> | | | |
| 72. | 24353 <i>Artamus cyanopterus (Dusky Woodswallow)</i> | | | |
| Asterinidae | | | | |
| 73. | <i>Meridiastra gunnii</i> | | | |
| Atherinidae | | | | |
| 74. | <i>Atherinosoma sp.</i> | | | |
| Atopomelidae | | | | |
| 75. | <i>Cytostethum tasmaniense</i> | | | Y |
| Balaenopteridae | | | | |
| 76. | 24046 <i>Balaenoptera borealis (Sei Whale)</i> | | T | |
| Blenniidae | | | | |
| 77. | <i>Parablennius postoculomaculatus</i> | | | |
| 78. | <i>Parablennius sp.</i> | | | |
| 79. | <i>Parablennius tasmanianus</i> | | | |
| Bovidae | | | | |
| 80. | 24251 <i>Bos taurus (European Cattle)</i> | Y | | |
| Bramidae | | | | |
| 81. | <i>Brama brama</i> | | | |
| Buccinidae | | | | |
| 82. | <i>Buccinulum bedhalli</i> | | | |
| 83. | <i>Cantharus sp.</i> | | | |
| 84. | <i>Cominella (Cominella) eburnea</i> | | | |
| 85. | <i>Cominella (Josepha) tasmanica</i> | | | |
| Bullidae | | | | |
| 86. | <i>Bulla quoyii</i> | | | |
| Buprestidae | | | | |
| 87. | <i>Castiarina eremita</i> | | | |
| 88. | <i>Castiarina subtrifasciata</i> | | | |
| 89. | <i>Melobasis vittata</i> | | | |
| Burramyidae | | | | |
| 90. | 24086 <i>Cercartetus concinnus (Western Pygmy-possum, Mundarda)</i> | | | |
| Cacatuidae | | | | |



| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|-------------------------|---|-------------|-------------------|------------------------------------|
| 91. | <i>Eolophus roseicapillus</i> | | | |
| Callionymidae | | | | |
| 92. | <i>Pseudocallirichthys goodladi</i> | | | |
| Calliostomatidae | | | | |
| 93. | <i>Astele (Astele) ciliare</i> | | | |
| Campephagidae | | | | |
| 94. | 25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike) | | | |
| Cancellariidae | | | | |
| 95. | <i>Cancellaria (nevia)</i> | | | |
| Canidae | | | | |
| 96. | 30883 <i>Canis lupus subsp. familiaris</i> (Dog) | Y | | |
| Caprimulgidae | | | | |
| 97. | 24368 <i>Eurostopodus argus</i> (Spotted Nightjar) | | | |
| Carabidae | | | | |
| 98. | <i>Clivina angustipes</i> | | | Y |
| 99. | <i>Clivina suturalis</i> | | | |
| 100. | <i>Euthenarus comes</i> | | | |
| 101. | <i>Haplener velox</i> | | | |
| 102. | <i>Scaraphites lucidus</i> | | | |
| Carangidae | | | | |
| 103. | <i>Gnathanodon speciosus</i> | | | |
| 104. | <i>Trachurus declivis</i> | | | |
| Carcharhinidae | | | | |
| 105. | <i>Carcharhinus brevipinna</i> | | | |
| Cardiidae | | | | |
| 106. | <i>Fulvia (Fulvia) tenuicostata</i> | | | |
| Carditidae | | | | |
| 107. | <i>Cardita aviculina</i> | | | |
| 108. | <i>Cardita sp.</i> | | | |
| Carybdeidae | | | | |
| 109. | <i>Carybdea xaymacana</i> | | | |
| Cerambycidae | | | | |
| 110. | <i>Ancita sp.</i> | | | |
| Cerithiidae | | | | |
| 111. | <i>Bittium sp.</i> | | | |
| 112. | <i>Cacozeliana granarium</i> | | | |
| Cetorhinidae | | | | |
| 113. | <i>Cetorhinus maximus</i> | | | |
| Chaetodontidae | | | | |
| 114. | <i>Chelmonops curiosus</i> | | | |
| Chamidae | | | | |
| 115. | <i>Chama pulchella</i> | | | |
| 116. | <i>Chama ruderalis</i> | | | |
| Charadriidae | | | | |
| 117. | <i>Charadrius (Charadrius) ruficapillus</i> | | | |
| 118. | 24377 <i>Charadrius ruficapillus</i> (Red-capped Plover) | | | |
| 119. | <i>Elseyornis melanops</i> | | | |
| 120. | 24379 <i>Erythronyctes alba</i> (Red-kneed Dotterel) | | | |
| 121. | 24382 <i>Pluvialis fulva</i> (Pacific Golden Plover) | | IA | |
| 122. | 25577 <i>Vanellus miles</i> (Masked Lapwing) | | | |
| 123. | 24386 <i>Vanellus tricolor</i> (Banded Lapwing) | | | |
| Cheilodactylidae | | | | |
| 124. | <i>Cheilodactylus gibbosus</i> | | | |
| 125. | <i>Dactylophora nigricans</i> | | | |
| Cheloniidae | | | | |
| 126. | 25335 <i>Caretta caretta</i> (Loggerhead Turtle) | | T | |
| Cheluidae | | | | |
| 127. | 43380 <i>Chelodina collyiei</i> (Oblong Turtle) | | | |
| Chromodorididae | | | | |



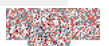
| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|-----------------------|--|-------------|-------------------|------------------------------------|
| 128. | <i>Ceratosoma amoenum</i> | | | |
| 129. | <i>Mexichromis macropus</i> | | | |
| Clavulariidae | | | | |
| 130. | <i>Carijoa sp.</i> | | | |
| Clinidae | | | | |
| 131. | <i>Cristiceps aurantiacus</i> | | | |
| 132. | <i>Cristiceps australis</i> | | | |
| 133. | <i>Heteroclinus sp.</i> | | | |
| 134. | <i>Ophiclinops sp.</i> | | | Y |
| Coccinellidae | | | | |
| 135. | <i>Coccinella transversalis</i> | | | |
| Coenagrionidae | | | | |
| 136. | <i>Austroagrion cyane</i> | | | |
| Colletidae | | | | |
| 137. | <i>Callomelitta sp.</i> | | | |
| 138. | <i>Hylaeus (Euprosopis) violaceus</i> | | | |
| 139. | <i>Hylaeus (Euprosopoides) obtusatus</i> | | | |
| 140. | <i>Hylaeus (Euprosopoides) ruficeps</i> | | | |
| 141. | <i>Hylaeus (Prosopistemon) perhumilis</i> | | | |
| 142. | <i>Hylaeus (Prosopistemon) subcoronatus</i> | | | Y |
| 143. | <i>Hylaeus (macrohylaesus)</i> | | | |
| 144. | <i>Hylaeus (prosopistemon)</i> | | | |
| 145. | <i>Hyleoides zonalis</i> | | | |
| 146. | <i>Leioproctus (Leioproctus) clarki</i> | | | |
| 147. | <i>Leioproctus (Leioproctus) plumosus</i> | | | |
| 148. | <i>Paracolletes sp.</i> | | | |
| Columbellidae | | | | |
| 149. | <i>Aesopus sp.</i> | | | |
| 150. | <i>Euplica sp.</i> | | | |
| 151. | <i>Mitrella (Dentimitrella) austrina</i> | | | |
| 152. | <i>Mitrella (Dentimitrella) lincolnensis</i> | | | |
| 153. | <i>Mitrella (Dentimitrella) semiconvexa</i> | | | |
| 154. | <i>Mitrella (Zemitrella) menkeana</i> | | | |
| Columbidae | | | | |
| 155. | 24399 <i>Columba livia (Domestic Pigeon)</i> | Y | | |
| 156. | 24407 <i>Ocyphaps lophotes (Crested Pigeon)</i> | | | |
| 157. | <i>Phaps (Phaps) elegans subsp. occidentalis</i> | | | |
| 158. | 24409 <i>Phaps chalcoptera (Common Bronzewing)</i> | | | |
| 159. | <i>Streptopelia (Spilopelia) senegalensis</i> | | | |
| 160. | 25590 <i>Streptopelia senegalensis (Laughing Turtle-Dove)</i> | Y | | |
| Congridae | | | | |
| 161. | <i>Gnathophis longicaudatus</i> | | | |
| Conidae | | | | |
| 162. | <i>Conus anemone</i> | | | |
| 163. | <i>Conus rutilus</i> | | | |
| Corvidae | | | | |
| 164. | 24416 <i>Corvus bennetti (Little Crow)</i> | | | |
| 165. | 25592 <i>Corvus coronoides (Australian Raven)</i> | | | |
| 166. | <i>Corvus coronoides subsp. coronoides</i> | | | |
| 167. | 24417 <i>Corvus coronoides subsp. perplexus (Australian Raven)</i> | | | |
| 168. | <i>Corvus sp.</i> | | | |
| Costellariidae | | | | |
| 169. | <i>Vexillum (Pusia) hansena</i> | | | |
| 170. | <i>Vexillum (Pusia) marrowi</i> | | | |
| Cracticidae | | | | |
| 171. | 24420 <i>Cracticus nigrogularis (Pied Butcherbird)</i> | | | |
| 172. | 25595 <i>Cracticus tibicen (Australian Magpie)</i> | | | |
| 173. | 24422 <i>Cracticus tibicen subsp. dorsalis (White-backed Magpie)</i> | | | |
| 174. | 25596 <i>Cracticus torquatus (Grey Butcherbird)</i> | | | |
| 175. | <i>Strepera (Neostrepera) versicolor</i> | | | |
| Crambidae | | | | |
| 176. | <i>Metallarcha sp.</i> | | | Y |
| Cuculidae | | | | |



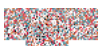
| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|------------------------|---|-------------|-------------------|------------------------------------|
| 177. | 24432 <i>Chrysococcyx lucidus</i> subsp. <i>plagosus</i> (Shining Bronze Cuckoo) | | | |
| Curculionidae | | | | |
| 178. | <i>Catasarcus coruscus</i> | | | |
| 179. | <i>Catasarcus hopei</i> | | | |
| 180. | <i>Catasarcus spinipennis</i> | | | |
| 181. | <i>Sitona discoideus</i> | | | |
| Cynoglossidae | | | | |
| 182. | <i>Paraplagusia</i> sp. | | | |
| Cypraeidae | | | | |
| 183. | <i>Monetaria</i> sp. | | | |
| 184. | <i>Notocypraea comptoni</i> | | | |
| 185. | <i>Notocypraea declivis</i> | | | |
| 186. | <i>Notocypraea piperita</i> | | | |
| 187. | <i>Notocypraea pulicaria</i> | | | |
| 188. | <i>Zoila friendii</i> | | | |
| 189. | <i>Zoila friendii</i> subsp. <i>friendii</i> | | | |
| 190. | <i>Zoila venusta</i> | | | |
| Cyprinidae | | | | |
| 191. | <i>Carassius auratus</i> | | | |
| Cystiscidae | | | | |
| 192. | <i>Gibberula</i> sp. | | | |
| Dasyuridae | | | | |
| 193. | 24092 <i>Dasyurus geoffroii</i> (Chuditch, Western Quoll) | | T | |
| 194. | 24099 <i>Phascogale tapoatafa</i> subsp. <i>tapoatafa</i> (Southern Brush-tailed Phascogale, Wambenger) | | T | |
| 195. | 24111 <i>Sminthopsis gilberti</i> (Gilbert's Dunnart) | | | |
| Delphinidae | | | | |
| 196. | 24052 <i>Delphinus delphis</i> (Common Dolphin) | | | |
| 197. | 24055 <i>Globicephala melas</i> (Long-finned Pilot Whale) | | | |
| 198. | 24063 <i>Pseudorca crassidens</i> (False Killer Whale) | | | |
| 199. | <i>Stenella coeruleoalba</i> | | | |
| 200. | 24069 <i>Tursiops truncatus</i> (Bottlenose Dolphin) | | | |
| Dendrodorididae | | | | |
| 201. | <i>Doriopsilla cameola</i> | | | Y |
| Dermochelyidae | | | | |
| 202. | 25346 <i>Dermochelys coriacea</i> (Leatherback Turtle) | | T | |
| Dicaeidae | | | | |
| 203. | 25607 <i>Dicaeum hirundinaceum</i> (Mistletoebird) | | | |
| Dicruridae | | | | |
| 204. | 24443 <i>Grallina cyanoleuca</i> (Magpie-lark) | | | |
| 205. | 25610 <i>Myiagra inquieta</i> (Restless Flycatcher) | | | |
| 206. | <i>Rhipidura (Rhipidura) albiscapa</i> subsp. <i>preissi</i> | | | |
| 207. | <i>Rhipidura (Rhipidura) fuliginosa</i> | | | |
| 208. | 24452 <i>Rhipidura fuliginosa</i> subsp. <i>preissi</i> (Grey Fantail) | | | |
| 209. | 25614 <i>Rhipidura leucophrys</i> (Willie Wagtail) | | | |
| Diodontidae | | | | |
| 210. | <i>Diodon nichthemerus</i> | | | |
| Diomedidae | | | | |
| 211. | 25619 <i>Diomedea cauta</i> (Shy Albatross) | | T | |
| 212. | 24468 <i>Diomedea chrysostoma</i> (Grey-headed Albatross) | | T | |
| 213. | 25618 <i>Diomedea exulans</i> (Wandering Albatross) | | T | |
| 214. | 24462 <i>Phoebastria fusca</i> (Sooty Albatross) | | T | |
| 215. | 24463 <i>Phoebastria palpebrata</i> (Light-mantled Sooty Albatross) | | P4 | |
| Dolichopodidae | | | | |
| 216. | <i>Parentia</i> sp. | | | |
| Donacidae | | | | |
| 217. | <i>Donax (Latona) columbella</i> | | | |
| Dytiscidae | | | | |
| 218. | <i>Rhantus suturalis</i> | | | |
| Echeneidae | | | | |
| 219. | <i>Echeneis naucrates</i> | | | |



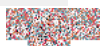
| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|-----------------------|---|-------------|-------------------|------------------------------------|
| Elapidae | | | | |
| 220. | 25251 <i>Echiopsis curta</i> (Bardick) | | | |
| 221. | 25250 <i>Elapognathus coronatus</i> (Crowned Snake) | | | |
| 222. | 25290 <i>Elapognathus minor</i> (Short-nosed Snake) | | P2 | |
| 223. | 25366 <i>Hydrophis elegans</i> (Elegant Seasnake, Bar-bellied Seasnake) | | | |
| 224. | 42410 <i>Hydrophis ornatus</i> | | | |
| 225. | 43384 <i>Hydrophis platurus</i> (Yellow-bellied Seasnake) | | | |
| 226. | 25252 <i>Notechis scutatus</i> (Tiger Snake) | | | |
| 227. | 25255 <i>Parasuta nigriceps</i> | | | |
| 228. | 25259 <i>Pseudonaja affinis</i> subsp. <i>affinis</i> (Dugite) | | | |
| Ellobiidae | | | | |
| 229. | <i>Allochroa layardi</i> | | | |
| Elopidae | | | | |
| 230. | <i>Elops hawaiiensis</i> | | | |
| Epitoniidae | | | | |
| 231. | <i>Opalia</i> (<i>Opalia</i>) <i>australis</i> | | | |
| Falconidae | | | | |
| 232. | 25622 <i>Falco cenchroides</i> (Australian Kestrel) | | | |
| 233. | 25623 <i>Falco longipennis</i> (Australian Hobby) | | | |
| 234. | 24474 <i>Falco longipennis</i> subsp. <i>longipennis</i> (Australian Hobby) | | | |
| 235. | 25624 <i>Falco peregrinus</i> (Peregrine Falcon) | | S | |
| Fasciariidae | | | | |
| 236. | <i>Fusinus</i> (<i>Fusinus</i>) <i>australis</i> | | | |
| 237. | <i>Fusinus</i> (<i>Fusinus</i>) <i>tessellatus</i> | | | |
| Felidae | | | | |
| 238. | 24041 <i>Felis catus</i> (Cat) | Y | | |
| Fergusoninidae | | | | |
| 239. | <i>Fergusonina</i> sp. | | | |
| Fissurellidae | | | | |
| 240. | <i>Amblychilepas nigrita</i> | | | |
| 241. | <i>Emarginula</i> (<i>Emarginula</i>) <i>candida</i> | | | |
| 242. | <i>Scutus</i> (<i>Scutus</i>) <i>antipodes</i> | | | |
| 243. | <i>Tugali cicatricosa</i> | | | |
| Formicidae | | | | |
| 244. | <i>Amblyopone clarki</i> | | | |
| 245. | <i>Amblyopone</i> sp. | | | |
| 246. | <i>Camponotus darlingtoni</i> | | | Y |
| 247. | <i>Iridomyrmex conifer</i> | | | |
| 248. | <i>Iridomyrmex hartmeyeri</i> | | | |
| 249. | <i>Iridomyrmex turbineus</i> | | | |
| 250. | <i>Sphinctomyrmex occidentalis</i> | | | |
| Galaxiidae | | | | |
| 251. | 34028 <i>Galaxias occidentalis</i> (Western Minnow) | | | |
| Galeommatidae | | | | |
| 252. | <i>Myllita</i> (<i>Myllita</i>) <i>deshayesi</i> | | | |
| Garypidae | | | | |
| 253. | <i>Synsphyronus magnus</i> | | | |
| Gekkonidae | | | | |
| 254. | 24980 <i>Christinus marmoratus</i> (Marbled Gecko) | | | |
| Geometridae | | | | |
| 255. | <i>Dichromodes galactica</i> | | | Y |
| 256. | <i>Phallaria</i> sp. | | | Y |
| 257. | <i>Scopula optivata</i> | | | |
| 258. | <i>Syneora nigrilinea</i> | | | Y |
| 259. | <i>Taxeotis exaereta</i> | | | Y |
| Gerreidae | | | | |
| 260. | <i>Parequula melbournensis</i> | | | |
| Glacidorbidae | | | | |
| 261. | 34115 <i>Helicarion castanea</i> (Albany land snail) | | X | |
| Glycymerididae | | | | |
| 262. | <i>Glycymeris</i> (<i>Glycymeris</i>) <i>radians</i> | | | |
| 263. | <i>Tucetona sordida</i> | | | |



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|--------------------------|---|-------------|-------------------|------------------------------------|
| Gobiidae | | | | |
| 264. | <i>Favonigobius</i> sp. | | | |
| 265. | <i>Pseudogobius olorum</i> | | | |
| Gonorynchidae | | | | |
| 266. | <i>Gonorynchus greyi</i> | | | |
| Gorgonocephalidae | | | | |
| 267. | <i>Conocladus australis</i> | | | |
| Haematopodidae | | | | |
| 268. | 24487 <i>Haematopus longirostris</i> (Pied Oystercatcher) | | | |
| Halcyonidae | | | | |
| 269. | 30901 <i>Dacelo novaeguineae</i> (Laughing Kookaburra) | Y | | |
| 270. | 30902 <i>Dacelo novaeguineae</i> subsp. <i>novaeguineae</i> (Laughing Kookaburra) | Y | | |
| 271. | <i>Todiramphus (Todiramphus) sanctus</i> subsp. <i>sanctus</i> | | | |
| 272. | 25549 <i>Todiramphus sanctus</i> (Sacred Kingfisher) | | | |
| Halictidae | | | | |
| 273. | <i>Lasioglossum (Chilalictus) cognatum</i> | | | |
| 274. | <i>Lasioglossum (Chilalictus) lanarium</i> | | | |
| 275. | <i>Lipotriches (Austronomia) australica</i> | | | |
| 276. | <i>Lipotriches (austronomia)</i> | | | |
| Haliotidae | | | | |
| 277. | <i>Haliotis roei</i> | | | |
| 278. | <i>Haliotis scalaris</i> subsp. <i>scalaris</i> | | | |
| 279. | <i>Haliotis</i> sp. | | | |
| 280. | <i>Haliotis varia</i> | | | |
| Helicidae | | | | |
| 281. | <i>Theba pisana</i> | | | |
| Hemiramphidae | | | | |
| 282. | <i>Hyporhamphus melanochir</i> | | | |
| Hersiliidae | | | | |
| 283. | <i>Tamopsis perthensis</i> | | | |
| Hesperidae | | | | |
| 284. | <i>Hesperilla chrysotricha</i> subsp. <i>chrysotricha</i> | | | |
| 285. | <i>Hesperilla donnysa</i> subsp. <i>albina</i> | | | |
| 286. | <i>Taractrocera papyria</i> subsp. <i>agraulia</i> | | | |
| Heterodontidae | | | | |
| 287. | ?? | | | |
| Hipponicidae | | | | |
| 288. | <i>Antisabia foliacea</i> | | | |
| 289. | <i>Hipponix</i> sp. | | | |
| 290. | <i>Sabia australis</i> | | | |
| Hirundinidae | | | | |
| 291. | <i>Cheramoeca leucosterna</i> | | | |
| 292. | <i>Hirundo (Hirundo) neoxena</i> subsp. <i>carteri</i> | | | |
| 293. | 24491 <i>Hirundo neoxena</i> (Welcome Swallow) | | | |
| Hydrophilidae | | | | |
| 294. | <i>Limnoxenus zealandicus</i> | | | |
| 295. | <i>Paracymus pygmaeus</i> | | | |
| Hygromiidae | | | | |
| 296. | <i>Cochlicella acuta</i> | | | |
| Hylidae | | | | |
| 297. | 25388 <i>Litoria moorei</i> (Motorbike Frog) | | | |
| Hymenosomatidae | | | | |
| 298. | <i>Haliscarcinus ovatus</i> | | | |
| Hypnidae | | | | |
| 299. | <i>Hypnos monopterygium</i> | | | |
| Hyridae | | | | |
| 300. | 34113 <i>Westralunio carteri</i> (Carter's Freshwater Mussel) | | T | |
| Istiophoridae | | | | |
| 301. | <i>Tetrapturus audax</i> | | | Y |



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|------------------------|---|-------------|-------------------|------------------------------------|
| Kalliapseudidae | | | | |
| 302. | <i>Kalliapseudes struthi</i> | | | |
| Labridae | | | | |
| 303. | <i>Austrolabrus maculatus</i> | | | |
| 304. | <i>Dotalabrus aurantiacus</i> | | | |
| 305. | <i>Haletta semifasciata</i> | | | |
| 306. | <i>Halichoeres brownfieldi</i> | | | |
| 307. | <i>Neoodax</i> sp. | | | |
| 308. | <i>Odax cyanomelas</i> | | | |
| 309. | <i>Pseudolabrus</i> sp. | | | |
| 310. | <i>Siphonognathus argyrophanes</i> | | | |
| 311. | <i>Siphonognathus radiatus</i> | | | |
| Lamponidae | | | | |
| 312. | <i>Lampona cylindrata</i> | | | |
| Laridae | | | | |
| 313. | 24505 <i>Anous stolidus</i> subsp. <i>pileatus</i> (Common Noddy) | | IA | |
| 314. | 24506 <i>Anous tenuirostris</i> subsp. <i>melanops</i> (Australian Lesser Noddy) | | T | |
| 315. | <i>Chroicocephalus novaehollandiae</i> | | | |
| 316. | <i>Hydroprogne caspia</i> | | | |
| 317. | 25638 <i>Larus pacificus</i> (Pacific Gull) | | | |
| 318. | <i>Stercorarius antarcticus</i> | | | |
| 319. | 24520 <i>Sterna anaethetus</i> subsp. <i>anaethetus</i> (Bridled Tern) | | | |
| 320. | <i>Thalasseus bergii</i> | | | |
| Leporidae | | | | |
| 321. | 24085 <i>Oryctolagus cuniculus</i> (Rabbit) | Y | | |
| Lestidae | | | | |
| 322. | <i>Austrolestes analis</i> | | | |
| Limidae | | | | |
| 323. | <i>Lima (Lima) nimbifer</i> | | | |
| Limnodynastidae | | | | |
| 324. | 25415 <i>Limnodynastes dorsalis</i> (Western Banjo Frog) | | | |
| Limnoriidae | | | | |
| 325. | <i>Limnoria agrostisa</i> | | | |
| 326. | <i>Lynseia annae</i> | | | |
| Lottiidae | | | | |
| 327. | <i>Lottia onychitis</i> | | | |
| 328. | <i>Patelloida alticostata</i> | | | |
| 329. | <i>Patelloida insignis</i> | | | |
| Lucinidae | | | | |
| 330. | <i>Anodontia (Cavatidens) perplexa</i> | | | |
| 331. | <i>Callucina (Pseudolucinisca) lacteola</i> | | | |
| 332. | <i>Wallucina assimilis</i> | | | |
| Lumbrineridae | | | | |
| 333. | <i>Lumbrineris</i> sp. | | | |
| Lycosidae | | | | |
| 334. | <i>Tasmanicosa leuckartii</i> | | | |
| 335. | <i>Tetrallycosa oraria</i> | | | |
| 336. | <i>Venator immansueta</i> | | | |
| 337. | <i>Venatrix pullastra</i> | | | |
| Macropodidae | | | | |
| 338. | 24132 <i>Macropus fuliginosus</i> (Western Grey Kangaroo) | | | |
| 339. | <i>Macropus</i> sp. | | | |
| Mactridae | | | | |
| 340. | <i>Lutraria</i> sp. | | | |
| Maeridae | | | | |
| 341. | <i>Elasmopus rapax</i> | | | |
| Maluridae | | | | |
| 342. | <i>Malurus (Malurus) splendens</i> | | | |
| 343. | 25654 <i>Malurus splendens</i> (Splendid Fairy-wren) | | | |
| 344. | 24554 <i>Stipiturus malachurus</i> subsp. <i>westernensis</i> (Southern Emu-wren) | | | |
| Marginellidae | | | | |
| 345. | <i>Austroginella muscaria</i> | | | |



| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|--------------------------|--|-------------|-------------------|------------------------------------|
| | | | | Y |
| 346. | <i>Serrata</i> sp. | | | |
| 347. | <i>Volvarina occidua</i> | | | |
| Megachilidae | | | | |
| 348. | <i>Coelioxys (Coelioxys) froggatti</i> | | | |
| 349. | <i>Megachile (Chalicodomoides) aethiops</i> | | | |
| 350. | <i>Megachile (Eutricharaea) chrysopyga</i> | | | |
| 351. | <i>Megachile (Hackeriapis) tosticauda</i> | | | |
| 352. | <i>Megachile apicata</i> | | | |
| 353. | <i>Megachile aurifrons</i> | | | |
| 354. | <i>Megachile erythrogyga</i> | | | |
| 355. | <i>Megachile</i> sp. | | | |
| Megapodagrionidae | | | | |
| 356. | <i>Archiargiolestes parvulus</i> | | | |
| 357. | <i>Miniargiolestes minimus</i> | | | |
| Meliphagidae | | | | |
| 358. | 24560 <i>Acanthorhynchus superciliosus (Western Spinebill)</i> | | | |
| 359. | <i>Anthochaera (Anellobia) chrysoptera</i> | | | |
| 360. | <i>Anthochaera (Anthochaera) carunculata</i> | | | |
| 361. | <i>Anthochaera (Anthochaera) carunculata subsp. woodwardi</i> | | | |
| 362. | 24561 <i>Anthochaera carunculata (Red Wattlebird)</i> | | | |
| 363. | 24562 <i>Anthochaera lunulata (Western Little Wattlebird)</i> | | | |
| 364. | 24567 <i>Epthianura albifrons (White-fronted Chat)</i> | | | |
| 365. | 42314 <i>Gavicalis virescens (Singing Honeyeater)</i> | | | |
| 366. | 25661 <i>Lichmera indistincta (Brown Honeyeater)</i> | | | |
| 367. | <i>Melithreptus (Melithreptus) lunatus subsp. chloropsis</i> | | | |
| 368. | 25663 <i>Melithreptus brevirostris (Brown-headed Honeyeater)</i> | | | |
| 369. | 24596 <i>Phylidonyris novaehollandiae (New Holland Honeyeater)</i> | | | |
| Melitidae | | | | |
| 370. | <i>Dulichia australis</i> | | | |
| Meropidae | | | | |
| 371. | <i>Merops (Merops) ornatus</i> | | | |
| 372. | 24598 <i>Merops ornatus (Rainbow Bee-eater)</i> | | IA | |
| Mesodesmatidae | | | | |
| 373. | <i>Paphies (Amesodesma) elongata</i> | | | |
| Microcanthidae | | | | |
| 374. | <i>Tilodon sexfasciatus</i> | | | |
| Miturgidae | | | | |
| 375. | <i>Mituliodon tarantulinus</i> | | | |
| Molidae | | | | |
| 376. | <i>Ranzania laevis</i> | | | |
| Monacanthidae | | | | |
| 377. | <i>Acanthaluteres brownii</i> | | | |
| 378. | <i>Acanthaluteres spilomelanurus</i> | | | |
| 379. | <i>Acanthaluteres vittiger</i> | | | |
| 380. | <i>Brachaluteres jacksonianus</i> | | | |
| 381. | <i>Chaetodermis penicilligera</i> | | | |
| 382. | <i>Meuschenia freycineti</i> | | | |
| 383. | <i>Meuschenia hippocrepis</i> | | | |
| 384. | <i>Nelussetta ayraudi</i> | | | |
| 385. | <i>Scobinichthys granulatus</i> | | | |
| Monocentridae | | | | |
| 386. | <i>Cleidopus gloriamaris</i> | | | |
| Moridae | | | | |
| 387. | <i>Lotella rhacinus</i> | | | |
| Muricidae | | | | |
| 388. | <i>Dicathais orbita</i> | | | |
| 389. | <i>Lepsiella (bedeva)</i> | | | |
| 390. | <i>Phycothais reticulata</i> | | | |
| Muridae | | | | |
| 391. | 24215 <i>Hydromys chrysogaster (Water-rat)</i> | | P4 | |
| 392. | 24223 <i>Mus musculus (House Mouse)</i> | Y | | |
| 393. | 24245 <i>Rattus rattus (Black Rat)</i> | Y | | |



| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|-----------------------|---|-------------|-------------------|------------------------------------|
| Myobatrachidae | | | | |
| 394. | 25400 <i>Crinia insignifera</i> (Squelching Froglet) | | | |
| 395. | 25433 <i>Pseudophryne guentheri</i> (Crawling Toadlet) | | | |
| Myrmeleontidae | | | | |
| 396. | <i>Heoclisia fundata</i> | | | |
| Mytilidae | | | | |
| 397. | <i>Brachidontes erosus</i> | | | |
| Nannopercidae | | | | |
| 398. | 34033 <i>Nannatherina balstoni</i> (Balston's Pygmy Perch) | | T | |
| Nassariidae | | | | |
| 399. | <i>Nassarius (Niotha) nigellus</i> | | | |
| 400. | <i>Nassarius (Zeuxis) pyrrhus</i> | | | |
| Naticidae | | | | |
| 401. | <i>Naticarius colliei</i> | | | |
| 402. | <i>Polinices (Conuber) conicus</i> | | | |
| 403. | <i>Tanea sagittata</i> | | | |
| Nemesiidae | | | | |
| 404. | <i>Aname mainae</i> | | | |
| Neobalaenidae | | | | |
| 405. | 24072 <i>Caperea marginata</i> (Pygmy Right Whale) | | | |
| Neosebastidae | | | | |
| 406. | <i>Maxillcosta scabriceps</i> | | | |
| Neosittidae | | | | |
| 407. | <i>Daphoenositta (Neositta) chrysoptera</i> subsp. <i>pileata</i> | | | |
| 408. | 25673 <i>Daphoenositta chrysoptera</i> (Varied Sittella) | | | |
| Neotylenchidae | | | | |
| 409. | <i>Fergusobia</i> sp. | | | |
| Nephiidae | | | | |
| 410. | <i>Nephila edulis</i> | | | |
| Nereididae | | | | |
| 411. | <i>Nereis</i> sp. | | | |
| Neritidae | | | | |
| 412. | <i>Nerita (Melanerita) atramentosa</i> | | | |
| Noctuidae | | | | |
| 413. | <i>Australothis rubescens</i> | | | |
| 414. | <i>Corgatha pleuroplaca</i> | | | Y |
| 415. | <i>Hecatesia thyrion</i> | | | |
| 416. | <i>Proteuxoa confinis</i> | | | Y |
| 417. | <i>Proteuxoa flexirena</i> | | | |
| 418. | <i>Proteuxoa sanguinipuncta</i> | | | |
| 419. | <i>Sophta</i> sp. | | | Y |
| Notodontidae | | | | |
| 420. | <i>Antimima cryptica</i> | | | |
| 421. | <i>Epicoma melanosticta</i> | | | |
| Nymphalidae | | | | |
| 422. | <i>Geitoneura minyas</i> | | | |
| Octopodidae | | | | |
| 423. | <i>Hapalochlaena</i> sp. | | | |
| 424. | <i>Octopus tetricus</i> | | | |
| Olivellidae | | | | |
| 425. | <i>Cupidoliva nympha</i> | | | |
| Olividae | | | | |
| 426. | <i>Amalda</i> sp. | | | |
| 427. | <i>Oliva australis</i> | | | |
| Ophichthidae | | | | |
| 428. | <i>Cirrhimuraena calamus</i> | | | |
| 429. | <i>Ophichthus melanochir</i> | | | |
| 430. | <i>Ophisurus serpens</i> | | | |
| Ophidiidae | | | | |



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|--------------------------|---|-------------|-------------------|------------------------------------|
| 431. | <i>Genypterus blacodes</i> | | | |
| 432. | <i>Genypterus tigerinus</i> | | | |
| Ophiocomidae | | | | |
| 433. | <i>Clarkcoma canaliculata</i> | | | |
| 434. | <i>Clarkcoma pulchra</i> | | | |
| Ophiidermatidae | | | | |
| 435. | <i>Ophiopsammus assimilis</i> | | | |
| Ophionereididae | | | | |
| 436. | <i>Ophionereis schayeri</i> | | | |
| Ostraciidae | | | | |
| 437. | <i>Anoplocapros lenticularis</i> | | | |
| 438. | <i>Anoplocapros robustus</i> | | | |
| 439. | <i>Aracana aurita</i> | | | |
| 440. | <i>Caprichthys gymnura</i> | | | |
| 441. | <i>Lactoria cornuta</i> | | | |
| Pachycephalidae | | | | |
| 442. | 25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush) | | | |
| 443. | <i>Pachycephala</i> (<i>Pachycephala</i>) <i>pectoralis</i> | | | |
| 444. | 25679 <i>Pachycephala pectoralis</i> (Golden Whistler) | | | |
| 445. | 24623 <i>Pachycephala pectoralis</i> subsp. <i>fuliginosa</i> (Golden Whistler) | | | |
| 446. | 25680 <i>Pachycephala rufiventris</i> (Rufous Whistler) | | | |
| 447. | 24624 <i>Pachycephala rufiventris</i> subsp. <i>rufiventris</i> (Rufous Whistler) | | | |
| Palaemonidae | | | | |
| 448. | <i>Palaemonella rotumana</i> | | | |
| Paradoxosomatidae | | | | |
| 449. | <i>Oxidus gracilis</i> | | | |
| Paralichthyidae | | | | |
| 450. | <i>Pseudorhombus jenynsii</i> | | | |
| Parascylliidae | | | | |
| 451. | <i>Parascyllium variolatum</i> | | | |
| Parastacidae | | | | |
| 452. | <i>Cherax quinquecarinatus</i> | | | |
| Pardalotidae | | | | |
| 453. | 25681 <i>Pardalotus punctatus</i> (Spotted Pardalote) | | | |
| 454. | 25682 <i>Pardalotus striatus</i> (Striated Pardalote) | | | |
| Patellidae | | | | |
| 455. | <i>Patella</i> (<i>scutellastra</i>) | | | |
| Pectinidae | | | | |
| 456. | <i>Mimachlamys asperrima</i> | | | |
| 457. | <i>Semipallium aktinos</i> | | | |
| Pelecanidae | | | | |
| 458. | 24648 <i>Pelecanus conspicillatus</i> (Australian Pelican) | | | |
| Pentacerotidae | | | | |
| 459. | <i>Paristiopterus</i> sp. | | | Y |
| Peramelidae | | | | |
| 460. | 25478 <i>Isodon obesulus</i> (Southern Brown Bandicoot) | | P5 | |
| 461. | 24153 <i>Isodon obesulus</i> subsp. <i>fusciventer</i> (Quenda, Southern Brown Bandicoot) | | P5 | |
| Percichthyidae | | | | |
| 462. | <i>Bostockia porosa</i> | | | |
| 463. | <i>Nannoperca vittata</i> | | | |
| Petroicidae | | | | |
| 464. | <i>Eopsaltria</i> (<i>Eopsaltria</i>) <i>griseogularis</i> subsp. <i>griseogularis</i> | | | |
| 465. | 24652 <i>Eopsaltria georgiana</i> (White-breasted Robin) | | | |
| 466. | <i>Melanodryas</i> (<i>Melanodryas</i>) <i>cucullata</i> | | | |
| 467. | 24660 <i>Petroica multicolor</i> subsp. <i>campbelli</i> (Scarlet Robin) | | | |
| Phaethontidae | | | | |
| 468. | 24663 <i>Phaethon rubricauda</i> (Red-tailed Tropicbird) | | P4 | |
| Phalacrocoracidae | | | | |
| 469. | <i>Microcarbo melanoleucos</i> | | | |
| 470. | <i>Phalacrocorax</i> (<i>Phalacrocorax</i>) <i>carbo</i> subsp. <i>novaeollandiae</i> | | | |



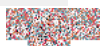
| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|-------------------------|---|-------------|-------------------|------------------------------------|
| 471. | 25697 <i>Phalacrocorax carbo</i> (Great Cormorant) | | | |
| 472. | 24667 <i>Phalacrocorax sulcirostris</i> (Little Black Cormorant) | | | |
| 473. | 25699 <i>Phalacrocorax varius</i> (Pied Cormorant) | | | |
| Phalangeridae | | | | |
| 474. | 25521 <i>Trichosurus vulpecula</i> (Common Brushtail Possum) | | | |
| 475. | 24158 <i>Trichosurus vulpecula</i> subsp. <i>vulpecula</i> (Common Brushtail Possum) | | | |
| Phasianidae | | | | |
| 476. | <i>Coturnix</i> (<i>Coturnix</i>) <i>pectoralis</i> | | | |
| 477. | 24671 <i>Coturnix pectoralis</i> (Stubble Quail) | | | |
| Pinguipedidae | | | | |
| 478. | <i>Parapercis haackei</i> | | | |
| Platycephalidae | | | | |
| 479. | <i>Leviprora inops</i> | | | |
| 480. | <i>Platycephalus speculator</i> | | | |
| Plesiopidae | | | | |
| 481. | <i>Trachinops noarlungae</i> | | | |
| Pleurobranchidae | | | | |
| 482. | <i>Pleurobranchus</i> sp. | | | |
| Pleuronectidae | | | | |
| 483. | <i>Ammotretis elongatus</i> | | | |
| Podargidae | | | | |
| 484. | 25703 <i>Podargus strigoides</i> (Tawny Frogmouth) | | | |
| 485. | 24679 <i>Podargus strigoides</i> subsp. <i>brachypterus</i> (Tawny Frogmouth) | | | |
| Podicipedidae | | | | |
| 486. | 24681 <i>Poliiocephalus poliocephalus</i> (Hoary-headed Grebe) | | | |
| 487. | 25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe) | | | |
| Polyclinidae | | | | |
| 488. | <i>Aplidium clivosum</i> | | | |
| Polynoidae | | | | |
| 489. | <i>Lepidonotus bowerbankii</i> | | | |
| Pomacentridae | | | | |
| 490. | <i>Parma mccullochi</i> | | | |
| 491. | <i>Parma victoriae</i> | | | |
| Pontogeneiidae | | | | |
| 492. | <i>Paramoera</i> sp. | | | |
| Pristiophoridae | | | | |
| 493. | <i>Pristiophorus cirratus</i> | | | |
| 494. | <i>Pristiophorus nudipinnis</i> | | | |
| Procellariidae | | | | |
| 495. | 24687 <i>Daption capense</i> (Cape Petrel) | | | |
| 496. | 24690 <i>Macronectes giganteus</i> (Southern Giant Petrel) | | | |
| 497. | 24692 <i>Pachyptila belcheri</i> (Slender-billed Prion) | | | |
| 498. | 24693 <i>Pachyptila desolata</i> (Antarctic Prion) | | | |
| 499. | 25707 <i>Pachyptila salvini</i> (Salvin's Prion) | | | |
| 500. | 24695 <i>Pachyptila salvini</i> subsp. <i>macgillivrayi</i> (Salvin's Prion) | | | Y |
| 501. | 24696 <i>Pachyptila turtur</i> (Fairy Prion) | | | |
| 502. | 24697 <i>Pachyptila vittata</i> (Broad-billed Prion) | | | |
| 503. | 24703 <i>Pterodroma lessonii</i> (White-headed Petrel) | | | |
| 504. | 24706 <i>Pterodroma macroptera</i> subsp. <i>gouldi</i> (Great-winged Petrel) | | | |
| 505. | <i>Pterodroma macroptera</i> subsp. <i>macroptera</i> | | | |
| Pseudocheiridae | | | | |
| 506. | 24166 <i>Pseudocheirus occidentalis</i> (Western Ringtail Possum) | | T | |
| Psittacidae | | | | |
| 507. | <i>Barnardius zonarius</i> | | | |
| 508. | 25714 <i>Cacatua pastinator</i> (Western Long-billed Corella) | | | |
| 509. | 24724 <i>Cacatua pastinator</i> subsp. <i>pastinator</i> (Muir's Corella, Muir's Corella (Western Corella SW WA)) | | S | |
| 510. | 25715 <i>Cacatua roseicapilla</i> (Galah) | | | |
| 511. | 25716 <i>Cacatua sanguinea</i> (Little Corella) | | | |
| 512. | <i>Cacatua</i> sp. | | | |
| 513. | 24731 <i>Calyptorhynchus banksii</i> subsp. <i>naso</i> (Forest Red-tailed Black-Cockatoo) | | T | |
| 514. | 24733 <i>Calyptorhynchus baudinii</i> (Baudin's Cockatoo (long-billed black-cockatoo), Baudin's | | | |



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|-------------------------|---|-------------|-------------------|------------------------------------|
| | Cockatoo) | | T | |
| 515. | 24734 <i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo (short-billed black-cockatoo), Carnaby's Cockatoo) | | T | |
| 516. | <i>Calyptorhynchus</i> sp. | | | |
| 517. | 24738 <i>Neophema elegans</i> (Elegant Parrot) | | | |
| 518. | 25720 <i>Platycercus icterotis</i> (Western Rosella) | | | |
| 519. | 24745 <i>Platycercus icterotis</i> subsp. <i>icterotis</i> (Western Rosella) | | | |
| 520. | 25721 <i>Platycercus zonarius</i> (Australian Ringneck, Ring-necked Parrot) | | | |
| 521. | 25722 <i>Polytelis anthopeplus</i> (Regent Parrot) | | | |
| 522. | <i>Purpureicephalus spurius</i> | | | |
| Pygopodidae | | | | |
| 523. | 24990 <i>Aprasia pulchella</i> (Granite Worm-lizard) | | | |
| 524. | 24991 <i>Aprasia repens</i> (Sand-plain Worm-lizard) | | | |
| 525. | 25008 <i>Pygopus lepidopodus</i> (Common Scaly Foot) | | | |
| Rachycentridae | | | | |
| 526. | <i>Rachycentron canadum</i> | | | |
| Rallidae | | | | |
| 527. | 25727 <i>Fulica atra</i> (Eurasian Coot) | | | |
| 528. | 25729 <i>Gallinula tenebrosa</i> (Dusky Moorhen) | | | |
| 529. | 24764 <i>Gallinula ventralis</i> (Black-tailed Native-hen) | | | |
| 530. | 25730 <i>Gallirallus philippensis</i> (Buff-banded Rail) | | | |
| 531. | 24765 <i>Gallirallus philippensis</i> subsp. <i>mellori</i> (Buff-banded Rail) | | | |
| 532. | <i>Porphyrio</i> (<i>Porphyrio</i>) <i>porphyrio</i> | | | |
| 533. | 25731 <i>Porphyrio porphyrio</i> (Purple Swamphen) | | | |
| 534. | 24771 <i>Porzana tabuensis</i> (Spotless Crane) | | | |
| 535. | <i>Tribonyx ventralis</i> | | | |
| Ranellidae | | | | |
| 536. | <i>Cabestana tabulata</i> | | | |
| 537. | <i>Cymatium</i> (<i>Reticutriton</i>) <i>pfeifferianum</i> | | | |
| 538. | <i>Cymatium</i> (<i>Turritriton</i>) <i>labiosum</i> | | | |
| Raspailiidae | | | | |
| 539. | <i>Echinodictyum clathrioides</i> | | | |
| Recurvirostridae | | | | |
| 540. | 24774 <i>Cladorhynchus leucocephalus</i> (Banded Stilt) | | | |
| 541. | 25734 <i>Himantopus himantopus</i> (Black-winged Stilt) | | | |
| 542. | 24775 <i>Himantopus himantopus</i> subsp. <i>leucocephalus</i> (Black-winged Stilt) | | | |
| 543. | 24776 <i>Recurvirostra novaehollandiae</i> (Red-necked Avocet) | | | |
| Regalecidae | | | | |
| 544. | <i>Regalecus glesne</i> | | | |
| Rhinobatidae | | | | |
| 545. | <i>Aptychotrema vincentiana</i> | | | |
| Rissoidae | | | | |
| 546. | <i>Rissoina</i> (<i>Rissoina</i>) <i>elegantula</i> | | | |
| 547. | <i>Zebina</i> (<i>Zebina</i>) <i>tridentata</i> | | | |
| Scarabaeidae | | | | |
| 548. | <i>Colpochila crassiventris</i> | | | |
| 549. | <i>Liparetrus striatus</i> | | | |
| 550. | <i>Maechidius major</i> | | | |
| 551. | <i>Onthophagus ferox</i> | | | |
| Scincidae | | | | |
| 552. | 30893 <i>Cryptoblepharus buchananii</i> | | | |
| 553. | 25020 <i>Cryptoblepharus plagioccephalus</i> | | | |
| 554. | 25031 <i>Ctenotus catenifer</i> | | | |
| 555. | 25047 <i>Ctenotus impar</i> | | | |
| 556. | 25100 <i>Egernia napoleonis</i> | | | |
| 557. | 25117 <i>Hemiergis peronii</i> subsp. <i>peronii</i> | | | |
| 558. | 25119 <i>Hemiergis quadrilineata</i> | | | |
| 559. | 25131 <i>Lerista distinguenda</i> | | | |
| 560. | 25184 <i>Menetia greyii</i> | | | |
| 561. | 25191 <i>Morethia lineocellata</i> | | | |
| Scolopacidae | | | | |
| 562. | 41323 <i>Actitis hypoleucos</i> (Common Sandpiper) | | IA | |
| 563. | 24779 <i>Calidris acuminata</i> (Sharp-tailed Sandpiper) | | IA | |
| 564. | 24780 <i>Calidris alba</i> (Sanderling) | | IA | |



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|-----------------------|--|-------------|-------------------|------------------------------------|
| 565. | 24784 <i>Calidris ferruginea</i> (Curlew Sandpiper) | | T | |
| 566. | 24786 <i>Calidris melanotos</i> (Pectoral Sandpiper) | | IA | |
| 567. | 24788 <i>Calidris ruficollis</i> (Red-necked Stint) | | IA | |
| 568. | 24789 <i>Calidris subminuta</i> (Long-toed Stint) | | IA | |
| 569. | 24790 <i>Calidris tenuirostris</i> (Great Knot) | | T | |
| 570. | 24806 <i>Tringa glareola</i> (Wood Sandpiper) | | IA | |
| 571. | 24808 <i>Tringa nebularia</i> (Common Greenshank) | | IA | |
| Scolopendridae | | | | |
| 572. | <i>Cormocephalus aurantiipes</i> | | | |
| Scombridae | | | | |
| 573. | <i>Sarda orientalis</i> | | | |
| 574. | <i>Thunnus alalunga</i> | | | |
| 575. | <i>Thunnus maccoyii</i> | | | |
| Sepiadaridae | | | | |
| 576. | <i>Sepiadarium</i> sp. | | | |
| 577. | <i>Sepioloidea</i> sp. | | | |
| Sepiidae | | | | |
| 578. | <i>Sepia apama</i> | | | |
| 579. | <i>Sepia braggi</i> | | | |
| 580. | <i>Sepia novaehollandiae</i> | | | |
| Serranidae | | | | |
| 581. | <i>Hypoplectrodes annulata</i> | | | |
| Sillaginidae | | | | |
| 582. | <i>Sillaginodes punctata</i> | | | |
| 583. | <i>Sillago bassensis</i> | | | |
| Soleidae | | | | |
| 584. | <i>Phyllichthys punctatus</i> | | | |
| Sparassidae | | | | |
| 585. | <i>Isopeda leishmanni</i> | | | |
| Sparidae | | | | |
| 586. | <i>Pagrus auratus</i> | | | |
| Spheniscidae | | | | |
| 587. | 24814 <i>Eudyptes chrysocome</i> subsp. <i>moseleyi</i> (Rockhopper Penguin) | | | |
| Sphingidae | | | | |
| 588. | <i>Hippotion celerio</i> | | | |
| Spondylidae | | | | |
| 589. | <i>Spondylus tenuitas</i> | | | Y |
| Squatinae | | | | |
| 590. | <i>Squatina australis</i> | | | |
| Staphylinidae | | | | |
| 591. | <i>Aleochara</i> sp. | | | Y |
| 592. | <i>Bledius minax</i> | | | |
| 593. | <i>Carpelimus</i> (Paratrogophloeus) <i>bilineatus</i> | | | Y |
| 594. | <i>Carpelimus siamensis</i> | | | |
| 595. | <i>Eupines</i> (byraxis) | | | |
| 596. | <i>Euplectops biplagiatus</i> | | | Y |
| 597. | <i>Paraplectus dubius</i> | | | |
| 598. | <i>Paraplectus</i> sp. | | | |
| 599. | <i>Rybaxis hortensis</i> | | | |
| 600. | <i>Rybaxis</i> sp. | | | |
| 601. | <i>Tachyporus rarus</i> | | | Y |
| 602. | <i>Tiracerus cultripes</i> | | | |
| 603. | <i>Tiracerus foveicollis</i> | | | |
| 604. | <i>Tyraphus major</i> | | | |
| Stichasteridae | | | | |
| 605. | <i>Allostichaster polyplax</i> | | | |
| Stichopodidae | | | | |
| 606. | <i>Stichopus ludwigi</i> | | | |
| Sylviidae | | | | |
| 607. | 25755 <i>Acrocephalus australis</i> (Australian Reed Warbler) | | | |
| 608. | 24833 <i>Cincloramphus cruralis</i> (Brown Songlark) | | | |
| 609. | 25758 <i>Megalurus gramineus</i> (Little Grassbird) | | | |



| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|--------------------------|--|-------------|-------------------|------------------------------------|
| Syngnathidae | | | | |
| 610. | <i>Filicampus tigris</i> | | | |
| 611. | <i>Histiogamphelus cristatus</i> | | | |
| 612. | <i>Phyllopteryx taeniolatus</i> | | | |
| 613. | <i>Pugnaso curtirostris</i> | | | |
| 614. | <i>Stigmatopora argus</i> | | | |
| 615. | <i>Vanacampus phillipi</i> | | | |
| 616. | <i>Vanacampus poecilolaemus</i> | | | |
| Tarsipedidae | | | | |
| 617. | 24167 <i>Tarsipes rostratus</i> (Honey Possum, Noolbenger) | | | |
| Tellinidae | | | | |
| 618. | <i>Pseudarcopagia victoriae</i> | | | |
| Tenebrionidae | | | | |
| 619. | <i>Leichenum canaliculatum</i> | | | |
| Terebellidae | | | | |
| 620. | <i>Nicolea amnis</i> | | | |
| 621. | <i>Nicolea</i> sp. | | | Y |
| 622. | <i>Polycirrus nephrosus</i> | | | Y |
| Terebridae | | | | |
| 623. | <i>Terebra</i> sp. | | | |
| Tetraodontidae | | | | |
| 624. | <i>Contusus brevicaudus</i> | | | |
| 625. | <i>Lagocephalus sceleratus</i> | | | |
| 626. | <i>Omegophora cyanopunctata</i> | | | |
| 627. | <i>Polyspina piosae</i> | | | |
| Tetrarogidae | | | | |
| 628. | <i>Gymnapistes marmoratus</i> | | | |
| Tettigoniidae | | | | |
| 629. | <i>Dexerra vigescens</i> | | | |
| 630. | <i>Metaballus litus</i> | | | |
| Theridiidae | | | | |
| 631. | <i>Latrodectus hasseltii</i> | | | |
| Thomisidae | | | | |
| 632. | <i>Stephanopis aspera</i> | | | Y |
| Threskiornithidae | | | | |
| 633. | 24841 <i>Platalea flavipes</i> (Yellow-billed Spoonbill) | | | |
| 634. | 24843 <i>Plegadis falcinellus</i> (Glossy Ibis) | | IA | |
| 635. | 24844 <i>Threskiornis molucca</i> (Australian White Ibis) | | | |
| 636. | 24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis) | | | |
| Tortricidae | | | | |
| 637. | <i>Technitis</i> GROUP <i>tessulatana</i> | | | Y |
| Triglidae | | | | |
| 638. | <i>Chelidonichthys kumu</i> | | | |
| 639. | <i>Lepidotrigla papilio</i> | | | |
| 640. | <i>Pterygotrigla polyommata</i> | | | |
| Tripterygiidae | | | | |
| 641. | <i>Helcogramma decurrens</i> | | | |
| Triviidae | | | | |
| 642. | <i>Trivia</i> (<i>ellatrivia</i>) | | | |
| Trochidae | | | | |
| 643. | <i>Austrocochlea rudis</i> | | | |
| 644. | <i>Cantharidus lepidus</i> | | | |
| 645. | <i>Cantharidus</i> sp. | | | |
| 646. | <i>Clanculus consobrinus</i> | | | |
| 647. | <i>Clanculus limbatus</i> | | | |
| 648. | <i>Clanculus maxillatus</i> | | | |
| 649. | <i>Clanculus personatus</i> | | | |
| 650. | <i>Clanculus plebejus</i> | | | |
| 651. | <i>Clanculus ringens</i> | | | |
| 652. | <i>Diloma</i> sp. | | | |
| 653. | <i>Granata imbricata</i> | | | |
| 654. | <i>Herpetopoma aspersus</i> | | | |



| Name ID | Species Name | Naturalised | Conservation Code | ¹ Endemic To Query Area |
|-------------------------|--|-------------|-------------------|------------------------------------|
| 655. | <i>Monilea callifera</i> | | | |
| 656. | <i>Notogibbula lehmanni</i> | | | |
| 657. | <i>Notogibbula preissiana</i> | | | |
| 658. | <i>Odontotrochus chlorostomus</i> | | | |
| 659. | <i>Phasianotrochus bellulus</i> | | | |
| 660. | <i>Phasianotrochus irisodontes</i> | | | |
| 661. | <i>Prothalotia lehmanni</i> | | | |
| 662. | <i>Stomatella impertusa</i> | | | |
| 663. | <i>Thalotia conica</i> | | | |
| 664. | <i>Vaceuchelus ampullus</i> | | | |
| Turbinidae | | | | |
| 665. | <i>Astrarium aureum</i> | | | |
| 666. | <i>Astrarium squamiferum</i> | | | |
| 667. | <i>Phasianella australis</i> | | | |
| 668. | <i>Phasianella ventricosa</i> | | | |
| 669. | <i>Tricolia rosea</i> | | | |
| 670. | <i>Tricolia tomlini</i> | | | |
| 671. | <i>Turbo (Ninella) torquatus</i> | | | |
| Turridae | | | | |
| 672. | <i>Crassispira (Crassispira) harpularia</i> | | | |
| Tytonidae | | | | |
| 673. | 24855 <i>Tyto novaehollandiae subsp. novaehollandiae (Masked Owl (southern subsp))</i> | | P3 | |
| Uranoscopidae | | | | |
| 674. | <i>Ichthyoscopus barbatus</i> | | | |
| Urodacidae | | | | |
| 675. | <i>Urodacus novaehollandiae</i> | | | |
| Veneridae | | | | |
| 676. | <i>Gomphina (Gomphina) undulosa</i> | | | |
| 677. | <i>Placamen flindersi</i> | | | |
| 678. | <i>Placamen tiara</i> | | | |
| 679. | <i>Tawera lagopus</i> | | | |
| 680. | <i>Timoclea (Chioneryx) cardioides</i> | | | |
| Veretillidae | | | | |
| 681. | <i>Cavernularia sp.</i> | | | |
| Vermetidae | | | | |
| 682. | <i>Serpulorbis (Cladopoda) siphon</i> | | | |
| Vespertilionidae | | | | |
| 683. | 24186 <i>Chalinolobus gouldii (Gould's Wattled Bat)</i> | | | |
| 684. | 24206 <i>Vespadelus regulus (Southern Forest Bat)</i> | | | |
| Volutidae | | | | |
| 685. | <i>Melo sp.</i> | | | |
| Volutomitridae | | | | |
| 686. | <i>Waimatea obscura</i> | | | Y |
| Ziphiidae | | | | |
| 687. | 24078 <i>Mesoplodon grayi (Gray's Beaked Whale)</i> | | | |
| Zosteropidae | | | | |
| 688. | 25765 <i>Zosterops lateralis (Grey-breasted White-eye, Silvereye)</i> | | | |
| 689. | 24856 <i>Zosterops lateralis subsp. gouldi (Grey-breasted White-eye)</i> | | | |
| Zygaenidae | | | | |
| 690. | <i>Pollanisus empyrea</i> | | | |

Conservation Codes

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

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



Appendix D – Flora data

Flora species list

Significant weeds recorded during the survey

Flora quadrat sheets

Flora likelihood of occurrence assessment guidelines

Flora likelihood of occurrence assessment

Flora species list – Survey September 2016 and September 2009 (GHD 2010)

| Family | Taxon | Status | GHD 2010 | GHD 2016 |
|------------------|---|--------|----------|----------|
| Aizoaceae | <i>Tetragonia decumbens</i> | * | X | X |
| Apiaceae | <i>Apium graveolens</i> | * | X | |
| Araceae | <i>Zantedeschia aethiopica</i> | *DP | | X |
| Asparagaceae | <i>Acanthocarpus preissii</i> | | | X |
| Asparagaceae | <i>Ornithogalum arabicum</i> | * | X | |
| Asphodelaceae | <i>Trachyandra divaricata</i> | * | X | X |
| Asteraceae | <i>Arctotheca calendula</i> | * | X | |
| Asteraceae | <i>Cotula turbinata</i> | * | X | X |
| Asteraceae | <i>Hypochaeris glabra</i> | * | X | |
| Asteraceae | <i>Hypochaeris</i> sp. | * | X | X |
| Asteraceae | <i>Leucophyta brownii</i> | | X | X |
| Asteraceae | <i>Olearia axillaris</i> | | | X |
| Asteraceae | <i>Ursinia anthemoides</i> | * | X | X |
| Asteraceae | <i>Lactuca serriola</i> | * | X | |
| Brassicaceae | <i>Raphanus raphanistrum</i> | * | X | X |
| Caryophyllaceae | <i>Pelargonium capitatum</i> | * | X | X |
| Caryophyllaceae | <i>Petrorhagia dubia</i> | * | X | X |
| Chenopodiaceae | <i>Rhagodia baccata</i> | | | X |
| Colchicaceae | <i>Burchardia congesta</i> | | X | X |
| Crassulaceae | <i>Crassula decumbens</i> | | X | X |
| Cucurbitaceae | <i>Cucumis myriocarpus</i> | * | X | X |
| Cyperaceae | <i>Cyperus tenellus</i> | * | | X |
| Cyperaceae | <i>Cyperus</i> sp. | | X | X |
| Cyperaceae | <i>Ficinia nodosa</i> | | | X |
| Cyperaceae | <i>Gahnia trifida</i> | | X | X |
| Cyperaceae | <i>Lepidosperma ?obtusum</i> (insufficient material) | | X | |
| Cyperaceae | <i>Lepidosperma carphoides</i> | | X | X |
| Cyperaceae | <i>Lepidosperma effusum</i> | | | |
| Cyperaceae | <i>Lepidosperma striatum</i> | | | X |
| Dennstaedtiaceae | <i>Pteridium esculentum</i> | | | X |
| Droseraceae | <i>Drosera glanduligera</i> | | | X |
| Euphorbiaceae | <i>Euphorbia paralias</i> | * | X | X |
| Euphorbiaceae | <i>Euphorbia terracina</i> | * | | X |
| Euphorbiaceae | <i>Ricinus communis</i> | * | | X |
| Fabaceae | <i>Acacia cochlearis</i> | | X | X |
| Fabaceae | <i>Acacia cyclops</i> | | X | |
| Fabaceae | <i>Acacia littorea</i> | | X | X |
| Fabaceae | <i>Acacia saligna</i> | | X | X |
| Fabaceae | <i>Acacia stenoptera</i> | | X | |
| Fabaceae | <i>Hardenbergia comptoniana</i> | | | X |
| Fabaceae | <i>Jacksonia furcellata</i> | | X | X |
| Fabaceae | <i>Lathyrus tingitanus</i> | * | X | |

| Family | Taxon | Status | GHD 2010 | GHD 2016 |
|-------------------|---|--------|----------|----------|
| Fabaceae | <i>Lupinus angustifolius</i> | * | X | X |
| Fabaceae | <i>Melilotus indicus</i> | * | | X |
| Fabaceae | <i>Vicia sativa</i> | * | X | X |
| Fabaceae | <i>Eutaxia virgata</i> | | X | |
| Fabaceae | <i>Trifolium campestre</i> | * | X | X |
| Fabaceae | <i>Trifolium</i> sp. | * | | X |
| Geraniaceae | <i>Erodium botrys</i> | * | | X |
| Goodeniaceae | <i>Scaevola crassifolia</i> | | X | X |
| Hemerocallidaceae | <i>Agrostocrinum scabrum</i> | | X | |
| Hemerocallidaceae | <i>Conostylis aculeata</i> subsp. <i>aculeata</i> | | X | X |
| Iridaceae | <i>Freesia alba x leichtlinii</i> | * | X | |
| Iridaceae | <i>Ixia maculata</i> | * | X | X |
| Iridaceae | <i>Romulea rosea</i> | | * | X |
| Iridaceae | <i>Watsonia meriana</i> | * | X | X |
| Juncaceae | <i>Juncus kraussii</i> | | X | X |
| Myrtaceae | <i>Agonis flexuosa</i> | | | X |
| Myrtaceae | <i>Astartea scoparia</i> | | | X |
| Myrtaceae | <i>Corymbia calophylla</i> | | | X |
| Myrtaceae | <i>Eucalyptus rudis</i> | | X | |
| Myrtaceae | <i>Kunzea glabrescens</i> | | X | |
| Myrtaceae | <i>Melaleuca cuticularis</i> | | X | X |
| Myrtaceae | <i>Melaleuca lanceolata</i> | | X | X |
| Myrtaceae | <i>Melaleuca raphiophylla</i> | | X | X |
| Myrtaceae | <i>Taxandria linearifolia</i> | | X | |
| Orchidaceae | <i>Microtis media</i> | | X | X |
| Oxalidaceae | <i>Oxalis pes-caprae</i> | * | X | X |
| Papaveraceae | <i>Fumaria capreolata</i> | * | X | X |
| Papaveraceae | <i>Fumaria muralis</i> | * | X | X |
| Pinaceae | <i>Pinus</i> sp. | * | X | X |
| Poaceae | <i>Avena fatua</i> | * | | X |
| Poaceae | <i>Briza minor</i> | * | X | |
| Poaceae | <i>Briza maxima</i> | * | X | X |
| Poaceae | <i>Bromus diandrus</i> | * | | X |
| Poaceae | <i>Cenchrus clandestinus</i> | * | | X |
| Poaceae | <i>Cynodon dactylon</i> | * | X | X |
| Poaceae | <i>Eragrostis curvula</i> | * | X | X |
| Poaceae | <i>Ehrharta calycina</i> | * | X | X |
| Poaceae | <i>Ehrharta longifolia</i> | * | | X |
| Poaceae | <i>Lagurus ovatus</i> | * | X | X |
| Poaceae | <i>Lolium perenne</i> | * | | X |
| Poaceae | <i>Spinifex longifolius</i> | | | X |
| Poaceae | sp. (insufficient material) | | | X |
| Polygonaceae | <i>Rumex vulgaris</i> | * | X | |

| Family | Taxon | Status | GHD 2010 | GHD 2016 |
|--------------|--|--------|----------|----------|
| Polygonaceae | <i>Rumex bucephalophorus</i> | * | X | |
| Primulaceae | <i>Lysimachia arvensis</i> | * | | X |
| Proteaceae | <i>Adenanthos meisneri</i> | | X | X |
| Proteaceae | <i>Conospermum caeruleum</i> <i>subsp. marginatum</i> | | X | X |
| Rhamnaceae | <i>Spyridium globulosum</i> | | X | X |
| Rutaceae | <i>Diplolaena dampieri</i> | | | X |
| Solanaceae | <i>Solanum nigrum</i> | * | X | X |

| Plant | Number | Easting | Northing |
|----------------|--------|----------|----------|
| Arum Lily | 20 | 348476.3 | 6271360 |
| Arum Lily | 1 | 348461.5 | 6271214 |
| Arum Lily | 1 | 348222.8 | 6271451 |
| Arum Lily | 10 | 348415.3 | 6271191 |
| Arum Lily | 10 | 348493.2 | 6271169 |
| Arum Lily | 10 | 348486.5 | 6271215 |
| Arum Lily | 15 | 348463.4 | 6271179 |
| Arum Lily | 20 | 348462.5 | 6271088 |
| Arum Lily | 20 | 348473.1 | 6271222 |
| Arum Lily | 3 | 348399.3 | 6271328 |
| Arum Lily | 50 | 348485.2 | 6271257 |
| Arum Lily | 8 | 348494 | 6271287 |
| Arum Lily | 1 | 348412.3 | 6271402 |
| Arum Lily | 1 | 348447.9 | 6271314 |
| Arum Lily | 1 | 344606.8 | 6274197 |
| Arum Lily | 1 | 344597.4 | 6273946 |
| Arum Lily | 2 | 348418.5 | 6271147 |
| Arum Lily | 5 | 348435.3 | 6271344 |
| Bridal Creeper | 1 | 344621.4 | 6274087 |

| | | | |
|----------------------------------|---------------------|----------------------|----------------|
| Site ID: | Q01 | Project: | 6134862 |
| Type: | Quadrat | Size: | 10 x 10 m |
| Date: | 28/9/2016 | Described by: | GO |
| Co-ordinates: | MGA 50 | 348414 mE | 6271181 mN |
| Location: | Vasse | | |
| Landform and slope: | Bank of river | | |
| Drainage: | Poor drainage | | |
| Soil colour & type: | Brown loam | | |
| Vegetation condition: | Completely Degraded | | |
| Fire age & intensity: | Nil | | |
| Disturbances: | Clearing and weeds | | |
| Surface component: | | | |
| Loose soil (%): | 100 | | |
| Leaf litter: | 2-10 | | |
| Wood litter: | <2 | | |



Species List:

| Taxon | Status | Cover (%) | Height (m) |
|--------------------------------|--------|-----------|------------|
| <i>Eucalyptus rudis</i> | | 2-10 | 18 |
| <i>Agonis flexuosa</i> | | 2-10 | 7 |
| <i>Melaleuca raphiophylla</i> | | 30-70 | 7 |
| <i>Watsonia meriana</i> | * | 30-70 | 1.2 |
| <i>Zantedeschia aethiopica</i> | *DP | <2 | 0.8 |
| <i>Oxalis pes-caprae</i> | * | 2-10 | 0.3 |
| <i>Avena fatua</i> | * | >70 | 0.8 |
| <i>Eragrostis curvula</i> | * | 2-10 | 0.9 |

| | | | |
|----------------------------------|-------------------------|----------------------|----------------|
| Site ID: | Q02 | Project: | 6134862 |
| Type: | Quadrat | Size: | 10 x 10 m |
| Date: | 28/9/2016 | Described by: | GO |
| Co-ordinates: | MGA 50 | 348483 mE | 6271109 mN |
| Location: | Vasse | | |
| Landform and slope: | Plain, negligible slope | | |
| Drainage: | Good drainage | | |
| Soil colour & type: | Grey brown loamy sand | | |
| Vegetation condition: | Completely Degraded | | |
| Fire age & intensity: | Nil | | |
| Disturbances: | Weeds and clearing | | |
| Surface component: | | | |
| Loose soil (%): | <2 | | |
| Leaf litter: | <2 | | |
| Wood litter: | <2 | | |



Species List:

| Taxon | Status | Cover (%) | Height (m) |
|--------------------------------|--------|-----------|------------|
| <i>Agonis flexuosa</i> | | 30-70 | 9 |
| <i>Corymbia calophylla</i> | | 2-10 | 15 |
| <i>Acacia saligna</i> | | 2-10 | 3 |
| <i>Ehrharta longifolia</i> | * | >70 | 0.8 |
| <i>Zantedeschia aethiopica</i> | *DP | 2-10 | 1 |
| <i>Lupinus angustifolius</i> | * | <2 | 0.6 |
| <i>Trifolium sp.</i> | * | <2 | 0.15 |
| <i>Oxalis pes-caprae</i> | * | 2-10 | 0.2 |

| | | | |
|----------------------------------|---------------------------------------|----------------------|----------------|
| Site ID: | Q03 | Project: | 6134862 |
| Type: | Quadrat | Size: | 10 x 10 m |
| Date: | 29/9/2016 | Described by: | GO |
| Co-ordinates: | MGA 50 | 344695 mE | 6273899 mN |
| Location: | Vasse | | |
| Landform and slope: | Plain, negligible slope | | |
| Drainage: | Good | | |
| Soil colour & type: | Grey brown sand | | |
| Vegetation condition: | Degraded | | |
| Fire age & intensity: | Nil | | |
| Disturbances: | Clearing, weeds and kangaroos grazing | | |
| Surface component: | | | |
| Loose soil (%): | 30-70 | | |
| Leaf litter (%): | 30-70 | | |
| Wood litter(%): | 10-30 | | |



Species List:

| Taxon | Status | Cover (%) | Height (m) |
|---------------------------------|--------|-----------|------------|
| <i>Corymbia calophylla</i> | | 30-70 | 10 |
| <i>Agonis flexuosa</i> | | 30-70 | 9 |
| <i>Hypochaeris</i> sp. | * | <2 | 0.1 |
| <i>Poaceae</i> sp. | | 30-70 | 0.15 |
| <i>Euphorbia terracina</i> | * | 2-10 | 0.15 |
| <i>Oxalis pes-caprae</i> | * | 30-70 | 0.2 |
| <i>Zantedeschia aethiopica</i> | *DP | <2 | 0.5 |
| <i>Jacksonia furcellata</i> | | <2 | 0.5 |
| <i>Watsonia meriana</i> | * | 2-10 | 0.5 |
| <i>Cotula turbinata</i> | * | <2 | 0.2 |
| <i>Erodium botrys</i> | * | <2 | 0.2 |
| <i>Hardenbergia comptoniana</i> | | <2 | creeper |
| <i>Solanum nigrum</i> | * | <2 | 0.2 |
| <i>Briza maxima</i> | * | <2 | 0.2 |

| | | | |
|----------------------------------|--------------------|----------------------|----------------|
| Site ID: | Q04 | Project: | 6134862 |
| Type: | Quadrat | Size: | 10 x 10 m |
| Date: | 29/9/2016 | Described by: | GO |
| Co-ordinates: | MGA 50 | 344686 mE | 6273845 mN |
| Location: | Vasse | | |
| Landform and slope: | Plain | | |
| Drainage: | Good | | |
| Soil colour & type: | Grey loamy sand | | |
| Vegetation condition: | Good | | |
| Fire age & intensity: | Nil | | |
| Disturbances: | Weeds and clearing | | |
| Surface component: | | | |
| Loose soil (%): | 10-30 | | |
| Leaf litter (%): | 10-30 | | |
| Wood litter (%): | 2-10 | | |



Species List:

| Taxon | Status | Cover (%) | Height (m) |
|---|--------|-----------|------------|
| <i>Agonis flexuosa</i> | | 2-10 | 4 |
| <i>Acacia saligna</i> | | 2-10 | 5 |
| <i>Avena fatua</i> | * | 2-10 | 1 |
| <i>Poaceae sp.</i> | | 2-10 | 0.2 |
| <i>Conostylis aculeata</i> subsp. <i>aculeata</i> | | 2-10 | 0.3 |
| <i>Ehrharta longifolia</i> | * | 2-10 | 1 |
| <i>Briza maxima</i> | * | 2-10 | 0.2 |
| <i>Pelargonium capitatum</i> | * | 10-30 | 0.3 |
| <i>Jacksonia furcellata</i> | | 30-70 | 2.2 |
| <i>Ursinia anthemoides</i> | * | <2 | 0.2 |
| <i>Romulea rosea</i> | * | 10-30 | 0.2 |
| <i>Poaceae sp.</i> | | 30-70 | 0.15 |
| <i>Watsonia meriana</i> | * | 2-10 | 1 |
| <i>Cotula turbinata</i> | * | <2 | 0.2 |

| Taxon | Status | Cover (%) | Height (m) |
|-------------------------------|--------|-----------|------------|
| <i>Erodium botrys</i> | * | <2 | 0.1 |
| <i>Euphorbia terracina</i> | * | <2 | 0.2 |
| <i>Ehrharta calycina</i> | * | <2 | 0.5 |
| <i>Trachyandra divaricata</i> | * | <2 | 0.2 |

| | | | |
|----------------------------------|--|----------------------|----------------|
| Site ID: | Q05 | Project: | 6134862 |
| Type: | Quadrat | Size: | 10 x 10 m |
| Date: | 29/9/2016 | Described by: | GO |
| Co-ordinates: | MGA 50 | 344587 mE | 6275114 mN |
| Location: | Vasse – narrow strip between drain and pathway | | |
| Landform and slope: | Bank | | |
| Drainage: | Good | | |
| Soil colour & type: | White yellow sand | | |
| Vegetation condition: | Good | | |
| Fire age & intensity: | Nil | | |
| Disturbances: | Weeds and clearing | | |
| Surface component: | | | |
| Loose soil (%): | 10-30 | | |
| Leaf litter (%) : | 2-10 | | |
| Wood litter (%): | <2 | | |



Species List:

| Taxon | Status | Cover (%) | Height (m) |
|------------------------------|--------|-----------|------------|
| <i>Lepidosperma effusum</i> | | 10-30 | 1.1 |
| <i>Scaevola crassifolia</i> | | 2-10 | 0.5 |
| <i>Spyridium globulosum</i> | | 2-10 | 2 |
| <i>Raphanus raphanistrum</i> | * | 2-10 | 1 |
| <i>Bromus diandrus</i> | * | 30-70 | 0.8 |
| <i>Arctotheca calendula</i> | * | <2 | 0.2 |
| <i>Oxalis pes-caprae</i> | * | 10-30 | 0.2 |
| <i>Ficinia nodosa</i> | | 2-10 | 1.1 |
| <i>Cenchrus clandestinus</i> | * | 10-30 | 0.2 |

| Taxon | Status | Cover (%) | Height (m) |
|------------------------------|--------|-----------|------------|
| <i>Avena fatua</i> | * | 2-10 | 0.8 |
| <i>Tetragonia decumbens</i> | * | <2 | 0.3 |
| <i>Fumaria capreolata</i> | * | <2 | 0.2 |
| <i>Pelargonium capitatum</i> | * | 2-10 | 1 |
| <i>Lysimachia arvensis</i> | * | <2 | 0.02 |
| <i>Diplolaena dampieri</i> | | <2 | 0.2 |
| <i>Juncus kraussii</i> | | 2-10 | 2 |
| <i>Romulea rosea</i> | * | <2 | 0.15 |
| <i>Ricinus communis</i> | * | <2 | 0.2 |
| <i>Scaevola crassifolia</i> | | 2-10 | 0.8 |

| | | | |
|----------------------------------|--------------------|----------------------|----------------|
| Site ID: | Q06 | Project: | 6134862 |
| Type: | Quadrat | Size: | 10 x 10 m |
| Date: | 29/9/2016 | Described by: | GO |
| Co-ordinates: | MGA 50 | 344539 mE | 6275077 mN |
| Location: | Vasse | | |
| Landform and slope: | Riparian bank | | |
| Drainage: | Good | | |
| Soil colour & type: | Black sand | | |
| Vegetation condition: | Very Good | | |
| Fire age & intensity: | Nil | | |
| Disturbances: | Weeds and clearing | | |
| Surface component: | | | |
| Loose soil (%): | 100 | | |
| Leaf litter: | 30-70 | | |
| Wood litter: | 2-10 | | |



Species List:

| Taxon | Status | Cover (%) | Height (m) |
|-------------------------------|--------|-----------|------------|
| <i>Lysimachia arvensis</i> | * | 2-10 | 0.02 |
| <i>Erodium botrys</i> | * | <2 | 0.2 |
| <i>Lepidosperma effusum</i> | | 70-30 | 1.2 |
| <i>Fumaria capreolata</i> | * | 70-30 | .5 |
| <i>Acacia littorea</i> | | 2-10 | 2.2 |
| <i>Olearia axillaris</i> | | 10-30 | 2 |
| <i>Bromus diandrus</i> | | 70-30 | .2 |
| <i>Rhagodia baccata</i> | | <2T | .2 |
| <i>Ricinus communis</i> | * | 2-10 | .4 |
| <i>Diplolaena dampieri</i> | | <2T | 1.5 |
| <i>Spyridium globulosum</i> | | 2-10 | 2 |
| <i>Acanthocarpus preissii</i> | | 2-10 | .5 |
| <i>Spinifex longifolius</i> | | 2-10 | 0.6 |

| | | | |
|----------------------------------|--------------------|----------------------|----------------|
| Site ID: | Q07 | Project: | 6134862 |
| Type: | Quadrat | Size: | 10 x 10 m |
| Date: | 29/9/2016 | Described by: | GO |
| Co-ordinates: | MGA 50 | 344603 mE | 6274503 mN |
| Location: | Vasse | | |
| Landform and slope: | Riparian bank | | |
| Drainage: | Good | | |
| Soil colour & type: | Grey sand | | |
| Vegetation condition: | 3 | | |
| Fire age & intensity: | Nil | | |
| Disturbances: | Weeds and clearing | | |
| Surface component: | | | |
| Loose soil (%): | 2-10 | | |
| Leaf litter: | 2-10 | | |
| Wood litter (%): | 2-10 | | |



Species List:

| Taxon | Status | Cover (%) | Height (m) |
|------------------------------|--------|-----------|------------|
| <i>Agonis flexuosa</i> | | 70-30 | 8.0 |
| <i>Avena fatua</i> | * | 70-30 | 1 |
| <i>Ricinus communis</i> | * | 10-30 | .5 |
| <i>Romulea rosea</i> | | 10-30 | .15 |
| <i>Fumaria capreolata</i> | * | 2-10 | .5 |
| <i>Lepidosperma effusum</i> | | 70-30 | 1 |
| <i>Acacia cochlearis</i> | | 2-10 | 1.5 |
| <i>Acacia littorea</i> | | 2-10 | 1 |
| <i>Cenchrus clandestinus</i> | * | 10-30 | .2 |
| <i>Lysimachia arvensis</i> | * | <2N | .15 |
| <i>Crassula decumbens</i> | | <2N | 0.02 |
| <i>Spyridium globulosum</i> | | 2-10 | 1.2 |
| <i>Euphorbia terracina</i> | * | <2N | .5 |
| <i>Scaevola crassifolia</i> | | <2T | 1.2 |

| Taxon | Status | Cover (%) | Height (m) |
|---------------------------------|--------|-------------|------------|
| <i>Burchardia congesta</i> | | <2N | 0.3 |
| Poaceae sp. | | <2N | .2 |
| <i>Cotula turbinata</i> | * | <2N | .15 |
| <i>Hardenbergia comptoniana</i> | <2T | CREE PER | |

| | | | |
|----------------------------------|--------------------|----------------------|----------------|
| Site ID: | Q08 | Project: | 6134862 |
| Type: | Quadrat | Size: | 10 x 10 m |
| Date: | 29/9/2016 | Described by: | GO |
| Co-ordinates: | MGA 50 | 344617 mE | 6274182 mN |
| Location: | Vasse | | |
| Landform and slope: | Swamp | | |
| Drainage: | Poor | | |
| Soil colour & type: | Loam | | |
| Vegetation condition: | 3-4 | | |
| Fire age & intensity: | Nil | | |
| Disturbances: | Weeds and clearing | | |
| Surface component: | | | |
| Loose soil (%): | 100 | | |
| Leaf litter (%): | 10-30 | | |
| Wood litter (%): | <2 | | |



Species List:

| Taxon | Status | Cover (%) | Height (m) |
|--------------------------------|--------|-----------|------------|
| <i>Melaleuca lanceolata</i> | | 10-30 | 4 |
| <i>Melaleuca cuticularis</i> | | 10-30 | 4 |
| <i>Melaleuca raphiophylla</i> | | 2-10 | 4 |
| <i>Lepidosperma carphoides</i> | | 70-100 | 1.1 |
| <i>Pelargonium capitatum</i> | * | <2T | 0.5 |
| Poaceae sp. | * | 2-10 | 0.8 |
| <i>Gahnia trifida</i> | | 30-70 | 1 |
| <i>Lagurus ovatus</i> | * | <2 | 0.2 |
| <i>Euphorbia terracina</i> | * | <2 | 0.2 |
| <i>Watsonia meriana</i> | * | <2T | 1 |

Flora likelihood of occurrence 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 survey area. |
| Possible | Species previously recorded within 5 km and areas of suitable habitat occur/may occur in the survey area. |
| Unlikely | Species previously recorded within 5 km, but suitable habitat does not occur in the survey area. |
| Highly unlikely | Species not previously recorded within 5 km, suitable habitat does not occur in the survey area and/or survey area 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 |

Flora likelihood of occurrence assessment

| Family | Taxon | Source | Status | | Description and closest record information (if available) (WA Herbarium 1998–, DotE 2015d) | Habitat | Likelihood of occurrence |
|--------------|-------------------------------------|--------|----------|--------------|---|---|---|
| | | | EPBC Act | WC Act /DPaW | | | |
| Apiaceae | <i>Brachyscias verecundus</i> | EPBC | CE | T | Annual (or ephemeral), herb, 0.012-0.022 m high, entirely glabrous. Fl. white/cream. | In a moss sward. On a granite outcrop. | Highly unlikely: this species does not occur within 5 km of the survey area and no habitat for this species occurs within the survey area. |
| Asparagaceae | <i>Thysanotus glaucus</i> | NM | | P4 | Caespitose, glaucose perennial, herb, 0.1-0.2 m high. Fl. purple, Oct to Dec or Jan to Mar. | White, grey or yellow sand, sandy gravel. | Possible: this species has previously been recorded within 5 km of the survey area and habitat occurs within the survey area. This species was not flowering during the time of the study. |
| Brassicaceae | <i>Lepidium pseudohyssopifolium</i> | NM | | P1 | Erect annual or perennial, herb, to 0.4(-0.6) m high. Fl. Jun to Sep. | Swampy ground. | Unlikely: this species has previously been recorded within 5 km of the survey area and small areas of habitat occur within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Brassicaceae | <i>Lepidium pseudotasmanicum</i> | NM | | P4 | Erect annual or biennial, herb, 0.2-0.4(-1) m high. Fl. | Loam, sand. | Possible: this species has previously been recorded within 5 km of the survey area and habitat occurs within the survey area. This species was not flowering during the time of the study. |

| Family | Taxon | Source | Status | | Description and closest record | Habitat | Likelihood of occurrence |
|----------------|---|----------|--------|----|--|---|---|
| | | | | | white-green, Feb or Dec. | | |
| Convolvulaceae | <i>Calystegia sepium</i> subsp. <i>roseate</i> | DPAW | | P2 | Description unknown. | | Possible: this species has previously been recorded within 5 km of the survey area and habitat may occur within the survey area. |
| Cyperaceae | <i>Schoenus benthamii</i> | NM | | P3 | Tufted perennial, grass-like or herb (sedge), 0.15-0.45 m high. Fl. brown, Oct to Nov. | White, grey sand, sandy clay. Winter-wet flats, swamps. | Possible: this species has previously been recorded within 5 km of the survey area and habitat occurs within the survey area. This species was not flowering during the time of the study. |
| Cyperaceae | <i>Tetraria australiensis</i> | NM, EPBC | Vu | T | Rhizomatous, tufted perennial, grass-like or herb (sedge), to 1 m high. Fl. brown, Nov to Dec. | | Possible: this species has previously been recorded within 5 km of the survey area and habitat may occur within the survey area. This species was not flowering during the time of the study. |
| Ericaceae | <i>Andersonia gracilis</i> | EPBC | En | T | Slender erect or open straggly shrub, 0.1-0.5(-1) m high. Fl. white-pink-purple, Sep to Nov. | White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps. <i>Andersonia gracilis</i> is currently known from the Badgingarra, Dandaragan and Kenwick areas (Stack et al. 2008) | Highly unlikely: this species is restricted to the Badgingarra, Dandaragan and Kenwick areas. |
| Ericaceae | <i>Leucopogon</i> sp. Busselton (D. Cooper 243) | NM | | P2 | Description unknown. | | Unlikely: this species has previously been recorded within 5 km of the survey area and small areas of habitat occur within the survey area. |

| Family | Taxon | Source | Status | Description and closest record | Habitat | Likelihood of occurrence | |
|---------------|--|----------|--------|--------------------------------|--|---|--|
| | | | | | | Large portions of the vegetated areas were traversed during the assessment. | |
| Euphorbiaceae | <i>Amperea micrantha</i> | NM, DPaW | | P2 | Low, spreading, bushy perennial, herb, 0.1-0.3 m high. Fl. brown, Oct to Nov. | Sandy soils. | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat occurs within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Fabaceae | <i>Acacia flagelliformis</i> | NM, DPaW | | P4 | Rush-like, erect or sprawling shrub, 0.3-0.75(-1.6) m high. Fl. yellow, May to Sep. | Sandy soils. Winter-wet areas. | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat occurs within the survey area. A large portion of the vegetated areas were traversed during the assessment. |
| Fabaceae | <i>Acacia heteroclita</i> subsp. <i>valida</i> | NM | | P2 | Erect, spreading shrub or tree, 1-4 m high, phyllodes 4-9 mm wide. Fl. yellow, Sep to Nov. | Shallow soils over granite. Rocky granite slopes & outcrops. | Unlikely: this species has previously been recorded within 5 km of the survey area however no habitat occurs within the survey area. |
| Fabaceae | <i>Acacia lateriticola</i> glabrous variant (B.R. Maslin 6765) | NM | | P3 | Shrub, 0.4-0.8 m high. Fl. yellow, Aug or Oct. | Lateritic soils. | Unlikely: this species has previously been recorded within 5 km of the survey area however no habitat occurs within the survey area. |
| Fabaceae | <i>Acacia semitrullata</i> | NM | | P4 | Slender, erect, pungent shrub, (0.1- | White/grey sand, sometimes over laterite, clay. Sandplains, swampy | Unlikely: this species has previously been recorded within 5 km of the survey area and some small areas of habitat occur within the survey area. Large portions of the vegetated |

| Family | Taxon | Source | Status | Description and closest record | Habitat | Likelihood of occurrence | |
|----------|---|----------|--------|--------------------------------|---|---|--|
| | | | | | 0.2-0.7(-1.5) m high. Fl. cream-white, May to Oct. | areas. | areas were traversed during the assessment. |
| Fabaceae | <i>Bossiaea disticha</i> | NM | | P4 | Erect or straggly to spreading shrub, 0.1-1.5 m high. Fl. yellow & brown/red, Sep to Nov. | Sandy soils over limestone. | Unlikely: this species has previously been recorded within 5 km of the survey area however no habitat occurs within the survey area. |
| Fabaceae | <i>Chorizema carinatum</i> | NM | | P3 | Erect or spreading shrub, 0.1-0.6 m high. Fl. yellow, Oct to Dec. | Sand, sandy clay. | Unlikely: this species has previously been recorded within 5 km of the survey area however no habitat occurs within the survey area. |
| Fabaceae | <i>Daviesia elongata</i> subsp. <i>elongata</i> | EPBC | Vu | T | Spreading shrub, 0.4-1 m high. Fl. yellow/orange & red, Dec or Jan to Feb. | Sandy soils. This species occurs within the Carburnup area (TSSC 2008). | Unlikely: this species has not previously been recorded within 5 km of the survey area however some habitat occurs within the survey area. |
| Fabaceae | <i>Gastrolobium papilio</i> | EPBC | En | T | Tangled, clumped shrub, to 1.5 m high. Fl. cream-red, Oct to Dec. | Sandy clay over ironstone and laterite. Flat plains. | Highly unlikely: this species does not occur within 5 km of the survey area and no habitat for this species occurs within the survey area. |
| Fabaceae | <i>Gastrolobium</i> sp. Yoongarillup (S.Dilkes s.n. 1/9/1969) | NM, DPaW | | P1 | Description unknown. | | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat may occur within the survey area. Large portions of the vegetated areas were traversed during the assessment. |

| Family | Taxon | Source | Status | Description and closest record | Habitat | Likelihood of occurrence | |
|-------------------|--------------------------------|----------|--------|--------------------------------|---|--|--|
| Fabaceae | <i>Jacksonia gracillima</i> | NM, DPaW | | P3 | Description unknown. | | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat may occur within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Fabaceae | <i>Kennedia lateritia</i> | NM | En | T | Description unknown. | | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat may occur within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Fabaceae | <i>Pultenaea pinifolia</i> | NM | | P3 | Erect, slender shrub, 1-3 m high. Fl. yellow-orange, Oct to Nov. | Loam or clay. Floodplains, swampy areas. | Unlikely: this species has previously been recorded within 5 km of the survey area and some small areas of habitat occur within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Hemerocallidaceae | <i>Johnsonia inconspicua</i> | NM, DPaW | | P3 | Rhizomatous, tufted perennial, grass-like or herb, 0.1-0.3 m high, to 0.2 m wide. Fl. green-white/pink, Oct to Nov. | White-grey or black sand. Low dunes, winter-wet flats. | Possible: this species has previously been recorded within 5 km of the survey area and habitat occurs within the survey area. This species was not flowering during the time of the study. |
| Malvaceae | <i>Lasiopetalum laxiflorum</i> | NM | | P3 | Description unknown. | | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat may occur within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Menyanthaceae | <i>Ornduffia submersa</i> | NM, DPaW | | P4 | Description unknown. | | Possible: this species has previously been recorded within 5 km of the survey area and habitat may occur within the survey area. This species was not flowering during the time of the |

| Family | Taxon | Source | Status | | Description and closest record | Habitat | Likelihood of occurrence |
|-----------|---|----------|--------|----|--|--|--|
| | | | | | | | study. |
| Myrtaceae | <i>Calothamnus quadrifidus</i> subsp. <i>teretifolius</i> | NM | | P4 | Description unknown. | | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat may occur within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Myrtaceae | <i>Chamelaucium</i> sp. S coastal plain (R.D.Royce 4872) | NM, EPBC | Vu | T | Description unknown. | | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat may occur within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Myrtaceae | <i>Chamelaucium</i> sp. Yoongarillup (G.J. Keighery 3635) | NM | | P4 | Description unknown. | | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat may occur within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Myrtaceae | <i>Darwinia whicherensis</i> | EPBC | En | T | Erect or sometimes spreading shrub, up to 70 cm tall x 40 cm wide. | The species occurs in a winter-wet area of shrubland on shallow red clay over ironstone under a tall shrubland of <i>Dryandra squarrosa</i> . This species is known from a wild and translocated population near the Whicher Range (TSSC 2016) | Highly unlikely: this species does not occur within 5 km of the survey area and no habitat for this species occurs within the survey area. |
| Myrtaceae | <i>Verticordia attenuata</i> | NM | | P3 | Shrub, 0.4-1 m high. Fl. pink, Dec or Jan to May. | White or grey sand. Winter-wet depressions. | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat occurs within the survey area. Large portions of the vegetated areas were traversed during the assessment. |

| Family | Taxon | Source | Status | | Description and closest record | Habitat | Likelihood of occurrence |
|-------------|---|----------------|--------|----|--|---|---|
| Myrtaceae | <i>Verticordia densiflora</i> var. <i>pedunculata</i> | NM, DPaW | En | T | Erect to spreading shrub, 0.3-0.6 m high. Fl. pink/pink-white, Dec or Jan. | Grey/yellow sand, sandy loam. Winter-wet low-lying areas. | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat occurs within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Myrtaceae | <i>Verticordia lehmannii</i> | NM | | P4 | er shrub, 0.2-1 m high. Fl. pink, Jan or Apr to Jun or Aug or Dec. | Sandy clay. Winter-wet flats. | Unlikely: this species has previously been recorded within 5 km of the survey area however no habitat occurs within the survey area. |
| Myrtaceae | <i>Verticordia plumosa</i> var. <i>ananeotes</i> | NM | En | T | Erect, sparsely branched shrub, 0.3-0.5 m high. Fl. pink-purple/white, Nov to Dec. | Sandy loam. Seasonally inundated plains. | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat occurs within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Myrtaceae | <i>Verticordia plumosa</i> var. <i>vassensis</i> | NM, DPaW, EPBC | En | T | Shrub, 0.3-1 m high. Fl. pink, Sep to Dec or Jan to Feb. | White/grey sand. Winter-wet flats. | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat occurs within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Orchidaceae | <i>Caladenia huegelii</i> | NM, DPaW, EPBC | En | T | Tuberous, perennial, herb, 0.25-0.6 m high. Fl. green & cream & red, Sep to Oct. | Grey or brown sand, clay loam. | Unlikely: this species has previously been recorded within 5 km of the survey area however no habitat occurs within the survey area. |
| Orchidaceae | <i>Caladenia procera</i> | NM, DPaW, EPBC | CE | T | Tuberous, perennial, herb, 0.35- | Rich clay loam. Alluvial loamy flats, jarrah/marri/peppermint | Unlikely: this species has previously been recorded within 5 km of the survey area and some habitat occurs within the survey area. Large |

| Family | Taxon | Source | Status | | Description and closest record | Habitat | Likelihood of occurrence |
|-------------|--------------------------|----------------|--------|---|---|---|--|
| | | | | | 0.9 m high. Fl. yellow, Sep to Oct. | woodland, dense heath, sedges. | portions of the vegetated areas were traversed during the assessment. |
| Orchidaceae | <i>Diuris micrantha</i> | EPBC | Vu | T | Tuberous, perennial, herb, 0.3-0.6 m high. Fl. yellow & brown, Sep to Oct. | Brown loamy clay. Winter-wet swamps, in shallow water. | Unlikely: this species does not occur within 5 km of the survey area however some habitat for this species occurs within the survey area. Large portions of the vegetated areas were traversed during the study and this species is likely to have been flowering during the time of the assessment. |
| Orchidaceae | <i>Diuris purdiei</i> | NM | En | T | Tuberous, perennial, herb, 0.15-0.35 m high. Fl. yellow, Sep to Oct. | Grey-black sand, moist. Winter-wet swamps. | Unlikely: this species has previously been recorded within 5 km of the survey area and some degraded habitat occurs within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Orchidaceae | <i>Drakaea elastica</i> | NM, DPaW, EPBC | Vu | T | Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red & green & yellow, Oct to Nov. | White or grey sand. Low-lying situations adjoining winter-wet swamps. | Unlikely: this species has previously been recorded within 5 km of the survey area and some degraded habitat occurs within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Orchidaceae | <i>Drakaea micrantha</i> | EPBC | Vu | T | Tuberous, perennial, herb, 0.15-0.3 m high. Fl. red & yellow, Sep to Oct. | White-grey sand. The species is usually found in cleared fire breaks or open sandy patches that have been disturbed, and where competition from other plants has been removed (TSSC 2008) | Unlikely: this species does not occur within 5 km of the survey area however some habitat for this species occurs within the survey area. Large portions of the vegetated areas were traversed during the study and this species is likely to have been flowering during the time of the assessment. |

| Family | Taxon | Source | Status | | Description and closest record | Habitat | Likelihood of occurrence |
|-------------|---|----------------|--------|----|---|---|---|
| Orchidaceae | <i>Thelymitra variegata</i> | NM | | P2 | Tuberous, perennial, herb, 0.1-0.35 m high. Fl. orange & red & purple & pink, Jun to Sep. | Sandy clay, sand, laterite. | Unlikely: this species has previously been recorded within 5 km of the survey area however no habitat occurs within the survey area. |
| Poaceae | <i>Puccinellia vassica</i> | NM, DPaW | | P1 | Caespitose annual or perennial, grass-like or herb, 0.41-0.55 m high. | Saline soils. On the outer margins of coastal saltmarshes. | Unlikely: this species has previously been recorded within 5 km of the survey area however no habitat occurs within the survey area. |
| Proteaceae | <i>Banksia nivea</i> subsp. <i>uliginosa</i> | NM, DPaW, EPBC | En | T | Dense, erect, non-lignotuberous shrub, 0.2-1.5 m high. Fl. yellow-brown, Aug to Sep. | Sandy clay, gravel. | Unlikely: this species has previously been recorded within 5 km of the survey area however no habitat occurs within the survey area. |
| Proteaceae | <i>Banksia sessilis</i> var. <i>cordata</i> | NM | | P4 | Non-lignotuberous shrub, to 2.5 m high. Fl. cream-yellow, Jul to Oct. | White/grey sand. Coastal limestone. | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat occurs within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Proteaceae | <i>Banksia squarrosa</i> subsp. <i>argillacea</i> | EPBC | Vu | T | Erect, open, non-lignotuberous shrub, 1.2-4 m high. Fl. yellow, Jun to Nov. | White/grey sand, gravelly clay or loam. Winter-wet flats, clay flats. | Highly unlikely: this species does not occur within 5 km of the survey area and no habitat for this species occurs within the survey area. |

| Family | Taxon | Source | Status | Description and closest record | Habitat | Likelihood of occurrence | |
|------------|--|----------|--------|--------------------------------|--|--|--|
| Proteaceae | <i>Conospermum paniculatum</i> | NM | | P3 | Spreading, open shrub, 0.3-1.25 m high. Fl. blue-white, Jul to Nov. | Sandy or clayey soils. Swampy areas, plains, slopes. | Unlikely: this species has previously been recorded within 5 km of the survey area and some habitat occurs within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Proteaceae | <i>Franklandia triaristata</i> | NM, DPaW | | P4 | Erect, lignotuberous shrub, 0.2-1 m high. Fl. white-cream-yellow/brown-purple, Aug to Oct. | White or grey sand. | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat occurs within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Proteaceae | <i>Grevillea brachystylis</i> subsp. <i>brachystylis</i> | NM, DPaW | | P3 | uch-branched, prostrate or decumbent, non-lignotuberous shrub, 0.2-0.5 m high, to 3 m wide. Fl. red, Aug to Nov. | Black sand, sandy clay. Swampy situations. | Unlikely: this species has previously been recorded within 5 km of the survey area and some habitat occurs within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Proteaceae | <i>Grevillea brachystylis</i> subsp. <i>grandis</i> | EPBC | CE | T | Shrubs, 0.3–1 m high. Branchlets not glaucous. Leaves simple, 70–110 mm long overall. Leaf blade 2–10 mm wide, | Amongst medium trees, or tall (sclerophyll) shrubland; in sand, or loam. It grows on brown lateritic clay loam soils (TSSC 2008) | Highly unlikely: this species does not occur within 5 km of the survey area and no habitat for this species occurs within the survey area. |

| Family | Taxon | Source | Status | Description and closest record | Habitat | Likelihood of occurrence | |
|------------|--|----------------|--------|--|---|---|--|
| | | | | undissected, flat, narrowly elliptic. Margins entire, recurved. Hairs straight. Flowers red, August, or September. | | | |
| Proteaceae | <i>Grevillea bronwenae</i> | NM, DPaW | | P3 | Slender, erect shrub, 0.5-1.6 m high. Fl. red, Jun to Dec. | Grey sand over laterite, lateritic loam. Hillslopes. | Unlikely: this species has previously been recorded within 5 km of the survey area however no habitat occurs within the survey area. |
| Proteaceae | <i>Grevillea elongata</i> | NM, DPaW, EPBC | Vu | T | Shrub, 1.5-2 m high. Fl. white-cream, Oct. | Gravelly clay, sandy clay, sand. Road verges, swamps, creek banks. | Unlikely: this species has previously been recorded within 5 km of the survey area and some habitat occurs within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Proteaceae | <i>Hakea oldfieldii</i> | NM | | P3 | Open, straggling shrub, up to 2.5 m high. Fl. white-cream/yellow, Aug to Oct. | Red clay or sand over laterite. Seasonally wet flats. | Unlikely: this species has previously been recorded within 5 km of the survey area however no habitat occurs within the survey area. |
| Proteaceae | <i>Isopogon formosus</i> subsp. <i>dasylepis</i> | NM, DPaW | | P3 | Low, bushy or slender, upright, non-lignotuberous shrub, 0.2-2 m high. Fl. pink-purple/red, | Sand, sandy clay, gravelly sandy soils over laterite. Often swampy areas. | Unlikely: this species has previously been recorded within 5 km of the survey area however no habitat occurs within the survey area. |

| Family | Taxon | Source | Status | | Description and closest record | Habitat | Likelihood of occurrence |
|------------|--|----------------|--------|----|--|--|---|
| | | | | | Jun to Dec. | | |
| Proteaceae | <i>Lambertia echinata</i> subsp. <i>occidentalis</i> | NM, DPaW, EPBC | En | T | Prickly, much-branched, non-lignotuberous shrub, to 3 m high. Fl. yellow, Feb or Apr or Dec. | White sandy soils over laterite, orange/brown-red clay over ironstone. Flats to foothills, winter-wet sites. | Unlikely: this species has previously been recorded within 5 km of the survey area however no habitat occurs within the survey area. |
| Proteaceae | <i>Lambertia orbifolia</i> subsp. Scott River Plains (L.W. Sage 684) | NM, DPaW | En | T | Small tree or shrub, to 5 m high. Fl. red-orange, Oct to Nov or Jan. | Yellow-brown sandy clay, grey sand, sandy gravel, laterite. Along riverbanks, sand dunes, plains & ridges, seasonally-inundated areas. | Unlikely: this species has previously been recorded within 5 km of the survey area however no habitat occurs within the survey area. |
| Proteaceae | <i>Petrophile latericola</i> | EPBC | En | T | Multi-stemmed shrub, 0.4-1.5 m high. Fl. yellow, Nov. | Red lateritic clay. Winter-wet flats. | Highly unlikely: this species does not occur within 5 km of the survey area and no habitat for this species occurs within the survey area. |
| Proteaceae | <i>Synaphea hians</i> | NM, DPaW | | P3 | Prostrate or decumbent shrub, 0.15-0.6 m high, to 1 m wide. Fl. yellow, Jul or Sep to Nov. | Sandy soils. Rises. | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat occurs within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Proteaceae | <i>Synaphea petiolaris</i> subsp. <i>simplex</i> | NM, DPaW | | P2 | Tufted shrub, 0.1-0.6 m high. Fl. | Sandy soils. Flats, winter-wet areas. | Unlikely: this species has previously been recorded within 5 km of the survey area and habitat occurs within the survey area. Large |

| Family | Taxon | Source | Status | Description and closest record | Habitat | Likelihood of occurrence | |
|---------------|--|----------|--------|--------------------------------|--|---|---|
| | | | | yellow, Sep to Oct. | | portions of the vegetated areas were traversed during the assessment. | |
| Restionaceae | <i>Loxocarya magna</i> | NM, DPaW | | P3 | Rhizomatous, perennial, herb (sedge-like), 0.5-1.5 m high. Fl. Sep or Nov. | Sand, loam, clay, ironstone. Seasonally inundated or damp habitats. | Unlikely: this species has previously been recorded within 5 km of the survey area however limited habitat occurs within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Santalaceae | <i>Leptomeria furtiva</i> | NM | | P2 | Lax, sprawling shrub, 0.2-0.45 m high. Fl. orange-brown, Aug to Oct. | Grey or black peaty sand. Winter-wet flats. | Unlikely: this species has previously been recorded within 5 km of the survey area however limited habitat occurs within the survey area. Large portions of the vegetated areas were traversed during the assessment. |
| Thymelaeaceae | <i>Pimelea ciliata</i> subsp. <i>longituba</i> | NM, DPaW | | P3 | Erect shrub, 0.3-1 m high. Fl. pink, Oct to Dec. | Grey sand over clay, loam. | Unlikely: this species has previously been recorded within 5 km of the survey area however no habitat occurs within the survey area. |

Appendix E - (Fauna data)

Fauna species list

Fauna likelihood of occurrence assessment

Fauna species list – species recorded during the September 2009 (GHD 2010) and 2016 surveys

| Family | Genus | Species | Common Name | Conservation listing | Introduced Fauna | GHD 2010 | GHD 2016 |
|---------------|--------------------|----------------------------------|---------------------------|----------------------|------------------|----------|----------|
| Birds | | | | | | | |
| Acanthizinae | <i>Acanthiza</i> | <i>inornata</i> | Western Thornbill | | | X | |
| Acanthizinae | <i>Smicrornis</i> | <i>brevirostris occidentalis</i> | Weebill | | | X | |
| Alcedinidae | <i>Dacelo</i> | <i>novaeguineae</i> | Laughing Kookaburra | int | X | X | X |
| Anatidae | <i>Anus</i> | <i>superciliosa</i> | Pacific Black Duck | | | X | X |
| Anatidae | <i>Anus</i> | <i>gracilis</i> | Grey Teal | | | X | |
| Anatidae | <i>Chenonetta</i> | <i>jubata</i> | Australian Wood Duck | | | X | X |
| Ardeidae | <i>Ardea</i> | <i>intermedia</i> | Intermediate Egret | | | X | |
| Ardeidae | <i>Egretta</i> | <i>novaehollandiae</i> | White-faced Heron | | | X | X |
| Campephagidae | <i>Coracina</i> | <i>novaehollandiae</i> | Black-faced Cuckoo-shrike | | | X | |
| Charadriidae | <i>Elseyornis</i> | <i>melanops</i> | Black-fronted Dotterel | | | X | |
| Columbidae | <i>Columba</i> | <i>livia</i> | Feral Pigeon | int | X | X | X |
| Columbidae | <i>Phaps</i> | <i>chalconoptera</i> | Common Bronzewing | | | X | X |
| Corvidae | <i>Corvus</i> | <i>coronoides perplexus</i> | Australian Raven | | | X | X |
| Cracticidae | <i>Cracticus</i> | <i>tiibicen dorsalis</i> | Australian Magpie | | | X | X |
| Cuculidae | <i>Cuculus</i> | <i>pallidus</i> | Pallid Cuckoo | | | X | |
| Dricuridae | <i>Grallina</i> | <i>cyanoleuca</i> | Magpie-lark | | | X | |
| Dricuridae | <i>Rhipidura</i> | <i>fuliginosa keasti</i> | Grey Fantail | | | X | |
| Dricuridae | <i>Rhipidura</i> | <i>leucophrys</i> | Willie Wagtail | | | X | X |
| Falconidae | <i>Falco</i> | <i>cenchroides</i> | Nankeen Kestrel | | | X | X |
| Hirundinidae | <i>Hirundo</i> | <i>neoxena</i> | Welcome Swallow | | | X | X |
| Hirundinidae | <i>Hirundo</i> | <i>ariel</i> | Fairy Martin | | | X | |
| Laridae | <i>Larus</i> | <i>novaehollandiae</i> | Silver Gull | | | X | X |
| Malurinae | <i>Malurus</i> | <i>splendens</i> | Splendid Fairy-wren | | | X | |
| Meliphagidae | <i>Anthochaera</i> | <i>carunculata</i> | Red Wattlebird | | | X | |
| Meliphagidae | <i>Anthochaera</i> | <i>lunulata</i> | Western Wattlebird | | | X | X |
| Meliphagidae | <i>Lichmera</i> | <i>indistincta</i> | Brown Honeyeater | | | X | |

| Family | Genus | Species | Common Name | Conservation listing | Introduced Fauna | GHD 2010 | GHD 2016 |
|-------------------|------------------------|-------------------------------|-----------------------------|----------------------|------------------|----------|----------|
| Meliphagidae | <i>Phylidonyris</i> | <i>novaehollandiae</i> | New Holland Honeyeater | | | X | X |
| Meliphagidae | <i>Lichenostomus</i> | <i>virescens</i> | Singing Honeyeater | | | X | |
| Meliphagidae | <i>Lichenostomus</i> | <i>ornatus</i> | Yellow-plumed Honeyeater | | | X | |
| Motacillidae | <i>Anthus</i> | <i>australis</i> | Australian Pipit | | | X | X |
| Phalacrocoracidae | <i>Phalacrocorax</i> | <i>carbo</i> | Great Cormorant | | | X | X |
| Phalacrocoracidae | <i>Phalacrocorax</i> | <i>melanoleucos</i> | Little Pied Cormorant | | | X | X |
| Rallidae | <i>Gallinula</i> | <i>tenebrosa</i> | Dusky Moorhen | | | X | |
| Rallidae | <i>Fulica</i> | <i>atra</i> | Eurasian Coot | | | X | |
| Cacatuidae | <i>Cacatua</i> | <i>sanguinea westralensis</i> | Little Corella | | | X | |
| Cacatuidae | <i>Eolophurus</i> | <i>roseicapilla</i> | Pink and Grey Galah | | | X | |
| Psittacidae | <i>Platycercus</i> | <i>zonarius semitorquatus</i> | Twenty-eight Parrot | | | X | X |
| Threskiornithidae | <i>Threskiornis</i> | <i>molucca</i> | Australian White Ibis | | | X | X |
| Charadrius | <i>Charadrius</i> | <i>ruficapillus</i> | Red Capped Dotterel | | | | X |
| Psittaculidae | <i>Platycercus</i> | <i>zonarius</i> | Australian Ringneck | | | | X |
| Pandionidae | <i>Pandion</i> | <i>haliaetus</i> | Osprey | Mi We, S5 | | | X |
| Zosteropidae | <i>Zosterops</i> | <i>lateralis gouldi</i> | Silvereye | | | X | |
| Reptiles | | | | | | | |
| Cheluidae | <i>Chelodina</i> | <i>oblonga</i> | Oblong Turtle | | | X | |
| Elapidae | <i>Echiopsis</i> | <i>curta</i> | Bardick | | | X | |
| Elapidae | <i>Elapognathus</i> | <i>coronatus</i> | Crown Snake | | | X | |
| Elapidae | <i>Pseudonaja</i> | <i>affinis</i> | Dugite | | | X | |
| Elapidae | <i>Notechis</i> | <i>scutatus</i> | Tiger Snake | | | X | X |
| Scincidae | <i>Cryptoblepharus</i> | <i>buchanani</i> | Fence Skink | | | X | |
| Scincidae | <i>Egernia</i> | <i>kingii</i> | King Skink | | | X | |
| Scincidae | <i>Egernia</i> | <i>luctuosa</i> | Mourning Skink | | | X | |
| Scincidae | <i>Lerista</i> | <i>distinguenda</i> | Southwest Four-toed Lerista | | | X | X |
| Scincidae | <i>Menetia</i> | <i>greyii</i> | Common Dwarf Skink | | | X | |

| Family | Genus | Species | Common Name | Conservation listing | Introduced Fauna | GHD 2010 | GHD 2016 |
|-----------------|----------------------|-----------------------------|----------------------------|----------------------|------------------|----------|----------|
| Scincidae | <i>Tiliqua</i> | <i>rugosa rugosa</i> | Bobtail | | | X | X |
| Amphibians | | | | | | | |
| Hylidae | <i>Litoria</i> | <i>adelaidensis</i> | Slender Tree Frog | | | X | X |
| Hylidae | <i>Litoria</i> | <i>moorei</i> | Motorbike Frog | | | X | |
| Myobatrachidae | <i>Crinia</i> | <i>glauerti</i> | Clicking Froglet | | | X | X |
| Myobatrachidae | <i>Crinia</i> | <i>insignifera</i> | Squelching Froglet | | | X | |
| Myobatrachidae | <i>Heleioporus</i> | <i>eyrei</i> | Moaning Frog | | | X | X |
| Mammals | | | | | | | |
| Canidae | <i>Vulpes</i> | <i>vulpes</i> | Fox | int | X | X | X |
| Canidae | <i>Canus</i> | <i>domesticus</i> | Dog | int | X | X | X |
| Leporidae | <i>Oryctolagus</i> | <i>cuniculus</i> | European Rabbit | int | X | X | X** |
| Bovidae | <i>Bos</i> | <i>taurus</i> | Cow | int | X | X | X |
| Macropodidae | <i>Macropus</i> | <i>fuliginosus</i> | Western Grey Kangaroo | | | X | X** |
| Peramelidae | <i>Isodon</i> | <i>obesulus fusciventer</i> | Southern Brown Bandicoot | P4 | | X* | X* |
| Felidae | <i>Felis</i> | <i>catus</i> | Cat | int | X | | X** |
| Pseudocheiridae | <i>Pseudocheirus</i> | <i>occidentalis</i> | Western Ringtail Possum | Vu, S1 | | X | X** |
| Fish | | | | | | | |
| Galaxiidae | <i>Galaxias</i> | <i>occidentalis</i> | Western Minnow | | | X | |
| Mugilidae | <i>Aldrichetta</i> | <i>forsteri</i> | Yelloweye Mullet | | | X | |
| Crustaceans | | | | | | | |
| Portunidae | <i>Portunus</i> | <i>pelagicus</i> | Blue Manna Crab | | | X | |
| Mollusca | | | | | | | |
| Hyriidae | <i>Westralunio</i> | <i>carteri</i> | Carter's Freshwater Mussel | En | En, S2 | | X |

* identified via diggings; ** identified by scats, int: introduced

Black Cockatoo trees recorded during 2016 survey (within and adjacent to the survey area)

| SPECIES | DBH | HOLLOW | FEEDING | Easting | Northing | Location |
|-----------------------|------|----------|---------|----------|----------|----------|
| Flooded Gum | 500 | | | 344579.8 | 6274013 | Outside |
| Flooded Gum | 1600 | 3 small | | 348394.3 | 6271339 | Outside |
| Flooded Gum | 900 | 1 large | | 348397 | 6271333 | Outside |
| Flooded Gum | 100 | 1 small | | 348397.4 | 6271326 | Outside |
| Flooded Gum | 700 | 1 large | | 348397.4 | 6271327 | Outside |
| Flooded Gum | 700 | | | 348402.6 | 6271321 | Inside |
| Flooded Gum | 1400 | | | 348409 | 6271395 | Inside |
| Flooded Gum | 1200 | | | 348417 | 6271114 | Inside |
| Flooded Gum | 600 | 1 medium | | 348417.6 | 6271123 | Inside |
| Flooded Gum | 1000 | | | 348417.7 | 6271168 | Inside |
| Flooded Gum | 500 | | | 348419.8 | 6271145 | Inside |
| Flooded Gum | 600 | 2 small | | 348420.9 | 6271132 | Inside |
| Flooded Gum | 500 | | | 348421.8 | 6271380 | Inside |
| Flooded Gum | 700 | | | 348422.5 | 6271380 | Inside |
| Flooded Gum | 500 | | | 348425.1 | 6271366 | Inside |
| Flooded Gum | 500 | | | 348426.2 | 6271371 | Inside |
| Flooded Gum | 500 | | | 348435.3 | 6271345 | Inside |
| Flooded Gum | 500 | | | 348435.3 | 6271333 | Inside |
| Flooded Gum | 500 | | | 348438.5 | 6271329 | Inside |
| Flooded Gum | 600 | | | 348439.8 | 6271332 | Inside |
| Flooded Gum | 600 | | | 348441.5 | 6271327 | Inside |
| Flooded Gum | 1000 | | | 348444.8 | 6271311 | Inside |
| Flooded Gum | 600 | | | 348453.8 | 6271259 | Inside |
| Flooded Gum | 700 | | | 348455.9 | 6271276 | Inside |
| Flooded Gum | 600 | | | 348458.4 | 6271275 | Inside |
| Flooded Gum | 900 | | | 348464.7 | 6271360 | Inside |
| Flooded Gum | 600 | | | 348470.6 | 6271361 | Inside |
| Flooded Gum | 700 | | | 348472.4 | 6271216 | Inside |
| Flooded Gum | 1100 | | | 348501 | 6271181 | Outside |
| Flooded Gum | 500 | 1 small | | 348508.5 | 6271164 | Outside |
| Flooded Gum | 120 | 3 small | | 348509.5 | 6271161 | Outside |
| Flooded Gum | 500 | | | 348516.7 | 6271171 | Outside |
| Flooded Gum, dying | 700 | 1 small | | 344599.4 | 6273939 | Inside |
| Marri | 700 | | | 348412.5 | 6271270 | Inside |
| Marri | 700 | | | 348412.7 | 6271289 | Inside |
| Marri | 500 | | | 348419.5 | 6271131 | Inside |
| Marri | 800 | | | 348450.3 | 6271157 | Inside |
| Marri | 120 | | | 348451.2 | 6271383 | Inside |
| Marri | 500 | | | 348452.3 | 6271170 | Inside |
| Marri | 110 | | | 348457.3 | 6271158 | Inside |

| SPECIES | DBH | HOLLOW | FEEDING | Easting | Northing | Location |
|---------|------|-------------|---------|----------|----------|----------|
| Marri | 500 | | | 348473.8 | 6271238 | Inside |
| Marri | 600 | | | 348482.2 | 6271303 | Inside |
| Marri | 500 | | | 348482.7 | 6271234 | Inside |
| Marri | 600 | | | 348485 | 6271262 | Inside |
| Marri | 900 | | | 348490.3 | 6271384 | Outside |
| Marri | 1000 | 1 medium | | 348490.5 | 6271385 | Outside |
| Marri | 600 | | | 348492.6 | 6271317 | Inside |
| Marri | 1400 | | | 348494.5 | 6271317 | Outside |
| Marri | 1000 | | | 348497.2 | 6271273 | Outside |

Western Ringtail Possum Scats and Dreys recorded during the 2016 survey

| Drey/Scat | Easting | Northing | Location (inside/outside survey area) |
|---------------|----------|----------|---------------------------------------|
| Drey | 344719.3 | 6273897 | Outside |
| Scat | 344535.8 | 6275080 | Outside |
| Scat | 344594 | 6275081 | Outside |
| Scat | 344587.2 | 6273970 | Inside |
| Scat | 345227.5 | 6273810 | Outside |
| Scat | 344536.6 | 6275160 | Outside |
| Scat | 344614.3 | 6273881 | Outside |
| Scat | 345139.8 | 6273761 | Outside |
| Drey | 344843.5 | 6273807 | Outside |
| Drey | 344950.8 | 6273787 | Outside |
| Drey | 346431.5 | 6273157 | Outside |
| Drey | 344864.2 | 6273806 | Outside |
| Drey | 344535.3 | 6275086 | Outside |
| Drey | 344837.4 | 6273807 | Outside |
| Drey and scat | 344717.8 | 6273894 | Outside |
| Scat | 344594.7 | 6274973 | Outside |
| Drey | 348497.8 | 6271097 | Outside |
| Scat | 348494.6 | 6271102 | Outside |

Parameters of fauna likelihood of occurrence assessment

| Assessment outcome | Description |
|--------------------|--|
| Present | Species recorded during the field survey or from recent, reliable records from within 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 5 km of the survey area however: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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. |

*It is important to note that an unlikely assessment of likelihood does not indicate that the species will not occur within the survey area. This definition indicates that there is a low likelihood of the species occurring within the survey area.

Fauna likelihood of occurrence assessment

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|---|-----------------|-----------|-----------|-----------|------------------------|---|--|
| Birds | | | | | | | |
| <i>Actitis hypoleucos</i> (Common Sandpiper) | MiW | IA, S5 | x | | X | Habitat for this species is varied: coastal and interior wetlands – narrow muddy edges of billabongs, river pools, mangroves, among rocks and snags, reefs or rocky beaches. Avoids wide open mudflats. This species is widespread and scattered, common on the north and west coasts and uncommon in the south-east and interior (Morcombe 2004). | Likely - The species is known to use the coastal and estuarine regions around Bunbury and Busselton. |
| <i>Calidris ferruginea</i> (Curlew Sandpiper) | CR, MiW | Vu, S3 | X | X | | Curlew Sandpipers mainly occur on 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 also recorded inland, though 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. Occasionally they are recorded around floodwaters (DSEWPaC 2013). | Likely: this species has been recorded within 5 km of the survey area and some habitat for this species occurs within the survey area. This species would be a visitor to the survey area. |
| <i>Calidris tenuirostris</i> (Great Knot) | Vu, MiW | Vu, S3 | X | | | In Australasia, the species typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats. This includes 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 | Likely: this species has been recorded within 5 km of the survey area and some habitat for this species occurs within the survey area. This species would be a visitor to the survey area. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|--|-----------------|-----------|-----------|-----------|------------------------|---|--|
| | | | | | | rarely occurs on inland lakes and swamps. Typically, the Great Knot roosts in large groups in open areas, often at the waters edge or in shallow water close to feeding grounds (DSEWPaC 2013). | |
| <i>Calidris acuminata</i> (Sharp-tailed Sandpiper) | MiW | IA, S5 | X | X | | 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, salt pans and hypersaline salt lakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgeland and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves (Higgins and Davies 1996) | Likely: this species has been recorded within 5 km of the survey area and some habitat for this species occurs within the survey area. This species would be a visitor to the survey area. |
| <i>Calidris alba</i> (Sanderling) | | IA, S5 | X | | | 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. Rarely, they are recorded in near-coastal wetlands, such as lagoons, hypersaline lakes, salt ponds and samphire flats (Higgins and Davies 1996) | Unlikely: this species has been recorded within 5 km of the survey area however very limited habitat for this species occurs within the survey area. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|--|-----------------|-----------|-----------|-----------|------------------------|--|---|
| <i>Calidris melanotos</i> (Pectoral Sandpiper) | | IA, S5 | X | | | 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. They forage in shallow water or soft mud at the edge of wetlands (Higgins & Davies 1996). | Unlikely: this species has been recorded within 5 km of the survey area however limited habitat for this species occurs within the survey area. This species would be an occasional visitor to the survey area. |
| <i>Calidris ruficollis</i> (Red-necked Stint) | MiW | IA, S5 | X | X | | The Red-necked Stint is distributed along most of the Australian coastline with large densities on the Victorian and Tasmanian coasts. It is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, near spits, islets and banks (DSEWPaC 2013). | Unlikely: this species has been recorded within 5 km of the survey area however limited habitat for this species occurs within the survey area. This species would be an occasional visitor to the survey area. |
| <i>Calidris subminuta</i> (Long-toed Stint) | MiW | IA, S5 | X | X | | In Australia, the Long-toed Stint occurs in a variety of terrestrial wetlands. They prefer shallow freshwater or brackish wetlands including lakes, swamps, river floodplains, streams, lagoons and sewage ponds. The species is also fond of areas of muddy shoreline, growths of short grass, weeds, sedges, low or floating aquatic vegetation, reeds, rushes and occasionally stunted samphire (Higgins and Davies 1996) | Likely: this species has been recorded within 5 km of the survey area and some habitat for this species occurs within the survey area. This species would be a visitor to the survey area. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|---|-----------------|-----------|-----------|-----------|------------------------|--|---|
| <i>Ixobrychus flavicollis subsp. australis</i> (Australian Black Bittern) | | P1 | X | | X | The Black Bittern inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, this species may occur in flooded grassland, forest, woodland, rainforest and mangroves (Marchant & Higgins 1990). | Unlikely: this species has been recorded within 5 km of the survey area however no habitat for this species occurs within the survey area. |
| <i>Ixobrychus minutus</i> (little Bittern) | | P4 | | | X | The Little Bittern inhabits areas of reed and cumbungi-choked freshwater swamps, lakes, rivers, tussocks in wetland areas and well vegetated lakes (Pizzey and Knight 2012) | Unlikely: this species has not been recorded within 5 km of the survey area and there are very scattered records of this species in the region. |
| <i>Calyptorhynchus banksii subsp. naso</i> (Forest Red-tailed Black-Cockatoo) | Vu | Vu | X | X | | Forest Red-tailed Black Cockatoo typically occurs in dense Jarrah (<i>Eucalyptus marginata</i>), Karri (<i>E. diversicolor</i>) and Marri (<i>Corymbia calophylla</i>) forests, however the species also occurs in a range of other forest and woodland types, including Blackbutt (<i>E. patens</i>), Wandoo (<i>E. wandoo</i>), Tuart (<i>E. gomphocephala</i>), Albany Blackbutt, Yate (<i>E. cornuta</i>), and Flooded Gum | Likely: feeding and potential breeding habitat is available within the survey area and this species is known to occur and/or visit the region. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|--|-----------------|-----------|-----------|-----------|------------------------|--|--|
| | | | | | | (<i>E. rudis</i>) (DSEWPaC, 2012). Habitats also tend to have an understorey of <i>Banksia spp.</i> , <i>Personia spp.</i> , <i>Allocasuarina spp.</i> The Forest red-tailed Black Cockatoo generally nests in hollows in live or dead trees of Marri, Karri, Wandoo, Bullich, Blackbutt, Tuart and Jarrah (DSEWPaC 2012). | |
| <i>Calyptorhynchus baudinii</i> (Baudin's Black Cockatoo) | Vu | En | X | X | | Baudin's Black Cockatoo occurs in high-rainfall areas, usually at sites that are heavily forested and dominated by Marri (<i>Corymbia calophylla</i>) and Eucalyptus species, especially Karri (<i>E. diversicolor</i>) and Jarrah (<i>E. marginata</i>). The species also occurs in woodlands of Wandoo (<i>E. wandoo</i>), Blackbutt (<i>E. patens</i>), Flooded Gum (<i>E. rudis</i>), and Yate (<i>E. cornuta</i>). Baudin's Black Cockatoo breeds in the Jarrah, Marri and Karri forests of the deep south-west in areas averaging more than 750 mm of rainfall annually. The range of the species extends from Albany northward to Gidgegannup and Mundaring (east of Perth), and inland to the Stirling Ranges and near Boyup Brook. Preferred roosts are in areas with a dense canopy close to permanent sources of water, that provide the birds with protection from weather conditions (DSEWPaC, 2012). | Likely: feeding and potential breeding habitat is available within the survey area and this species is known to occur and/or visit the region. |
| <i>Calyptorhynchus latirostris</i> (Carnaby's Black Cockatoo) | En | En | X | X | | This species mainly occurs in uncleared or remnant native eucalypt woodlands and in shrubland or kwongan heathland dominated by <i>Hakea</i> , <i>Dryandra</i> , <i>Banksia</i> and <i>Grevillea</i> species. The species also occurs in forests containing Marri (<i>Corymbia calophylla</i>), Jarrah (<i>Eucalyptus marginata</i>) or Karri (<i>E. diversicolor</i>). Breeding usually occurs in the Wheatbelt region of | Likely: feeding and potential breeding habitat is available within the survey area and this species is known to occur and/or visit the region. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|--|-----------------|-----------|-----------|-----------|------------------------|---|---|
| | | | | | | Western Australia, with flocks moving to the higher rainfall coastal areas to forage after the breeding season. Feeds on the seeds of a variety of native plants, including <i>Allocasuarina</i> , <i>Banksia</i> , <i>Dryandra</i> , <i>Eucalyptus</i> , <i>Grevillea</i> and <i>Hakea</i> , and some introduced plants (DSEWPaC, 2012). | |
| <i>Cacatua pastinator subsp. pastinator</i> (Muir's Corella) | | S6 | X | | | Muir's Corella is now confined to a small region from Boyup Brook, McAlinden and Qualeup, south to Lake Muir and the lower Perup River, and east to Frankland and Rocky Gully (DEC 2008). Muir's Corella occurs in eucalyptus woodlands that are dominated by Wandoo (<i>Eucalyptus wandoo</i>), Marri, (<i>Corymbia calophylla</i>), or Jarrah, (<i>E. marginata</i>). Most suitable woodland habitat for this species now consists of remnant patches. These patches occur in or adjacent to farmland, or along roadsides, paddock boundaries or watercourses, and sometimes as a few, isolated shade trees in otherwise cleared paddocks (Garnett & Crowley 2000). | Unlikely: this species current distribution is confined to a small region, east of the survey area. A small amount of habitat for this occurs within the survey area. |
| <i>Charadrius rubricollis</i> (Hooded Plover) | | P4 | x | | | The Hooded Plover is a wader that is endemic to Australia with most of the remaining birds occurring in southern Western Australia. Hooded Plovers primarily inhabit sandy, ocean beaches, with the highest densities on beaches with large amounts of beach-washed seaweed, that are backed by extensive open dunes. In Western Australia the species also inhabits inland and coastal salt lakes. This species is known to occur on coastal areas and inland lakes in the Esperance region. They are mainly found on the coast during the dry season, but some birds | Unlikely: this species has been recorded within 5 km of the survey area however limited habitat for this species occurs within the survey area. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|---|-----------------|-------------------|-----------|-----------|------------------------|--|---|
| | | | | | | move inland during the wet season (Morcombe, 2004). | |
| <i>Charadrius leschenaultii</i> <i>leschenaultii</i> (Greater Sand Plover) | MiW | VU, S3, IA, S5 | | | X | In the non-breeding grounds in Australasia, the species is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons, and inshore reefs, rock platforms, small rocky islands or sand cays on coral reefs. They are occasionally recorded on near-coastal saltworks and saltlakes, including marginal saltmarsh, and on brackish swamps (DSEWPaC 2013). | Highly unlikely: this species has not been recorded within 5 km of the survey area and no habitat for this species occurs within the survey area. |
| <i>Charadrius mongolus</i> (Lesser Sand Plover) | En, MiW | En, S2, IA, S5 | | X | | In non-breeding grounds in Australia, this species usually occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops. It also sometime occurs in short saltmarsh or among mangroves. The species also inhabits saltworks and near-coastal salt pans, brackish swamps and sandy or silt islands in river beds (Marchant & Higgins 1993). | Highly unlikely: this species has not been recorded within 5 km of the survey area and no habitat for this species occurs within the survey area. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|--|-----------------|-----------|-----------|-----------|------------------------|---|---|
| <i>Charadrius bicinctus</i> (Double-banded Plover) | MiW | IA, S5 | | X | | 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. The species is sometimes associated with coastal lagoons, inland saltlakes and saltworks. It is also found on seagrass beds, especially <i>Zostera</i> , which, when exposed at low tide, remain heavily saturated or have numerous water-filled depressions (R.J Pierce in Marchant and Higgins 1993) | Unlikley: this species has not been recorded within 5 km of the survey area however habitat for this species occurs within the survey area. |
| <i>Limosa lapponica</i> (Bar-tailed Godwit) | Mi We | IA, S5 | | x | | 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 (Morcombe 2004). They usually forage near the edge of water or in shallow water, mainly in tidal estuaries and harbours and roost on sandy beaches, sandbars, spits and also in near-coastal saltmarshs (Marchant & Higgins 1993). | Highly unlikley: this species has not been recorded within 5 km of the survey area and no habitat for this species occurs within the survey area. |
| <i>Oxyura australis</i> (Blue-billed Duck) | | P4 | X | | X | The blue-billed duck is a small Australian almost entirely aquatic duck, with both the male and female growing to a length of 40 cm. The male has a slate-blue bill which changes to bright-blue during the breeding season (Morcombe 2004). The blue-billed duck is endemic to Australia's temperate regions, ranging from the south west of Western Australia, extending to southern Queensland, through New South Wales and | Unlikley - The species is known from the region however the habitat present in the survey area is not suitable for this species. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|--|-----------------|-----------|-----------|-----------|------------------------|--|--|
| | | | | | | Victoria, to Tasmania. The species is readily seen on freshwater lakes and billabongs where deep fresh water is present (Morcombe 2004). | |
| <i>Pandion haliaetus</i> (Osprey) | Mi We | IA, S5 | | X | | Osprey are a widespread bird of prey found around the entire coast line of Australia. The species feeds on fish and nests on large platforms of sticks and vegetation including seaweed and debris. Osprey do follow esteries and large rivers inland to arid areas where large pools are formed (Morcombe 2004). However shelter and food source is required. | Present: this species was sighted during the assessment. |
| <i>Motacilla cinerea</i> (Grey Wagtail) | Mi Te | IA, S5 | | X | | 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 - this species is not known from this region. |
| <i>Botaurus poiciloptilus</i> (Australasian Bittern) | En | En, S2 | | X | | The Australasian Bittern occurs mainly in densely vegetated freshwater wetlands and, rarely, in estuaries or tidal wetlands. The species favours foraging in tall, dense vegetation in shallow permanent or seasonal fresh water. In the southwest of Western Australia, the Bittern is now largely confined to coastal areas especially along the south coast where it is found in beds of tall rush mixed with or near short fine sedge or open pools (Burbridge 2004). It also occurs around swamps, lakes, pools, rivers and channels fringed with lignum Muehlenbeckia, | Unlikely: this species has not been recorded within 5 km of the survey area however some habitat for this species occurs within the survey area. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|--|-----------------|-----------|-----------|-----------|------------------------|--|---|
| | | | | | | canegrass <i>Eragrostis</i> or other dense vegetation (Marchant & Higgins 1990). It occasionally ventures into areas of open water or onto banks. | |
| <i>Plegadis falcinellus</i> (Glossy Ibis) | MiW | IA, S5 | X | | | Within Australia, the Glossy Ibis is generally located east of the Kimberley. The species is also known to be patchily distributed in the rest of Western Australia. Its preferred habitat for foraging and breeding are freshwater marshes at the edges of lakes and rivers, lagoons, floodplains, wet meadows, swamps, reservoirs, sewerage ponds, rice-fields and cultivated areas under irrigation (DSEWPaC 2013). | Unlikely: this species has been recorded within 5 km of the survey area however limited to no habitat for this species occurs within the survey area. |
| <i>Pluvialis fulva</i> (Pacific Golden Plover) | MiW | IA, S5 | X | | | In non-breeding grounds in Australia this species usually inhabits coastal habitats, though it occasionally occurs around inland wetlands. Pacific Golden Plovers usually occur on beaches, mudflats and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as <i>Sarcocornia</i> , or beds of seagrass) in sheltered areas including harbours, estuaries and lagoons, and also in evaporation ponds in saltworks. The species is also sometimes recorded on islands, sand and coral cays and exposed reefs and rocks. They are less often recorded in terrestrial habitats, usually wetlands such as fresh, brackish or saline lakes, billabongs, pools, swamps and wet claypans, especially those with muddy margins and often with submerged vegetation or short emergent grass (Marchant and Higgins 1993) | Unlikely: this species has been recorded within 5 km of the survey area however limited to no habitat for this species occurs within the survey area. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|--|-----------------|-----------|-----------|-----------|------------------------|--|---|
| <i>Tringa glareola</i> (Wood Sandpiper) | MiW | IA, S5 | X | X | X | The Wood Sandpiper has its largest numbers recorded in north-west Australia. Typical habitat includes well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. This species does not breed in Australia (DSEWPaC 2013). | Unlikely: this species has been recorded within 5 km of the survey area however limited to no habitat for this species occurs within the survey area. |
| <i>Ninox connivens connivens</i> (Barking Owl) | | P2 | | | X | The southwest subspecies of the Barking Owl is found in the lower south-west region and is very scarce. There is little known about the subspecies (Nevill 2008). Barking Owls are found in open woodlands and the edges of forests, often adjacent to farmland. They are less likely to use the interior of forested habitat. They are usually found in habitats that are dominated by eucalyptus species, particularly red gum, and, in the tropics, paperbark species. They prefer woodlands and forests with a high density of large trees and particularly sites with hollows that are used by the owls as well as their prey. Habitat preference is strongly biased towards areas that provide a high density of large trees greater than 60cm diameter and a high density of hollow trees of a range of sizes, including large hollows greater than 15cm diameter which are suitable nesting places for Barking Owls. Roost sites are often located near waterways or wetlands. | Unlikely: this species has not been recorded within 5 km of the survey area however limited to no habitat for this species occurs within the survey area. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|---|-----------------|-----------|-----------|-----------|------------------------|--|---|
| <i>Tringa nebularia</i> (Common Greenshank) | MiW | IA, S5 | X | X | X | The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands and will also use artificial wetlands (Higgins and Davis 1996) | Likely: this species has been recorded within 5 km of the survey area however habitat for this species occurs within the survey area. |
| <i>Tringa stagnatilis</i> (Marsh Sandpiper) | MiW | IA, S5 | X | | X | The Marsh Sandpiper is found on coastal and inland wetlands throughout Australia. It lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks (DSEWPac 2013). | Likely: this species has been recorded within 5 km of the survey area however habitat for this species occurs within the survey area. |
| <i>Tyto novae-hollandiae subsp. novae-hollandiae</i> (Masked Owl) | | P3 | X | | X | The Masked Owl is found across a range of habitats from wet sclerophyll forest, dry sclerophyll forest, non eucalypt dominated forest, scrub and cleared land with remnant old growth trees. There are however several aspects of habitat preference which appear to be common: the Masked Owl requires large hollows in old growth eucalypts for nesting; it often favours areas with dense understorey or ecotones comprising dense and sparse ground cover, they are often recorded foraging within 100-300m of the boundary of two vegetation types (Bell & Mooney, 2002). | Unlikely: this species has been recorded within 5 km of the survey area however limited habitat for this species occurs within the survey area. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|--|-----------------|-----------|-----------|-----------|------------------------|--|---|
| <i>Ardea ibis</i> (Cattle Egret) | | IA, S5 | X | | | The Cattle Egret is a common and widespread species. Typical habitat includes tropical and temperate grasslands, wooded lands and terrestrial wetlands. It often forages away from water on low lying grasslands, improved pastures and croplands and roosts in trees, or amongst ground vegetation in or near lakes and swamps (Morcombe, 2004). | Likely: this species has been recorded within 5 km of the survey area and habitat for this species occurs within the survey area. |
| <i>Ardea modesta</i> (Eastern Great Egret) | | IA, S5 | X | | | The eastern Great Egret is widespread in Australia. They have been reported in a wide range of wetland habitats, include swamps and marshes; margins of rivers and lakes; damp or flooded grasslands, pasture or agricultural lands; reservoirs; sewerage treatment ponds; drainage channels; salt pans; salt marshes; mangrove, and a range of coastal/marine habitats (DSEWPaC 2013) | Likely: this species has been recorded within 5 km of the survey area and habitat for this species occurs within the survey area. |
| <i>Falco peregrinus</i> (Peregrine Falcon) | | S7 | X | | | The Peregrine Falcon is seen occasionally anywhere in the south-west of Western Australia. It is found everywhere from woodlands to open grasslands and coastal cliffs - though less frequently in desert regions. The species nests primarily on ledges of cliffs, shallow tree hollows, and ledges of building in cities. (Morcombe, 2004). | Likely: this species has been recorded within 5 km of the survey area and habitat for this species occurs within the survey area. |
| Reptiles | | | | | | | |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|---|-----------------|-----------|-----------|-----------|------------------------|--|--|
| <i>Elapognathus minor</i> (Short-nosed Snake) | | P2 | X | | | The Short-nosed Snake occurs from Busselton south to Two-Peoples Bay. Inhabits heaths edging swamps and shelters in low dense vegetation such as tussocks and sedges (Wilson & Swan 2013). | Likely: this species has been recorded within 5 km of the survey area and habitat for this species occurs within the survey area. |
| <i>Ctenotus delli</i> (dell's Skink) | | P4 | | | X | Associated with Jarrah-Marri woodland that has a shrub-dominated understorey, on laterite, sandy or clay soils. It is occasionally found on granite outcrops, and is absent from the Swan Coastal Plain (Wilson and Swan, 2013). | Highly unlikely: this species has not been recorded within 5 km of the survey area and not habitat for this species occurs within the survey area. |
| <i>Ctenotus ora</i> (Coastal Plains Skink) | | P3 | | | X | The Coastal Plains Skink is locally restricted the sandy regions of the Swan Coastal Plain south of Perth. It inhabits open euclaypt woodland over Banksia, as well as sandy coastal plain and coastal dunes between Pinjarra and Yallingup Brook (Wilson and Swan 2013). | Unlikely: habitat for this species occurs within the survey area, however this species has been recorded within 27 km of the survey area. |
| Mammals | | | | | | | |
| <i>Bettongia penicillata ogilbyi</i> (Woylie) | En | CR | | | X | Preferred habitat for the Woylie includes dense undergrowth, logs and rock-cavities and occasionally in burrows (Burbidge 2004). Scattered Woylie populations may be found throughout the Jarrah forest in the south-west corner of Western Australia. Extant naturally occurring populations of the species are | Highly unlikely: this species has not been recorded within 5 km of the survey area and no habitat for this species occurs within the survey area. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|---|-----------------|-----------|-----------|-----------|------------------------|--|--|
| | | | | | | restricted to three small wheatbelt reserves in WA – Dryandra Woodland, Tutanning Nature Reserve and Perup Forest. All are characterised by the presence of thickets of the plant <i>Gastrolobium</i> (Van Dyck and Strahan 2008). The species historically occurred in a wide variety of habits, however is now restricted to forests and areas where predation has been controlled (or excluded). | |
| <i>Dasyurus geoffroii</i> (Chuditch, Western Quoll) | Vu | Vu | | X | X | The Chuditch inhabits eucalypt forest (especially Jarrah, <i>Eucalyptus marginata</i>), dry woodland and mallee shrublands. In Jarrah forest, Chuditch populations occur in both moist, densely vegetated, steeply sloping forest and drier, open, gently sloping forest. Most diurnal resting sites in sclerophyll forest consist of hollow logs or earth burrows (Van Dyke & Strahan, 2008). The species can travel large distances, has a large home range and is sparsely populated through a large portion of its range. | Unlikely: there are three records of this species within 5 km of the survey area (latest record 2010), however limited habitat for this species occurs within the survey area. This species may occasionally visit the survey area. |
| <i>Hydromys chrysogaster</i> (Water Rat) | | P4 | X | | X | Water-rats live primarily in a wide variety of freshwater habitats, from sub-alpine streams and other inland waterways to lakes, swamps, farm dams and irrigation channels and are thought to be one of the few native species to have at least partially benefited from human encroachment (Gardner and Serena, 1995) | Likely - there are three records of this species within 5 km of the survey area (latest record 2011). The drain links into the Vasse River and a wetland which are both permanent water bodies with suitable habitat for maintaining a Water Rat population. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|--|-----------------|-----------|-----------|-----------|------------------------|---|---|
| <i>Isoodon obesulus subsp. fusciventer</i> (Quenda, Southern Brown Bandicoot) | | P4 | X | | X | The Quenda prefers dense scrubby, often swampy, vegetation with dense cover up to one metre high. However, it also occurs in woodlands, and may use less ideal habitat where this habitat occurs adjacent to the thicker, more desirable vegetation. The species often feeds in adjacent forest and woodland that is burnt on a regular basis and in areas of pasture and cropland lying close to dense cover (Van Dyck and Strahan, 2008). | Present – Quenda were recorded in the current and previous survey by GHD (2010). |
| <i>Phascogale tapoatafa subsp. tapoatafa</i> (Southern Brush-tailed Phascogale, Wambenger) | | Vu | X | | X | Dry sclerophyll forests and open woodlands with a generally sparse ground-storey, which contain suitable nesting resources such as tree hollows, rotted stumps and tree cavities (Van Dyck and Strahan, 2008). | Likely: habitat is available to this species and they are known to occur in the region, however this species would be restricted to the Eucalypt woodland. |
| <i>Pseudocheirus occidentalis</i> (Western Ringtail Possum) | En | En | X | X | X | The Western Ringtail Possum occurs in and near coastal Peppermint Tree (<i>Agonis flexuosa</i>) forest and Tuart (<i>Eucalyptus gomphocephala</i>) dominated forest with a Peppermint Tree understorey from Bunbury to Albany. Also occurs in Jarrah (<i>Eucalyptus marginata</i>) forest and Jarrah-Marri (<i>Corymbia calophylla</i>) forest associated with Peppermint Tree (Van Dyck and Strahan, 2008). | Present: Western Ringtail Possum was recorded in the current and previous survey. |
| <i>Macropus eugenii derbianus</i> (Tamar Wallaby) | | P4 | | | X | The Tamar Wallaby inhabits dense, low vegetation for daytime shelter and open grassy areas for feeding. Inhabits coastal scrub, heath, dry sclerophyll (leafy) forest and thickets in mallee and woodland The tamar wallaby is currently known to inhabit three islands in the Houtman Abrolhos group, Garden Island near | Highly unlikely: this species is restricted to three islands off WA and nine sites on the mainland. The nearest record of this species is over 50 km from the |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|--|-----------------|-----------|-----------|-----------|------------------------|---|---|
| | | | | | | Perth, Middle and North Twin Peak Islands in the Archipelago of the Recherche, and at least nine sites on the mainland including, Dryandra, Boyagin, Tutanning Batalling (reintroduced) Perup, private property near Pingelly, Jaloran Road timber reserve near Wagin, Hopetown, Stirling Range National Park, and Fitzgerald River National Park (Van Dyck and Strahan 2008). | survey area. |
| <i>Macropus Irma</i> (Western Brush Wallaby) | | P4 | | | X | 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). | Unlikely: this species has been recorded within 11 km of the survey area (record dated 1995), however some habitat occurs within the survey area. |
| <i>Myrmecobius fasciatus</i> (Numbat) | Vu | EN | | | X | The Numbat's distribution once encompassed a number of habitat types, including eucalypt forest, eucalypt woodland, Acacia woodland and Triodia grasslands. Current populations occupy several different habitat types: upland Jarrah forest, open eucalypt woodland, banksia woodland and tall closed shrubland. There are currently two remnant native populations at Dryandra and Perup, WA and several reintroduced populations including Boyagin Nature Reserve, Tutanning Nature Reserve, Batalling block and Karroun Hill Nature Reserve. At Dryandra, numbats inhabit brown mallet (<i>Eucalyptus astringens</i>) plantations. Habitats | Highly unlikely: this species has been recorded 40 km from the survey area (record dated 1973), however some habitat occurs within the survey area. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|--|-----------------|-----------|-----------|-----------|------------------------|--|---|
| | | | | | | usually have an abundance of termites in the soil, hollow logs and branches for shelter (Friend 2008). This species has been part of a recovery plan since the late 1980's and has been relocated into several areas of the south west (Van Dyck and Strahan, 2008). | |
| <i>Falsistrellus mackenziei</i> (Western False Pipistrelle) | | P4 | | | X | The Western False Pipistrelle occurs in wet sclerophyll forest dominated by Karri (<i>Eucalyptus diversicolor</i>), and in the high rainfall zones of the Jarrah (<i>E. marginata</i>) and Tuart (<i>E. gomphocephala</i>) forests. The species is restricted to areas in or adjacent to stands of old growth forest. It has also been recorded in mixed Tuart-Jarrah tall woodlands on the adjacent coastal plain. Marri (<i>E. calophylla</i>), Sheoak (<i>Casuarina heugeliana</i>) and Peppermint (<i>Agonis flexuosa</i>) trees are often co-dominant at its collection localities (Churchill 2008; McKenzie & Start 1999). | Unlikely: this species has been recorded 17 km from the survey area, however some habitat occurs within the survey area in the form of the eucalypts in the southern section. |
| <i>Setonix brachyurus</i> (Quokka) | Vu | Vu | x | x | x | Dense forests and thickets, streamside vegetation, heaths and shrublands <i>Agonis linearifolia</i> -dominated swamps in the Jarrah (<i>Eucalyptus marginata</i>) forest. The northern extent of the current distribution on the mainland is in the Jarrah forest immediately south-east of the Perth metropolitan area, from where it extends southward through the southern Jarrah, Marri and Karri forests to the south coast, but largely confined throughout to areas receiving an annual rainfall of 1,000 millimetres or more (Van Dyck and Strahan, 2008). | Unlikely: an old record (1931) of this species occurs within 6 km from the survey area and limited to no habitat occurs within the survey area. |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|---|-----------------|-----------|-----------|-----------|------------------------|---|---|
| Fish | | | | | | | |
| <i>Nannatherina balstoni</i> (Balston's Pygmy Perch) | Vu | Vu, S3 | X | | X | Balston's Pygmy Perch inhabits acidic, tannin-stained freshwater pools, streams and lakes in peat flats within 30 km of the coast of south-west Western Australia, preferring shallow water, and commonly associated with tall sedge thickets and inundated riparian vegetation (Allen et al. 2002). | Likely: a record from 2008 of this species occurs within 5 km of the survey area and habitat occurs within the survey area. |
| <i>Galaxiella nigrostriata</i> (Black-stripe minnow) | | P3 | | | X | This freshwater fish generally lives in acidic black water (tannin stained) in seasonal wetlands between Muchea and Albany, but mostly within the Swan Coastal Plain. These wetlands only hold water for about half of the year. Also found in a range of conditions from slow-flowing rivers, swamps, freshwater lakes and pools, and road side ditches. It can often be found in and around submerged vegetation in lakes and swamps (Morgan et al. 1996; Allen et al. 2002). | Unlikely: this species has not been recorded within 5 km of the survey area (nearest record is over 70 km from survey area) however some habitat occurs within the survey area. |
| <i>Geotria australis</i> (Pouched Lamprey) | | P1 | | | X | This species utilises freshwater streams in the south west (Perth to Albany) to breed and grow before migrating to the ocean to mature (Allen et al. 2002). Dams and weirs are the main obstacles for the species. Sporadic records exist throughout the South West Coast Drainage Division between Perth and Albany including the Swan, Canning, Serpentine, Margaret, Donnelly, Warren and Goodga rivers. | Likely: a record of this species from 1996 occurs 23 km north west of the survey area and habitat for this species occurs within the survey area. This species is known from scattered occurrences throughout the south west. |
| Invertebrates | | | | | | | |

| Species Name | EPBC Act Status | WA Status | Naturemap | EPBC PMST | DPaW South-West Region | Description and habitat requirements | Likelihood |
|---|-----------------|-----------|-----------|-----------|------------------------|--|--|
| <i>Westralunio carteri</i> (Carter's Freshwater Mussel) | | Vu | X | | | Carter's Freshwater Mussel is usually found in freshwater river pools. They are most common in areas with muddy, silty and sandy bottoms and flowing permanent water. Environmental tolerances of <i>W. carteri</i> are not precisely known but they can be found where water temperatures range from 4° C to over 30° C. | Present: this species was sighted during the assessment. |
| <i>Engaewa reducta</i> (Dusborough burrowing Crayfish) | CR | EN | | | X | All <i>Engaewa reducta</i> records have been within the Busselton Shire boundary, bounded by the Carbinup River to the east and the Leeuwin-Naturaliste Ridge to the west. This species is usually found in ephemeral drainage swamp systems and to date have only been located in headwater seepage/swamp areas of drainage systems that flow north into Carbinup River, Mary Brook and Station Gully or directly into Geographe Bay. The vegetation is usually very dense heathland dominated by myrtaceous shrubs and the soils have a high sand content (DEC 2008) | Unlikely: the nearest record of this species is over 18 km from the survey area. Limited to no habitat for this species occurs within the survey area. |

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Appendix C

Biological Assessment Report

– Rocky Gully

Flora, Vegetation and Fauna Survey, Rocky Gully



Flora, Vegetation and Fauna Survey, Rocky Gully

Rocky Gully Offsets Site

Client: Water Corporation

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Executive Summary

The Water Corporation proposes to use Rocky Gully Reserve (no. 24734) as an offset site for impacts on Black Cockatoo habitat and riparian vegetation for works conducted in other areas of the State. The proposed offset site (the Project Area) is approximately 671 ha of intact native vegetation containing a Jarrah and Marri Forest and a wetland system.

A Level 1 flora and vegetation assessment, Level 1 fauna assessment, targeted Black Cockatoo survey and riparian assessment were undertaken, which comprised a desktop review and field survey. This report presents the existing environment, methodology and the results of these assessments.

A detailed desktop assessment was undertaken incorporating results (where relevant) from the Department of Parks and Wildlife (DPaW) database, NatureMap and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (PMST). The desktop assessment identified no Threatened or Priority communities present in the vicinity of the Project Area. Database records indicated that a high number of conservation significant flora species that may occur, including 14 that are known or likely to occur, and eight that may occur. Similarly, the desktop fauna assessment identified 48 conservation significant fauna species that could potentially occur within the Project Area. Of these, six species are likely to occur, 18 species may occur and 24 species are unlikely to occur. The species likely to occur in the Project Area include four bird and two mammal species. The likelihood of occurrence of fauna species was determined by assessing the likely presence of suitable habitat in the Project Area, and reviewing the recent records and distribution of the species.

The field surveys were undertaken by Botanist Floora de Wit and Ecologist Jared Leigh on 11-14 July 2016. The Project Area was traversed by vehicle via existing tracks and on foot to a certain extent. Data was captured at 18 sample point locations considered suitable for representing environmental values observed within the Project Area. Additional opportunistic observations were made whilst traversing the area. The Level 1 fauna survey primarily focused on recording observations of fauna (particularly conservation significant species) within the Project Area, which included evidence of fauna activity such as scats, tracks, burrows, foraging evidence and diggings. Seven microhabitat searches of leaf litter, bark, fallen logs and rocks were conducted opportunistically when appropriate areas were located, and motion activated cameras were installed at three locations to observe fauna, particularly nocturnal fauna. Ten detailed habitat assessments were also completed across the Project Area. For Black Cockatoos, a breeding habitat and foraging habitat assessment was conducted at eight sites within the Project Area. Opportunistic observations of Black Cockatoos and roosting were recorded.

As anticipated, no conservation significant vegetation communities were observed in the Project Area. It cannot be confidently determined whether Threatened or Priority flora species are present as this was not an objective of the field survey. One *Hibbertia* species was collected and may represent the Priority 4 species *Hibbertia helianthemoides*. Lacking suitable identifiable characteristics such as flowers due to the timing of the field survey, the identification could not be determined with confidence. This species was collected at one location and recorded at two other locations. One *Andersonia* species was collected, which may represent a Priority 3 *Andersonia* species. This species had old flowering material and was therefore submitted to the Western Australian Herbarium (WAH) for formal identification by a DPaW taxonomist. It is likely that further surveys would lead to the identification of more conservation significant flora species as the vegetation is in excellent condition with no weeds recorded.

Sixteen fauna species were recorded within the Project Area during the field survey. This comprised 10 bird, four mammal and one amphibian species. Of the 16 fauna species observed, one species was of conservation significance, Baudin's Black Cockatoo (*Calyptorhynchus baudinii*), which is listed as Vulnerable under the EPBC Act and Endangered under the *Wildlife Conservation Act 1950* (WC Act). Baudin's Black Cockatoo were seen or heard four times within the Project Area. Four introduced fauna species were also recorded in the Project Area. The European Wild Rabbit (*Oryctolagus cuniculus*) and the Red Fox (*Vulpes vulpes*) were both recorded and are listed as Declared Pests under the *Biosecurity and Agricultural Management Act 2007* (BAM Act).

Three main fauna habitats (including Cleared Areas) have been defined and mapped within the Project Area. The most common fauna habitat was the Marri and Jarrah Forest at approximately 81% of the Project Area. This habitat varies in density of understorey but would generally support many of the common and conservation significant fauna species likely to occur in the Project Area, such as Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*), Muir's Corella (*Cacatua pastinator pastinator*), Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*), Baudin's Black Cockatoo (*Calyptorhynchus baudinii*), Chuditch (*Dasyurus geoffroyi*) and Western Brush Wallaby (*Macropus irma*).

The Project Area contains a significant area of young and mature Marri and Jarrah trees with Black Cockatoo breeding potential (Diameter at Breast Height [DBH] >500cm). It also contains and is located adjacent to several freshwater sources, but does not contain habitats dominated by proteaceous species. The Black Cockatoo foraging assessments determined that the Project Area contains approximately 547 ha of High quality foraging habitat for all three Western Australian Black Cockatoo species. This aligns with the Jarrah and Marri Forest fauna habitat, which would also provide Quality breeding habitat due to the moderate density of eucalypts with a DBH >500 cm. Baudin's Black Cockatoo were observed foraging on Marri within the Project Area on two occasions, with recent evidence of Baudin's Black Cockatoo foraging within the Project Area recorded an additional three times during the field survey.

Riparian vegetation was mapped as vegetation community MpAsCa. This community incorporates all wetland vegetation in the Project Area, including narrow streams with running water and wide shallow troughs with inundated soils. All riparian vegetation was considered as A grade vegetation in the Pristine category according to the foreshore condition assessment developed by the Waters & Rivers Commission (1999). No weeds were observed in the wetland vegetation and there has been no obvious historical disturbance.

A summary of total area for the environmental values identified as requiring an offset are outlined in Table 1.

Table 1 Summary of environmental values assessed for the Rocky Gully proposed offset site

| Environmental Values | Foraging | Breeding | Area |
|----------------------------------|----------|----------|-----------|
| Carnaby's Black Cockatoo | X | X | 547 ha |
| Forest Red-tailed Black Cockatoo | X | X | 547 ha |
| Baudin's Black Cockatoo | X | X | 547 ha |
| Riparian vegetation | NA | NA | 111.60 ha |

1.0 Introduction

1.1 Background

The Water Corporation is proposing to use Reserve 24734 in Rocky Gully (Rocky Gully Reserve as an environmental offset site (the Project Area). The proposed offset would be required to offset impacts on Black Cockatoo habitat and riparian vegetation. Water Corporation would seek to transfer ownership of the proposed offset site to the Department of Parks and Wildlife (DPaW) for conservation purposes if it was determined to meet the appropriate criteria as an offset.

The offsets referral guide (DSEWPaC, 2012a) requires reporting on the extent to which the proposed offset correlates to and adequately compensates for the impacts on the attributes of specific environmental values. For the purposes of this Project, these environmental values refer to Black Cockatoo foraging, breeding and roosting habitat, and riparian vegetation.

1.2 Location

The Project Area is located adjacent to the Rocky Gully townsite, approximately 110 km northwest of Albany and 360 km southeast of Perth. The Study Area incorporates a 10 km buffer around the Project Area. The Study Area was used to provide context for the desktop assessment and field survey results.

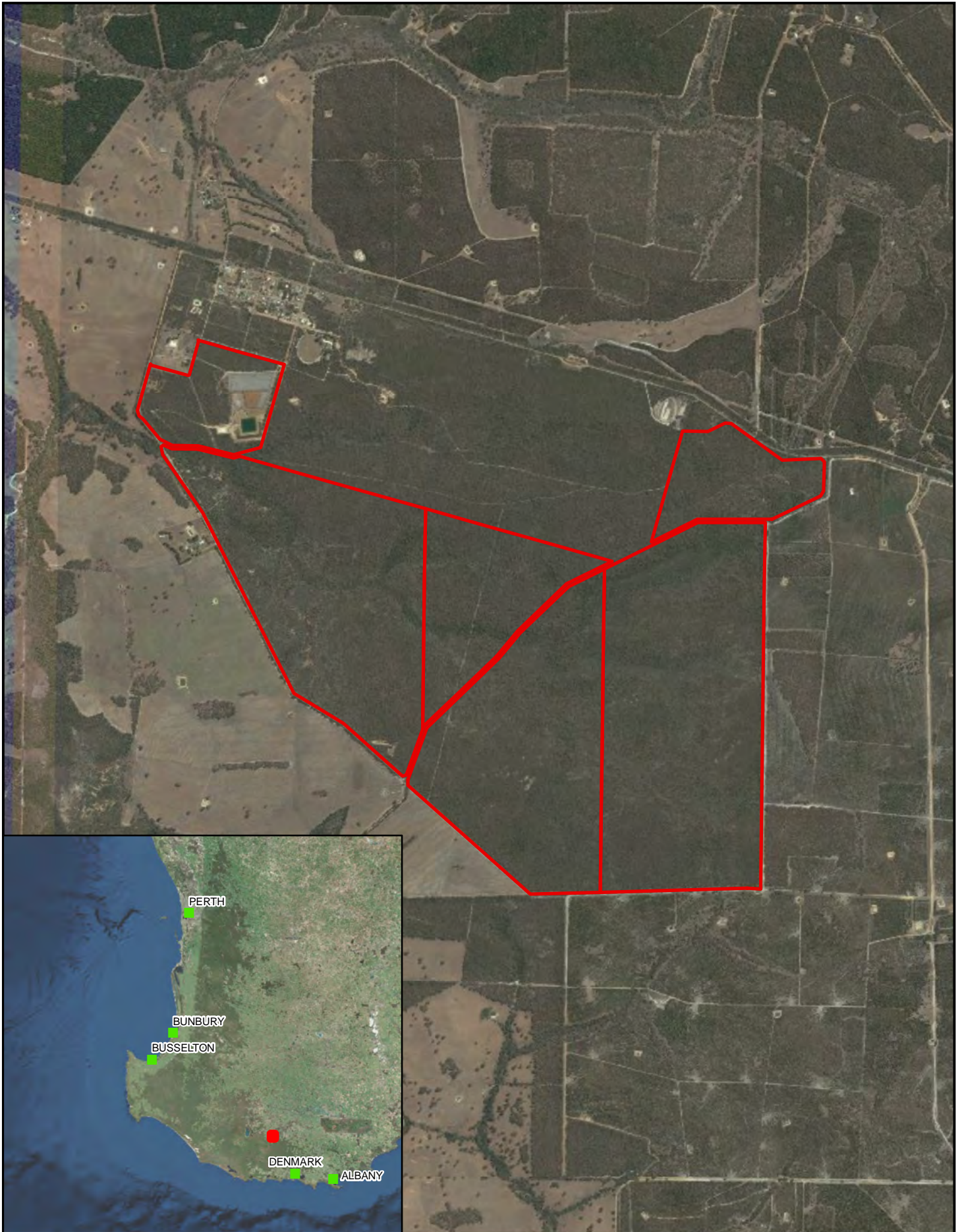
1.3 Objectives



The objective of the project is to assess the factors relevant to the offset proposal, including Black Cockatoo breeding, foraging and roosting habitat, and mapping riparian vegetation within the Project Area.

The specific objectives of the assessment were to:

- conduct a Level 1 flora and vegetation assessment
- map and delineate vegetation communities and vegetation condition
- conduct a Level 1 fauna assessment
- assess the extent and quality of Black Cockatoo foraging, roosting and breeding habitat
- assess extent and condition of riparian vegetation.

This technical document describes the existing environment, methodology, desktop and field results and provides a preliminary discussion of results.



| | | | |
|--|---|---|---|
| <p>PROJECT ID 60507828 CREATED BY DGF APPROVED BY FDW LAST MODIFIED 08 AUG 2016</p> <p>AECOM www.aecom.com</p> | <p>LEGEND  Project Area</p> | <p>Project Area</p> | |
| <p> DATUM GDA 1994, PROJECTION MGA ZONE 50</p> <p>0 230 460 690 920 metres</p> <p>1:30,000 when printed at A4</p> | <p><small>Data sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerotrid, IGN, IGP, swisstopo, and the GIS User Community</small></p> | <p>WATER CORPORATION ROCKY GULLY FLORA VEGETATION AND FAUNA SURVEY</p> | <p>Figure 1</p> |

2.0 Existing Environment

2.1 Climate

The Project Area is located in the southwest of Western Australia which experiences a Mediterranean climate. A Mediterranean climate is characterised by warm to hot dry summers and mild to cool wet winters. The Mediterranean climate in Australia is a result of the Indian Ocean High, a high pressure cell that shifts towards the poles in summer and the equator in winter, playing a major role in the formation of the deserts of Western Australia, and the Mediterranean climate of southwest and south-central Australia. Precipitation occurs during winter months, with the possibility of some summer storms.

The nearest Bureau of Meteorology (BoM) weather station is Rocky Gully station 9661. Rocky Gully station has recorded an average annual rainfall of 713.7 mm since 1954, with the majority of rainfall occurring during May to August (Figure 2 [BoM, 2012]). The months preceding the survey showed higher than average rainfall in January, March, April and May.

Average maximum temperatures peak between December and February and coincide with low rainfall averages (BoM, 2016). Temperatures at the time of the survey varied between 10.8-16.9°Celsius.

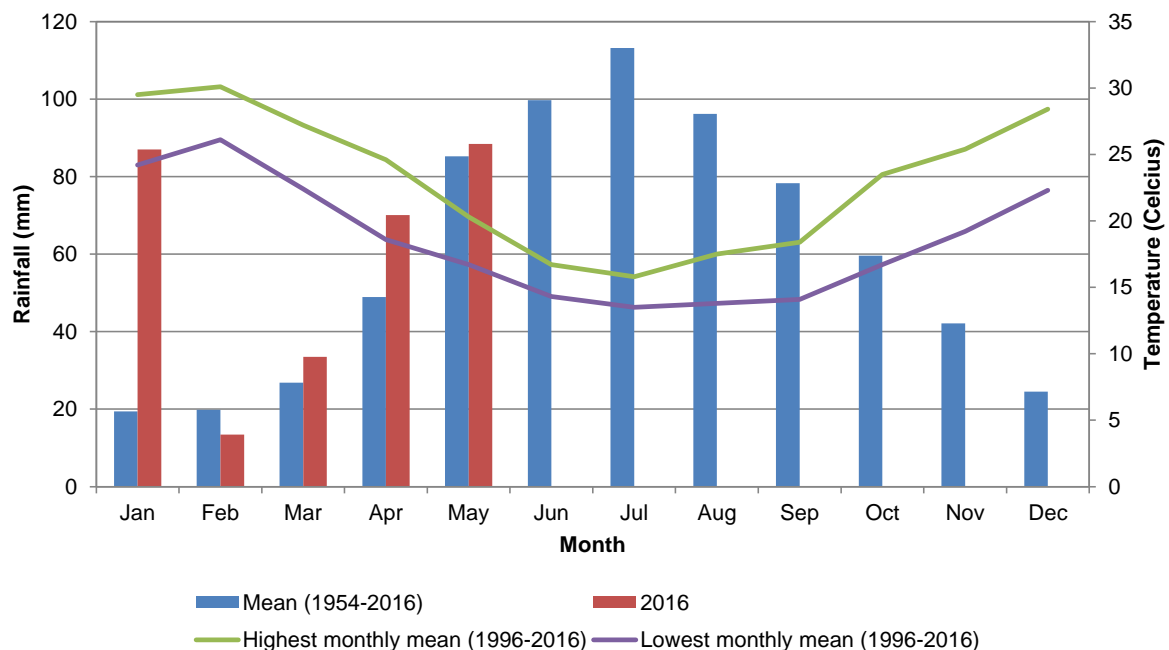


Figure 2 Rainfall data from Rocky Gully weather station (number 9661) showing mean monthly rainfall and rainfall received in the 12 months preceding the field survey (BOM, 2016)

2.2 IBRA Regions

There are 89 recognised Interim Biogeographic Regionalisation for Australia (IBRA) regions across Australia that have been defined based on climate, geology, landforms and characteristic vegetation and fauna (Commonwealth of Australia, 2013a). The Project Area lies within the Jarrah Forest IBRA region and, at a finer scale, within the Southern Jarrah Forest subregion (Mitchell *et al.*, 2002).

The Southern Jarrah Forest bioregion, described by Hearn *et al.* (2002), extends south of Collie where the plateau broadens and slopes gently to the south coast. The drainage broadens and levels on the surface in the east causing poor drainage and numerous wetlands. The west supports Jarrah-Marri forest grading to Marri-Wandoo woodlands in the east, with extensive swamp vegetation in the south-east dominated by Paperbarks and Swamp Yate. Land use is mostly grazing and dry-land agriculture, forestry and conservation. The area contains a number of rare plants, birds, frogs and critical weight range mammals (Bandicoot, Chuditch and Potoroo) and freshwater wetland *Baumea* reed beds.

2.3 Vegetation

Beard (1981) mapping is used to determine the current extent of remnant vegetation remaining when compared to pre-European vegetation extent. The EPA's objective is to retain at least 30% of all pre-European ecological communities, which is consistent with recognised retention levels (EPA, 2000; EPA, 2015). Beard (1981) mapping shows one vegetation association within the Project Area, vegetation association 3 Open Forest: Jarrah-Marri. There is 59.87% of the original extent of vegetation association 3 remaining in the Southern Jarrah Forest (Government of WA, 2015).

2.4 Soils

There are two dominant soil types within the Project Area as mapped on the Australian Soil Atlas. These include:

- Tf6: Undulating to hilly portions of dissected lateritic plateau at moderate elevation: chief soils are hard acidic and neutral yellow mottled soils containing small to large amounts of ironstone gravels. Associated are leached sands and soils containing ironstone gravels. This unit merges with unit Cd22
- Cd22: Flat to gently undulating portions of lateritic plateau at moderate elevation, occasional low hills, some tors: chief soils are leached sands, some only 6 inches thick, underlain by thick ironstone gravel and boulder layers and mottled kaolinic clays at depths below 2-5 feet. Associated are: soils containing ironstone gravels and other soils of unit Tf6 on slopes; flats of leached sands, some small areas of yellow soils containing ironstone gravel.

3.0 Legislative Framework

3.1 Overview

Table 2 summarises the key legislation governing the protection and management of Western Australia's conservation significant species and communities, which are further discussed below and in Appendix A.

Table 2 Relevant legislation, regulations and guidance

| Legislation | Purpose |
|---|--|
| Commonwealth of Australia | |
| <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) | Provides for the protection of the environment and the conservation of biodiversity. |
| Western Australia | |
| <i>Wildlife Conservation Act 1950</i> (WC Act) | Provides for the conservation and protection of Western Australia's wildlife. |
| <i>Environmental Protection Act 1986</i> (EP Act) | Preventing, controlling and abating environmental harm and conserving, preserving, protecting, enhancing and managing the environment. |
| <i>Biosecurity and Agriculture Management Act 2007</i> (BAM Act) | Provides for the management, control and prevention of certain plants and animals, and for the protection of agriculture and related resources generally. |
| EPA Position Statement No. 2 <i>Environmental Protection of Native Vegetation in Western Australia: Clearing of native vegetation, with particular reference to the agricultural area</i> | Provides guidance on clearing of native vegetation, with particular reference to the agricultural area. |
| EPA Guidance Statement No. 51 <i>Guidance for the Assessment of Environmental Factors – Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia</i> | Provides guidance on the standard of survey required to assist in collecting the appropriate data for decision-making associated with the protection of Western Australia's terrestrial flora and vegetation and their ecosystems. |
| EPA Position Statement No. 3 <i>Terrestrial Biological Surveys as an Element of Biodiversity Protection</i> | Provides guidance on the requirements of biological surveys in Western Australia. |
| EPA Guidance Statement No. 56 <i>Guidance for the Assessment of Environmental Factors – Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia</i> | Provides guidance on the standard of survey required to assist in collecting the appropriate data for decision-making associated with the protection of Western Australia's terrestrial fauna. |
| <i>Land Administration Act 1997</i> (LAA) | An Act to consolidate and reform the law about Crown land and the compulsory acquisition of land generally, to repeal the <i>Land Act 1933</i> and to provide for related matters. The Act allows for the |
| <i>Rights in Water and Irrigation Act 1914</i> (RIWI Act) | An Act relating to rights in water resources, to make provision for the regulation, management, use and protection of water resources, to provide for irrigation schemes, and for related purposes. |

3.2 Commonwealth

3.2.1 Matters of National Environmental Significance

Matters of National Environmental Significance (MNES) include:

- listed threatened species and ecological communities
- migratory species protected under international agreements
- Ramsar wetlands of international importance
- the Commonwealth marine environment
- world Heritage properties
- national Heritage places

- Great Barrier Reef Marine Park
- a water resource, in relation to coal seam gas development and large coal mining development
- nuclear actions.

If an action is likely to have a significant impact on a MNES this action must be referred to the Minister for the Environment for a decision on whether assessment and approval is required under the EPBC Act.

3.2.2 Flora and fauna

The EPBC Act is the main piece of federal legislation protecting biodiversity in Australia. Species at risk of extinction are recognised at a Commonwealth level and are categorised in one of six categories as outlined in Table 3.

Table 3 Categories of Species Listed under Schedule 179 of the EPBC Act (Commonwealth)

| Conservation | Code Category |
|--------------|------------------------|
| Ex | Extinct Taxa |
| ExW | Extinct in the Wild |
| CE | Critically Endangered |
| E | Endangered |
| V | Vulnerable |
| CD | Conservation Dependent |

3.2.3 Vegetation Communities

Communities can be classified as Threatened Ecological Communities (TECs) under the EPBC Act. The EPBC Act protects Australia's ecological communities by providing for:

- identification and listing of ecological communities as threatened
- development of conservation advice and recovery plans for listed ecological communities
- recognition of key threatening processes
- reduction of the impact of these processes through threat abatement plans.

Categories of federally listed TECs are described in Table 4.

Table 4 Categories of TECs that are listed under the EPBC Act

| Conservation Code | Category |
|-------------------|---|
| CE | Critically Endangered If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future. |
| E | Endangered If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future. |
| V | Vulnerable If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future. |

3.3 Western Australian

3.3.1 Flora and fauna

Plants and animals that are considered threatened and need to be specially protected because they are under identifiable threat of extinction are listed under the WC Act. These categories are defined in Table 5.

Table 5 Conservation codes for WA flora and fauna listed under the *Wildlife Conservation Act 1950* updated November 2015

| Code | Category |
|------|--|
| CR | Critically endangered species |
| EN | Endangered species |
| VU | Vulnerable species |
| EX | Presumed extinct species |
| IA | Migratory birds protected under an international agreement (fauna only) |
| CD | Special conservation (fauna only) |
| OS | Special protection for reasons other than those already mentioned (fauna only) |

Species that have not yet been adequately surveyed to warrant being listed under the WA Act are added to a Priority List by the State Minister for Environment. Categories and definitions of Priority flora and fauna species are provided in Table 6 and expanded in Appendix A.

Table 6 Conservation codes for WA flora and fauna as listed by DPaW and endorsed by the Minister for Environment

| Conservation Code | Category |
|-------------------|---|
| Priority One | Poorly Known Species |
| Priority Two | Poorly Known Species |
| Priority Three | Poorly Known Species |
| Priority Four | Rare, Near Threatened and other species in need of monitoring |
| Priority Five | Conservation Dependent species |

3.3.2 Vegetation Communities

State listed TECs are not protected under any legislation, rather they are endorsed by the Minister for Environment. Categories of TECs are defined in Table 7. PECs are endorsed by the Minister for Environment as having insufficient information available to be considered a TEC, or which are rare but not currently threatened. These categories are described in Table 8.

Table 7 Conservation codes for State listed Ecological Communities

| Conservation Code | Category |
|-------------------|----------------------------|
| PD | Presumed Totally Destroyed |
| CR | Critically Endangered |
| EN | Endangered |
| VU | Vulnerable |

Table 8 Categories for Priority Ecological Communities

| Conservation | Code Category |
|--------------|---|
| P1 | Priority One: poorly-known ecological communities |
| P2 | Priority Two: poorly-known ecological communities |
| P3 | Priority Three: poorly known ecological communities |
| P4 | Priority Four: 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. |
| P5 | Priority Five: Conservation Dependent ecological communities. |

3.3.3 *Biosecurity and Agriculture Management Act 2007*

Biosecurity is the management of the risk of animal and plant pests and diseases entering, emerging, establishing or spreading in WA to protect the economy, environment and community. Biosecurity is managed under the BAM Act which came into effect 1 May 2013. Exotic animals and plants can become an invasive species if they can establish in new areas where local conditions are favourable for their growth.

4.0 Methodology

4.1 Desktop Assessment

A detailed desktop assessment was completed. The desktop assessment focussed on defining the existing environment and determining the locations of Threatened and Priority flora, fauna, and communities. Desktop database searches were requested for the Project Area with a 10 km buffer. Sources consulted included:

- DPaW Threatened Species and Communities database including Threatened and Priority flora, fauna and communities (and additional Black Cockatoo observational data)
- Western Australian Herbarium (WAH) records
- NatureMap
- EPBC Act Protected Matters Search Tool (PMST).

The search results were reviewed to assess the potential presence of conservation significant environmental values. All conservation significant matters including flora, fauna and communities were reviewed and a likelihood of occurrence was completed based on the categories outlined in Table 9.

Table 9 Categories of likelihood of occurrence for species and communities

| Likelihood Category | Flora | Fauna | Communities |
|---------------------|---|--|---|
| Likely to occur | Habitat is present in the Project area and the species has been recorded in close proximity to the Project Area | Project Area is within the known distribution of the species, habitat is present in the Project Area and the species has been recorded in close proximity to the Project Area | Known occurrences of the community in close proximity to the Project area. Vegetation looks the same within the known occurrence and Project Area based on aerial imagery. Geographic location is similar to the Project Area |
| May occur | Habitat may be present and/or the species has been recorded in close proximity to the Project Area | Project Area is within the known distribution of the species, marginal habitat may be present and/or the species has been recorded in close proximity to the Project Area | Known occurrence of the community in the local area, and/or vegetation looks the same within known occurrence and Project Area based on aerial imagery. Geographic location is similar to the Project Area |
| Unlikely to occur | No suitable habitat is present and the species has not been recorded in close proximity to the Project Area | Project Area is outside the known distribution for the species, or no suitable habitat is present and the species has not been recorded in close proximity to the Project Area | Known occurrence of the community in close proximity to the Project Area however geographic location does not occur in Project Area |

4.2 Field Surveys

All field surveys were undertaken by Senior Botanist Floora de Wit (collection permit SL011555) and Ecologist Jared Leigh on 11-15 July 2016.

4.2.1 Flora and vegetation

A Level 1 flora and vegetation survey was undertaken as described in Guidance Statement No. 51 (EPA, 2004a). The Level 1 survey comprised of low-intensity sampling using relevés at locations representative of healthy vegetation within the Project Area. Data collected at each relevé included GPS coordinates, species list, vegetation structure, landform and soils, vegetation condition, period since last fire, and description of disturbances (as outlined in Technical Guide for Flora Surveys; EPA & DPaW, 2015). The field survey focussed on mapping the vegetation communities within the Project Area using the National Vegetation Information System (NVIS) format. The Project Area was traversed by vehicle and on foot to document the flora and vegetation values.

Species that were unable to be identified in the field were collected and pressed for identification using the AECOM in-house Herbarium and the Western Australian State Herbarium (WAH). Nomenclature of the species recorded follows the protocol of the WAH.

Vegetation communities were mapped using interpretation of aerial imagery and quantitative data collected during the field survey. The naming of vegetation communities follows the National Vegetation Information System (NVIS) (Australian Government, 2003).

Vegetation condition was assessed at sample point locations supplemented by additional opportunistic observations as the Project Area was traversed. The categories of vegetation condition used were consistent with methods developed by Keighery (1994).

Table 10 Bushland condition ratings (Keighery, 1994)

| Descriptor | Explanation |
|---------------------|---|
| Pristine | Pristine or nearly so, no obvious signs of disturbance. |
| Excellent | Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. |
| Very Good | Vegetation structure altered obvious signs of disturbance. For example, 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. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, 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. For example, disturbance of vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing. |
| Completely Degraded | The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as "parkland cleared" with the flora comprising weed or crop species with isolated native trees or shrubs. |

4.2.2 Riparian vegetation

Riparian vegetation was assessed using methods described by Waters and Rivers Commission (1999) including a detailed foreshore condition assessment (Table 11; Figure 3). It was proposed to demarcate the boundary of riparian vegetation by marking the edge using a hand-held GPS. During the field survey it was observed that the wetland system was extensive, extending from east to west, weaving, splitting, and joining up again numerous times throughout the Project Area. Tracks were also limited. Riparian vegetation was therefore mapped using sample point locations during the flora and vegetation assessment and through analysis of aerial imagery.

Table 11 Condition classes for a detailed assessment of foreshore condition (Water & Rivers Commission, 1999)

| Category | Sub-category | Description |
|----------|--------------|--|
| A | A1 | Pristine. The river embankments and floodway are entirely vegetated with native species, and there is no evidence of human presence or livestock damage. |
| | A2 | Near pristine. Native vegetation dominates. Some introduced weeds may be present in the understorey, but not to the extent that they displace native species. Otherwise there is no evidence of human impact. (A river valley in this condition is as good as will be found today) |
| | A3 | Slightly disturbed. Native vegetation dominates, but there are some areas of human disturbance where soil may be exposed and weeds are relatively dense (such as along tracks). The native vegetation would quickly recolonise the disturbed areas if human activity declined. |
| B | B1 | Degraded - weed infested. Weeds have become a significant component of the understorey vegetation. Although native species are dominant, a few have been |

| Category | Sub-category | Description |
|----------|--------------|---|
| | | replaced by weeds. |
| | B2 | Degraded - heavily weed infested. In the understorey, weeds are about as abundant as native species. The regeneration of some tree and large shrub species may have declined. |
| | B3 | Degraded - weed dominated. Weeds dominate the understorey, but many native species remain. Some trees and large shrub species may have declined or disappeared altogether. |
| C | C1 | Erosion prone. Trees remain, and possibly some large shrubs or tree grasses, but the understorey consists entirely of weeds, mainly annual grasses. The trees are generally resilient or long lived species but there is little or no evidence of regeneration. The shallow-rooted weedy understorey provides no support to the soil, and only a small increase in physical disturbance will expose the soil and make the river embankments and floodway vulnerable to erosion. |
| | C2 | Soil exposed. Older trees remain, but the ground is virtually bare. Annual grasses and other weeds have been removed by livestock trampling or grazing, or through over use by humans. Low-level soil erosion has begun, by the action of either wind or water. |
| | C3 | Eroded Soil is washed away from between tree roots, trees are being undermined and unsupported embankments are subsiding into the river valley. |
| D | D1 | Ditch – eroding. There is not enough fringing vegetation to control erosion Some trees and shrubs remain and act to retard erosion in certain spots, but are doomed to be undermined eventually. |
| | D2 | Ditch - freely eroding. No significant fringing vegetation remains and erosion is completely out of control. Undermined and subsided embankments are common, and large sediment plumes are visible along the river channel. |
| | D3 | Drain - weed dominated. The highly eroded river valley has been fenced off, preventing control of weeds by stock. Perennial (long lived) weeds have become established. The river has become a simple drain, similar or identical to a typical major urban drain. |

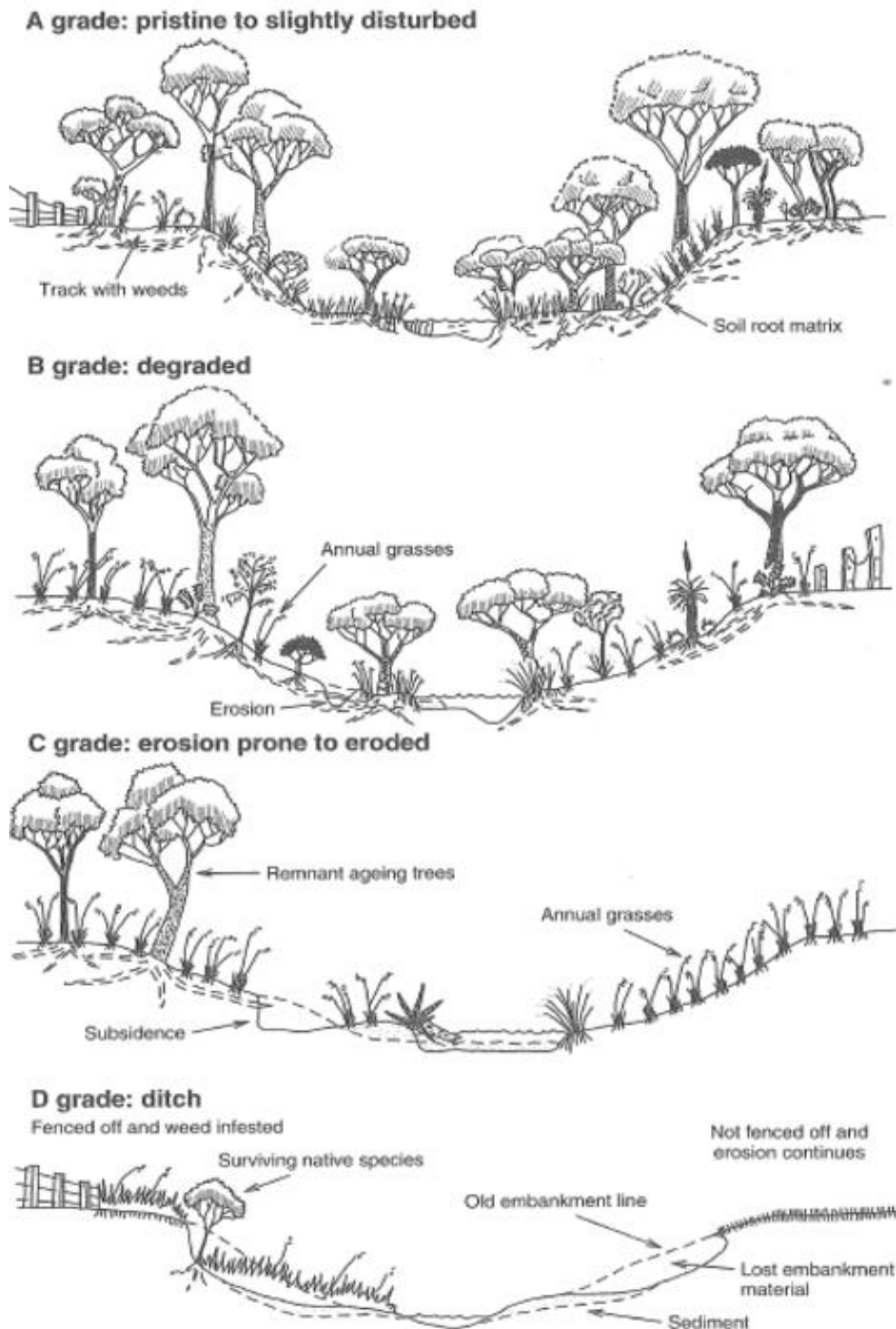


Figure 3 Foreshore condition assessment used to assess riparian vegetation condition (Water & Rivers Commission, 1999).

4.2.3 Fauna

The Level 1 fauna survey primarily focused on recording observations of fauna within the Project Area, which included evidence of fauna activity such as scats, tracks, burrows, foraging evidence and diggings. This survey was undertaken in accordance with EPA (2002) Position Statement No. 3 Terrestrial Biological Surveys as an Element of Biodiversity Protection, and EPA (2004b) Guidance Statement No. 56 Guidance for the Assessment of Environmental Factors – Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia. Particular attention was given to locating species of conservation significance that have the potential to occur in

the Project Area, as identified in the desktop assessment. All observations were made during daylight hours of 0730 and 1700.

Microhabitat searches of leaf litter, bark, fallen logs and rocks were also conducted opportunistically when appropriate areas were located. Seven microhabitat searches were conducted across the Project Area (refer to Figure 4 for locations). Motion activated cameras (Scoutguard Zeroglow 10M) were also installed in the Project Area to observe fauna, particularly nocturnal fauna. These cameras were placed in three locations in habitats assessed as potentially containing conservation significant fauna, and were left out for the duration of the three night survey. Figure 4 also illustrates these locations.

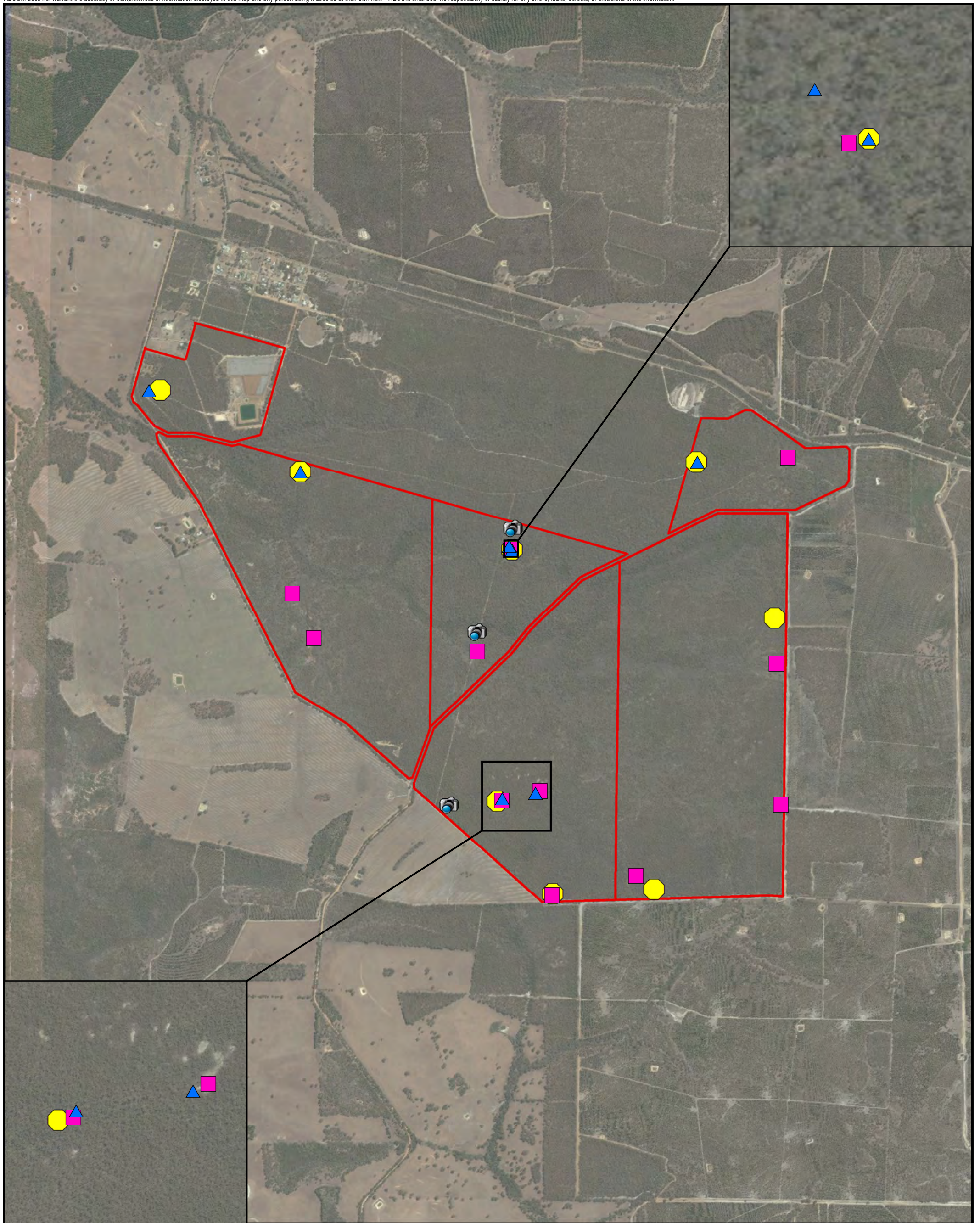
The taxonomy and nomenclature of vertebrate species for mammals, reptiles and amphibians is consistent with the Western Australian Museum's Checklist of Vertebrates of Western Australia (2010) and for bird species the Bird's Australia Checklist of Australian Birds by Christidis and Boles (2008).

4.2.3.1 Fauna habitats

The fauna habitats of the Project Area were mapped during the field survey, in conjunction with the vegetation mapping. Eleven detailed habitat assessments were completed throughout the Project Area. Fauna habitats were assessed for specific habitat components in order to determine the potential for these habitats to support conservation significant species.

Information collected included:

- Location
- General habitat description
- Habitat condition and disturbance types
- Dominant / characteristic flora species and vegetation layers
- Presences and abundance of hollows (large / small), fallen logs (<10 cm / 10-30 cm / >30 cm), litter (course / fine), decortivating bark, bare ground, grass, stones and boulders (<20 cm / 20-60 cm / 60 cm – 2 m / >2 m), rock crevices, soil cracks, cryptogamic crust, vines, mistletoe, dense shrubs, water bodies etc.
- Presence of animal signs (e.g. scats, digging, tracks, burrows, egg shell, bones, feathers etc.)
- Fauna observations
- Connectivity and potential significance of habitat.

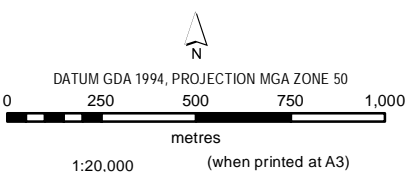


PROJECT ID 60507828
 CREATED BY DGF
 APPROVED BY FDW
 LAST MODIFIED 09 AUG 2016



LEGEND

- ▭ Project Area
- ▲ Microhabitat Search Locations
- Fauna Habitat Assessment Location
- Camera Locations
- ⬡ Black Cockatoo Foraging and Breeding Habitat Assessment Locations



Data sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Geomatics, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Base Data: (c) Based on information provided by and

Fauna Survey Assessment Locations

Water Corporation

**ROCKY GULLY FLORA
 VEGETATION AND FAUNA SURVEY**

Figure

4

4.2.3.2 Black Cockatoo assessment

A targeted Black Cockatoo assessment was conducted to identify potential breeding, roosting and foraging habitat for the three threatened Black Cockatoo species that occur in Western Australia. These are Carnaby's Black Cockatoo (*Calyptorhynchus latirostris* [Endangered under the EPBC Act and under the WC Act]), Baudin's Black Cockatoo (*Calyptorhynchus baudinii* [Vulnerable under the EPBC Act and Endangered under the WC Act]), and the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii* subsp. *naso* [Vulnerable under the EPBC Act and under the WC Act]). Refer to Section 6.3.4 for further information on these species.

Surveys were conducted in accordance with DSEWPaC (2012b) Referral Guidelines for the three species of Black Cockatoos, as well as in accordance with the outcomes from a workshop recently hosted by the Department of the Environment and Energy (DoEE). The field survey was conducted by Floora de Wit (who has more than four years' experience conducting Black Cockatoo assessments) and Ecologist Jared Leigh (who has conducted multiple Black Cockatoo surveys).

Aerial photography was utilised to identify potentially suitable habitat for Black Cockatoos, and to inform the sample plan. The sample plan was then refined in the field, with the following assessments conducted at relevant sample points:

- foraging quality
- breeding habitat
- roosting habitat.

4.2.3.3 Breeding habitat

A Black Cockatoo breeding habitat assessment was conducted which focussed on quantifying potential breeding trees and associated habitat within the Project Area. Table 12 defines breeding habitat and identifies those trees that Black Cockatoos will utilise as breeding trees, according to DSEWPaC (2012b). Vegetation communities were assessed for their potential to provide breeding habitat by installing a 50 x 50 m quadrat as representative sample points. All trees within this quadrat were then assessed for their suitability as a breeding tree. A total of eight quadrats were assessed within the Project Area (refer to Figure 4). These quadrats were used to provide a representative sample to determine the total amount of breeding habitat (and approximate number of trees) within the Project Area. The following information was collected for potential breeding trees with a Diameter at Breast Height (DBH) >500 cm:

- location
- fire scarring present
- tree species
- DBH
- tree height
- number of hollows
- number of potentially suitable hollows
- hollow height, type and size
- occupancy
- evidence of use.

Photographs were also taken of each tree.

Table 12 Breeding habitat for the three Western Australian Threatened Black Cockatoo species

| | Baudin's | Carnaby's | Forest Red-Tailed |
|---|--|--|--|
| Specific breeding habitat for the three Cockatoos | Nest in hollows in live or dead trees of <i>Eucalyptus diversicolor</i> , <i>Corymbia calophylla</i> , <i>E. wandoo</i> and <i>E. gomphocephala</i> . | Nest in hollows in live or dead trees of <i>E. salmonophloia</i> , <i>E. wandoo</i> , <i>E. gomphocephala</i> , <i>E. marginata</i> , <i>E. rudis</i> , <i>E. loxophleba</i> subsp. <i>loxophleba</i> , <i>E. accedens</i> , <i>E. diversicolor</i> and <i>Corymbia calophylla</i> . | Nest in hollows in live or dead trees of <i>E. diversicolor</i> and <i>Corymbia calophylla</i> , <i>E. wandoo</i> , <i>E. megacarpa</i> , <i>E. patens</i> , <i>E. gomphocephala</i> and <i>E. marginata</i> . |
| Definition of breeding habitat | 'Breeding habitat' is defined in these referral guidelines as trees of species known to support breeding within the range of the species which either have a suitable nest hollow OR are of a suitable diameter at breast height (DBH) to develop a nest hollow. For most tree species, suitable DBH is 500 mm. For salmon gum and wandoo, suitable DBH is 300 mm. | | |

Source: DSEWPaC (2012b).

4.2.3.4 Roosting habitat

Table 13 defines the suitable trees that the three Western Australian Black Cockatoo species may utilise as roosting trees. Both white-tailed Black Cockatoo species roost in or near riparian environments or near other permanent water sources. The Forest Red-Tailed Black Cockatoo prefers the edges of forests for roosting (DSEWPaC, 2012b). Potential roosting trees were searched for and assessed during the field survey.

Table 13 Suitable roosting trees for the three Western Australian Threatened Black Cockatoo species

| Baudin's | Carnaby's | Forest Red-Tailed |
|---|--|--|
| <i>Corymbia calophylla</i> , <i>E. marginata</i> , <i>E. rudis</i> , <i>E. patens</i> , and <i>E. gomphocephala</i> . | <i>E. salmonophloia</i> , <i>E. wandoo</i> <i>Corymbia calophylla</i> , <i>Eucalyptus diversicolor</i> , <i>E. patens</i> , and <i>E. gomphocephala</i> . | <i>Corymbia calophylla</i> , <i>E. marginata</i> , and <i>E. gomphocephala</i> . |

Source: DSEWPaC (2012b).

4.2.3.5 Foraging habitat

The quality of foraging habitat not only reflects the availability of food sources, but also the proximity to reliable water sources, connectivity to other suitable habitat, presence of potential breeding trees, and proximity to confirmed roost and breeding sites (amongst others). These parameters were utilised by the DotE to produce a draft quality of foraging habitat scoring system for its Referral Guidelines. AECOM has adapted this tool for use in offset assessments, presented in Table 15. This scoring system was utilised to assess potential foraging habitat for each Black Cockatoo species. Initially a desktop assessment was conducted to select sample point locations in varying representative habitats throughout the Project Area, and these sites were then refined in the field. 50 x 50 m quadrats were established in the field at each of these eight sites and the scoring assessment tool utilised.

The scoring tool is used by initially defining the quality of the overall habitat present (i.e. High, Quality, Valued, Low) and then adding or subtracting points from this depending on the ecological values of the habitat (i.e. proximity to water, proximity to a known roost site, evidence of foraging material etc.). This determines an overall quantitative rating. These scores were then used as representative scores for that vegetation unit. Table 15 defines the levels of foraging habitat quality used during the assessment.

Table 14 Black Cockatoo foraging assessment scoring

| Score | Foraging Quality |
|--------|------------------|
| 1 - 3 | Low |
| 4 - 6 | Valued |
| 7 - 8 | Quality |
| 9 - 10 | High |

Table 15 Quality of foraging habitat assessment tool for the three Western Australian Threatened Black Cockatoo species

| Score | Carnaby's | Baudin's | Forest Red-tailed |
|---|---|---|---|
| ≥10 High | Quality foraging habitat that is being managed for Black Cockatoos, including successful rehabilitation, and/or has some level of protection from clearing, and / or is Quality habitat described below with attributes contributing to meet a score of 10 or greater | Quality foraging habitat that is being managed for Black Cockatoos, including successful rehabilitation, and/or has some level of protection from clearing, and / or is Quality habitat described below with attributes contributing to meet a score of 10 or greater | Quality foraging habitat that is being managed for Black Cockatoos, including successful rehabilitation, and/or has some level of protection from clearing, and / or is Quality habitat described below with attributes contributing to meet a score of 10 or greater |
| 7 Quality | Native shrubland, kwongan heathland and woodland dominated by proteaceous plant species (e.g. <i>Banksia</i> sp., <i>Hakea</i> sp. and <i>Grevillea</i> sp.) as well as eucalypt (not mallee) woodland and forest that is dominated by foraging species. Does not include orchards, canola, or areas under a RFA | Eucalypt (not mallee) woodlands and forest, and proteaceous woodland and heath, particularly Marri. Does not include orchards or areas under a RFA | Jarrah and Marri woodlands and forest, and edges of Karri forests, including Wandoo and Blackbutt, within the range of the subspecies. Does not include areas under a RFA |
| 5 Valued | Pine plantation or introduced eucalypts | Pine plantation or introduced eucalypts | Introduced eucalypts as well as the introduced Cape lilac (<i>Melia acedarach</i>) |
| 2 Moderate | Native shrubland, heathland and woodland that contains foraging species | Native shrubland, heathland and woodland that contains foraging species | n/a |
| 1 Low | Individual foraging plants or small stand of foraging plants (≤2 ha) | Individual foraging plants or small stand of foraging plants (≤2 ha) | Individual foraging plants or small stand of foraging plants (≤2 ha) |
| Additions: Context adjustor – attributes improving habitat quality | | | |
| +3 | Is within the Swan Coastal Plain | Is within the known foraging area | Jarrah and/or Marri shows good recruitment (i.e. evidence of young trees) |
| +3 | Contains trees known to be used for breeding | Contains trees known to be used for breeding | Contains trees known to be used for breeding |
| +2 | Primarily comprises Marri | Primarily contains Marri | Primarily contains Marri and/or Jarrah |
| +2 | Contains trees with potential to be used for breeding (DBH ≥500 mm or ≥300 mm for Salmon Gum and Wandoo) | | |
| +2 | Known to be a large or key roosting site | | |
| +1 | Contains evidence of foraging by species | | |
| +1 | Is <12 km from known breeding location | | |

| Score | Carnaby's | Baudin's | Forest Red-tailed |
|---|---|----------|-------------------|
| +1 | Is <2 km from a watering point | | |
| +1 | Is within 6 km of known roosting site | | |
| Subtractions: Context adjustor – attributes reducing habitat quality | | | |
| -3 | Does not contain Marri and contains less than 25% proteaceous species | | |
| -2 | No other foraging habitat within 6 km | | |
| -1 | Is >6km from known roosting site | | |
| -1 | Does not contain evidence of foraging by species | | |
| -1 | Is >12 km from known breeding location | | |
| -1 | Is >2 km from watering point | | |
| -1 | Disease present (e.g. <i>Phytophthora cinnamomi</i> or Marri canker) | | |

Source: 2016 DotE workshop (and subsequently modified by AECOM).

4.3 Survey Limitations

| Limitation | Flora and Vegetation and Riparian Assessment | Fauna and Black Cockatoo Assessment |
|---|--|---|
| Competency/experience of consultant conducting survey | Nil. Floora de Wit has eight years' experience conducting surveys of similar scope and has extensive experience in the Jarrah Forest. | Nil. Floora de Wit has four years' experience conducting Black Cockatoo assessments. Jared is an ecologist with over 14 years' experience in the environmental industry and has conducted fauna surveys in a range of bioregions within Western Australia. Jared has also conducted multiple Black Cockatoo assessments. |
| Scope (i.e. what life forms were sampled) | Nil. As a Level 1 assessment, effort was made to document all species within each stratum present in the vegetation communities. Where species were unable to be identified, they were collected and identified at the WA Herbarium. Some juvenile and sterile species lacked suitable identification material and were therefore only identified to genus or family level. | <p>Minor. The Level 1 fauna survey:</p> <ul style="list-style-type: none"> - Assessed all fauna habitats within the Project Area - Documented secondary evidence (scats, diggings, burrows etc.) and fauna sightings - Conducted microhabitat searches at appropriate sites - Utilised motion activated cameras. <p>Although reptiles would generally have been in brumation and not sampled effectively, it is not the objective of a Level 1 survey to trap or sample for fauna groups extensively.</p> <p>Sufficient representative quadrats were assessed for breeding and foraging habitat for all three Western Australian Threatened Black Cockatoo species, within all the fauna habitats of the Project Area.</p> |
| Proportion of flora/fauna identified, recorded and/or collected (based on sampling, timing and intensity) | Minor. Broad-based sampling was undertaken across the Project Area, with a minimum of three quadrats representing each vegetation community. A majority of the flora was sampled, with the exception of aquatic flora. | <p>Minor. Information gained for a Level 1 fauna survey was sufficient. Fauna were observed (through direct or indirect evidence) during daylight hours (0700 and 1730hrs). Therefore nocturnal species were only predominantly observed through indirect evidence, although three motion activated cameras were installed in appropriate habitats. Although reptiles would generally have been in brumation and not sampled effectively, it is not the objective of a Level 1 survey to trap or sample for fauna groups extensively.</p> <p>Sufficient representative quadrats were assessed for breeding and foraging habitat for all three Western Australian Threatened Black Cockatoo species, within all the fauna habitats of the Project Area.</p> |

| Limitation | Flora and Vegetation and Riparian Assessment | Fauna and Black Cockatoo Assessment |
|--|--|--|
| Sources of information | Nil. DPaW databases, Florabase, Naturemap and EPBC PMST were used to inform the desktop assessment and provide regional and local context. | Minor. DPaW database (with additional Black Cockatoo observational data), Naturemap and EPBC Act PMST were utilised to inform the Level 1 fauna and Black Cockatoo assessments. Minimal ecological information could be found for a number of the freshwater fish and invertebrates potentially occurring within the Project Area. |
| Completion (is further work needed) | Nil. As a proposed offset site, it is unclear whether further work would be required for targeting conservation significant flora species. If a comprehensive understanding of environmental values is required then additional surveys including quadrat-based sampling and targeted conservation significant flora surveys may be required. | Nil. The objectives of the proposed offset site fauna and Black Cockatoo assessments were met and no further work is required. |
| Timing, weather, season, cycle | Minor. The field survey was undertaken in July 2016, two months before the Spring season. Despite this timing, a number of species were in flower. The timing is likely to have affected species presence including daisies (Asteraceae family) and other annual species. Furthermore, some species lacked suitable identification material for a confident identification to species level. Despite this, the field survey is considered to have met the objectives of the Project therefore this limitation is not considered significant. The winter months are considered the ideal time for undertaking riparian/wetland assessments. | Minor. The survey was conducted during the colder months when some fauna groups (reptiles in particular) are not as active. This assessment was also limited to one survey period during one year, and predominantly during daylight hours. However, this does not significantly impact a Level 1 fauna or Black Cockatoo survey. |
| Disturbances (e.g. fire flood, accidental human intervention) which affected results of the survey | Nil. No evidence of disturbance was observed. | Nil. Neither the Level 1 fauna or Black Cockatoo survey were disrupted or impacted. |
| Intensity (was the intensity adequate) | Nil. Flora and vegetation was sampled from 18 relevés. This is considered suitable for a Level 1 survey requiring broad-based sampling. The riparian assessment was undertaken at xx locations to monitor the health of vegetation. This was further informed by the condition mapping undertaken as part of the Level 1 assessment. | Nil. The Project Area was surveyed over a two and a half day period which enabled sufficient time to assess the fauna habitats present, search for and collect opportunistic records for conservation significant species. The fauna survey was conducted in accordance with EPA Guidance Statement No. 56 (EPA, 2004b). It also enabled sufficient time to conduct the Black Cockatoo foraging, breeding and roosting assessments. |
| Resources (degree of | Nil. Plant material was sampled where | Nil. The resources (time, equipment |

| Limitation | Flora and Vegetation and Riparian Assessment | Fauna and Black Cockatoo Assessment |
|--|--|---|
| expertise available in plant/animal identification) | specimens were not able to be correctly identified in the field. These were identified at the WA Herbarium by Floora de Wit. One specimen was submitted to the WAH for confirmation as it may represent a Priority 3 species and it does not have ideal detection material present (flowers/fruits/seeds). | and expertise) were sufficient for a Level 1 fauna survey and the Black Cockatoo survey. Floora de Wit has four years' experience conducting Black Cockatoo assessments, and Jared is an ecologist with over 14 years' experience in the environmental industry who has also conducted multiple Black Cockatoo assessments. |
| Remoteness and/or access problems | Minor. Tracks were limited therefore the survey plan was revised to use existing tracks only. The forest was thick in places and difficult to traverse therefore large areas were not accessed. This is not considered a limitation as it did not affect the objective of the field survey. | Minor. Not all of the Project Area was covered on-ground due to the size of the Project Area and the limited availability of tracks. However, this minor limitation was not deemed significant as the requirements of the Level 1 fauna and Black Cockatoo survey were met. |
| Availability of contextual information on the region | Minor. No previous studies were found to be available in the public domain. The Beard pre-European vegetation was used for context, and there are several plant identification books relevant to the southwest of WA. | Minor. No previous studies were found to be available in the public domain. |

5.0 Desktop Assessment Results

5.1 Threatened and Priority Ecological Communities

The database searches identified no Threatened Ecological Communities (TEC) or Priority Ecological Communities (PECs) that occur in the Study Area.

5.2 Conservation Significant Flora

A total of 29 Threatened and Priority flora species were identified from the database search as potentially occurring within the Project Area. Of these species, 11 are listed as Threatened under the WC Act and also under the EPBC Act. The remaining 18 species are listed as Priority Flora. The EPBC Act PMST results are included in Appendix B. The spatial location of desktop assessment results are shown in Figure 5.

Based on desktop assessment of specimen records and preferred habitat, it has been determined that 14 flora species of conservation significance are known or likely to occur in the Project Area and eight flora species of conservation significance may occur in the survey area (Table 16). The remaining seven species are considered unlikely to occur in the survey area.

Species for which no information was available except historical known records were automatically considered as 'May Occur'.

Table 16 Records of Threatened and Priority Flora from the vicinity of the Project Area identified from DPaW database searches and the EPBC Act PMST. Descriptions sourced from Florabase (WAH 1998-) and SPRAT (DotE, 2016).

| Species | Cons Code | Source | Habitat | Flowering Period | Likelihood of Occurrence |
|--|--------------------------|---------------------------|---|------------------|---|
| <i>Andersonia auriculata</i> | P3 | WAHerb, TPFL | Grows on grey or peaty sand, often over laterite. Swampy areas, granite outcrops. | Apr-Oct | Likely. Suitable habitat present and record from 1997 in the Study Area. |
| <i>Andersonia</i> sp. Amabile (N. Gibson & M. Lyons 355) | P3 | WAHerb, TPFL | Often a coastal species. No habitat information. Previously recorded on grey/black clayey sand in sedgeland with <i>Synaphea intricata</i> , <i>Agonis linearifolia</i> , <i>A. parviceps</i> , <i>Anarthria prolifera</i> and <i>Pericalymma crassipes</i> . | Unknown | Likely. Suitable habitat present and record from 1997 in the Study Area. |
| <i>Banksia porrecta</i> | P4 | WAHerb | White/grey sand, sandy loam. Previously recorded in low woodland and shrubland. | Jul-Aug | Likely. Suitable habitat present and record in Study Area from 2009. |
| <i>Caladenia christineae</i> | EPBC Act: VU, WC Act: EN | WAHerb, TPFL, EPBC Report | Sand, clayey loam, laterite. Margins of winter-wet flats, swamps, & freshwater lakes. | Sep-Nov | Likely. Record in study area from 2013 and suitable habitat present. |
| <i>Caladenia dorrienii</i> | EPBC Act: EN, WC Act: EN | WAHerb | Clayey loam. Moist sites adjacent to rivers and seasonal creeks. | Sep-Nov | May Occur. Record in study area from 1990, suitable habitat likely to be present. |
| <i>Caladenia harringtoniae</i> | EPBC Act: VU, WC Act: VU | WAHerb, TPFL, EPBC Report | Sandy loam. Winter-wet flats, margins of lakes, creeklines, granite outcrops. | Oct-Nov | May Occur. Winter-wet flats present but no granite outcrops. Record in Study Area from 1997. |
| <i>Conostylis misera</i> | EPBC Act: EN, WA Act: VU | EPBC Report | Occurs in waterlogged flats of brown sandy clay loams under shrubs including <i>Pericalymma ellipticum</i> , <i>Hakeas</i> , <i>Melaleucas</i> and sedges. | Oct-Nov | May Occur. No record in the Study Area but suitable habitat is present. |
| <i>Diuris drummondii</i> | EPBC Act: VU, WC Act: VU | WAHerb, TPFL, EPBC Report | Recorded in low-lying depressions in peaty and sandy clay swamps. Plants are frequently observed standing in several centimetres of water even during the summer flowering period | Oct-Jan | Likely, recorded in 1993 within 1km of project area. Recorded in the study area in 2009. |

| Species | Cons Code | Source | Habitat | Flowering Period | Likelihood of Occurrence |
|--|-----------------------------------|-----------------|---|--------------------|---|
| <i>Diuris micrantha</i> | EPBC Act: VU, WC Act: VU | EPBC Report | Brown loamy clay. Winter-wet swamps, in shallow water. | Sep-Oct | May occur. Suitable habitat present but no known records in the Study Area. |
| <i>Drakaea micrantha</i> | EPBC Act: VU, WC Act: EN | WAHerb, TPFL | Previously recorded on cleared firebreaks or open sandy patches that have been disturbed, where competition from other plants has been removed. The Dwarf Hammer-orchid occurs in infertile grey sands, in Jarrah (<i>Eucalyptus marginata</i>) and Common Sheoak (<i>Allocasuarina fraseriana</i>) woodland or forest associated with Banksia species. It is often found under thickets of Spearwood (<i>Kunzea ericifolia</i>). | Sep-Oct | Likely. Recorded in the study area in 2006 and suitable habitat present. Most likely to be found along tracks. |
| <i>Hemigenia rigida</i> | P1 | WAHerb | Sandy soils, lateritic gravelly soils. Hillslopes, granite outcrops, flats, ironstone ridges. | Aug-Dec or Jan. | Likely. Recorded in study area in 1998 and suitable habitat present |
| <i>Hibbertia</i> sp. Tenterden (M. Sowry 154) | P2 | WAHerb | No information | | May Occur. Record in the Study Area from 2003. |
| <i>Montia australasica</i> | P2 | WAHerb, TPFL | No information | | May Occur. Record in the Study Area from 2003. |
| <i>Ornduffia submersa</i> | P4 | WAHerb | No information | | May Occur. Record in Study Area from 2000. |
| <i>Pentapogon quadrifidus</i> var. <i>quadrifidus</i> | P2 | WAHerb, TPFL | Open winter wet flat in forest. | Unknown | Known, recorded in 1998 |
| <i>Spyridium riparium</i> | P2 | WAHerb | Sandy or gravelly soils over laterite. River banks, slopes. | Jul-Oct | Likely. Recorded within 1km from project area in 1980 and suitable habitat present. |
| <i>Stylidium lepidum</i> | P3 | WAHerb | Gravelly sand or loam, clay. Winter-wet depressions. | Oct-Nov | Likely. Suitable habitat present and record in study area from 2003. |

| Species | Cons Code | Source | Habitat | Flowering Period | Likelihood of Occurrence |
|--|-----------|--------------|--|------------------|---|
| <i>Synaphea intricata</i> | P3 | WAHerb, TPFL | Sand, peaty sand. Flats, swampy areas. | Sep-Oct | Likely. Suitable habitat present and record in study area from 2007. |
| <i>Synaphea</i> sp. Kworncup (D. Trenowden 429) | P2 | WAHerb | No information | | Likely. No habitat information available but record in Study Area from 2014. |
| <i>Tetralia</i> sp. Warren (M. McCallum Webster 23/2/1979) | P1 | WAHerb | No information | | May Occur. No habitat information and record in Study Area is from 1979. |
| <i>Wurmbea</i> sp. Cranbrook (A.R. Annels 3819) | P3 | WAHerb | Valley floor | Sep | Likely. Suitable habitat present and record in the study area from 2015. |
| <i>Xanthosia eichleri</i> | P4 | WAHerb | Grey sand over granite, sandy loam. Granite outcrops, jarrah/marri woodland. | Oct-Nov | Likely. Suitable habitat present. |

5.3 Conservation significant fauna

The desktop fauna assessment identified 48 conservation significant fauna species that could potentially occur within the Project Area. Of these:

- six species are likely to occur
- 18 species may occur
- 24 species are unlikely to occur.

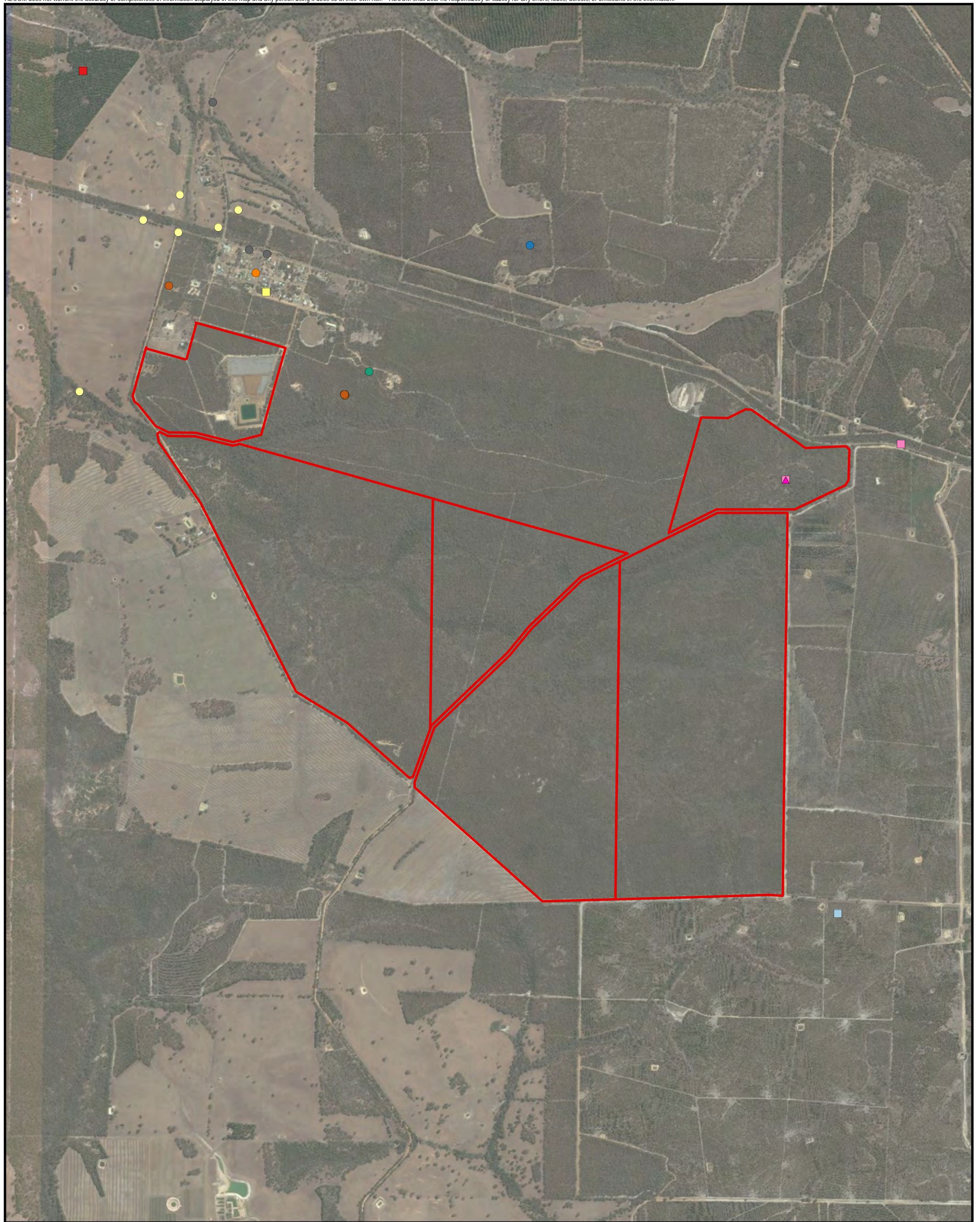
The species likely to occur in the Project Area include four bird and two mammal species. The likelihood of occurrence of fauna species was determined by assessing the likely presence of suitable habitat in the Project Area, and reviewing the recent records and distribution of the species. Table 17 identifies the six species likely to occur, and the 18 species that may occur within the Project Area. The conservation significant categories as defined by DPaW, the WC Act and EPBC Act are defined in Appendix A.

The full desktop assessment for all 48 fauna species and their likelihood of occurrence in the Project Area are presented in Appendix C.

Table 17 Desktop fauna assessment for the Project Area

| Name | Common Name | Conservation Status | | Source | DPaW Records | | Likelihood of Occurrence |
|--|----------------------------------|---------------------|-------|-------------------------------|--------------|--------|-------------------------------|
| | | Commonwealth | State | | Most Recent | Number | |
| Birds | | | | | | | |
| <i>Apus pacificus</i> | Fork-tailed Swift | Marine / Migratory | IA | EPBC Act | - | - | May fly over the project area |
| <i>Ardea modesta</i> | Great Egret, White Egret | Migratory | IA | DPaW EPBC Act | 2009 | 13 | May occur |
| <i>Cacatua pastinator pastinator</i> | Muir's Corella | - | CD | DPaW | 2013 | 6507 | Likely |
| <i>Calyptorhynchus banksii naso</i> | Forest Red-tailed Black Cockatoo | V | VU | DPaW EPBC Act | 2013 | 271 | Likely |
| <i>Calyptorhynchus baudinii</i> | Baudin's Black Cockatoo | V | EN | DPaW EPBC Act | 2010 | 342 | Likely |
| <i>Calyptorhynchus latirostris</i> | Carnaby's Black Cockatoo | E | EN | DPaW EPBC Act | 2013 | 25 | Likely |
| <i>Falco peregrinus</i> | Peregrine Falcon | - | OS | DPaW NatureMap | 2010 | 2 | May occur |
| <i>Leipoa ocellata</i> | Malleefowl | V | VU | NatureMap | - | - | May occur |
| <i>Merops ornatus</i> | Rainbow Bee-eater | Migratory / Marine | IA | DPaW NatureMap EPBC Act | 2009 | 1 | May occur |
| <i>Motacilla cinerea</i> | Grey Wagtail | Migratory / Marine | IA | EPBC Act | - | - | May occur |
| <i>Platycercus icterotis</i> subsp. <i>xanthogenys</i> | Western Rosella (inland) | - | P4 | NatureMap | | | May occur |
| Mammals | | | | | | | |
| <i>Dasyurus geoffroii</i> | Chuditch, Western Quoll | V | VU | DPaW EPBC Act | 2010 | 4 | Likely |
| <i>Isoodon obesulus fusciventer</i> | Quenda, Southern Brown Bandicoot | - | P4 | DPaW | 2000 | 2 | May occur |
| <i>Macropus irma</i> | Western Brush Wallaby | - | P4 | DPaW | 2012 | 5 | Likely |

| Name | Common Name | Conservation Status | | Source | DPaW Records | | Likelihood of Occurrence |
|---|--|---------------------|-------|------------------|--------------|--------|--------------------------|
| | | Commonwealth | State | | Most Recent | Number | |
| | | | | NatureMap | | | |
| <i>Myrmecobius fasciatus</i> | Numbat | V | EN | DPaW | 2014 | 1 | May occur |
| <i>Phascogale tapoatafa</i> subsp. (WAM M434) | South-western Brush-tailed Phascogale, Wambenger | - | VU | DPaW | 1992 | 9 | May occur |
| <i>Pseudocheirus occidentalis</i> | Western Ringtail Possum | V | EN | EPBC Act | - | - | May occur |
| Fish | | | | | | | |
| <i>Galaxias truttaceus hesperius</i> | Western Trout Minnow | CE | EN | EPBC Act | - | - | May occur |
| <i>Galaxiella munda</i> | Mud Minnow, Western Mud Minnow | - | VU | DPaW | 1997 | 12 | May occur |
| <i>Galaxiella nigrostriata</i> | Black-stripe Minnow | - | P3 | DPaW | 1997 | 4 | May occur |
| <i>Nannatherina balstoni</i> | Balston's Pygmy Perch | V | VU | DPaW EPBC Act | 1997 | 4 | May occur |
| Invertebrates | | | | | | | |
| <i>Austromerope poultoni</i> | a scorpionfly | - | P2 | DPaW | 2004 | 2 | May occur |
| <i>Hylaeus globuliferus</i> | a bee | - | P3 | NatureMap | - | - | May occur |
| <i>Pseudohydryphantes doegi</i> | Doeg's Watermite | - | P2 | DPaW | 1998 | 2 | May occur |



PROJECT ID 60507828
 CREATED BY DGF
 APPROVED BY FDW
 LAST MODIFIED 08 AUG 2016



LEGEND

Project Area

Fauna Search

- *Cacatua pastinator pastinator*
- *Calyptorhynchus banksii naso*
- *Calyptorhynchus baudinii*
- *Dasyurus geoffroi*
- *Macropus irma*
- *Phascogale tapoatafa subsp. (WAM M434)*
- ▲ *Pentapogon quadrifidus var. quadrifidus*

TPFL

- ▲ *Pentapogon quadrifidus var. quadrifidus*

WA Herb

- *Diuris drummondii*
- *Pentapogon quadrifidus var. quadrifidus*
- *Spyridium riparium*
- *Verticordia fimbrilepis subsp. australis*

Data sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Geomapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Base Data: (c) Based on information provided by and

Desktop Flora, Fauna and Vegetation Records

Water Corporation

ROCKY GULLY FLORA
 VEGETATION AND FAUNA SURVEY

Figure

5

6.0 Field Results and Discussion

6.1 Vegetation

6.1.1 Threatened and Priority Ecological Communities

No TECs or PECs were anticipated to occur in the Project Area and none were recorded.



6.1.2 Vegetation Communities

A total of three vegetation communities were described and mapped from 18 relevés within the Project Area during the field assessment. This includes two Jarrah Forest communities and one wetland community.

The wetland community encompasses a mosaic of various wetland species occurring in thickets throughout the Project Area. Foliage cover varies greatly throughout this community, likely dependant on water expression, proximity to the water table, and soil conditions. Access issues prevented us from completing more relevés in the riparian zone. For the purposes of the Level 1 assessment, capturing the riparian vegetation in one community was considered suitable. There are no clear boundaries evident on aerial imagery between the various thickets of wetland species.

Sites completed in ecotones were difficult to classify into a vegetation community and every attempt was made to ensure vegetation community descriptions incorporate common dominant species for the three strata described. For example, Site 16 was located in a seasonally-wet area that is subject to less inundation than other wetland communities. Therefore, the floristic composition present represents a mix of wetland species and Jarrah Forest species.

Table 18 Vegetation communities recorded in the Project Area including code and description using the NVIS system, size of community, representative photograph and survey effort

| Code | Vegetation Description | Photograph |
|----------------------|--|--|
| Jarrah Forest | | |
| EmAtAp | <p><i>Eucalyptus marginata</i> subsp. <i>marginata</i> and <i>Corymbia calophylla</i> mid open forest (2000 cm, 50%) over <i>Agonis theiformis</i>, <i>Bossiaea linophylla</i> and <i>Xanthorrhoea preissii</i> (200 cm, 30%) mid to tall shrubland over <i>Anarthria prolifera</i>, <i>Cheilanthes austrotenuifolia</i> and <i>Bossiaea ornata</i> mid to low open mixed sedge/shrub and forbland.</p> <p>Occasional <i>Banksia grandis</i> were observed, usually in poor condition with numerous dead and fallen trees. High diversity of other forbs and shrubs in this community including <i>Leucopogon</i> species, Fabaceae (pea) species, and <i>Lomandra</i>.</p> <p>Area: 223.96 ha Sites: four relevés (2, 3, 7, 12) Species richness: 63 native species</p> |  |
| EmBIHa | <p><i>Eucalyptus marginata</i> subsp. <i>marginata</i> and <i>Corymbia calophylla</i> mid open forest over <i>Bossiaea linophylla</i>, <i>Leucopogon obovatus</i> subsp. <i>revolutus</i> and <i>Hakea lissocarpha</i> mid open shrubland over <i>Hypocalymma angustifolium</i>, <i>Cyathochaeta avenacea</i> and <i>Astroloma pallidum</i> mid to low open mixed rush/shrubland.</p> <p>The most notable difference between EmBIHa and EmAtAp is the lack of tall shrubs of <i>Agonis theiformis</i> which has led to a more diverse low shrub and forb understorey. Encompassed in this community are small bare areas of white sand and exposed granite, too small to map as separate communities for the purposes of this assessment.</p> <p>Area: 322.63 ha Sites: 6 relevés (1, 6, 9, 10, 11, 17), one ecotone releve (16) Species richness: 86 native species</p> |  |


| Code | Vegetation Description | Photograph |
|---------|---|---|
| Wetland | | |
| MpAsCa | <p><i>Melaleuca preissiana</i>, <i>Eucalyptus marginata</i> subsp. <i>marginata</i> and occasional <i>Eucalyptus rudis</i> low to mid woodland to open woodland over <i>Astartea scoparia</i>, <i>Taxandria parviceps</i> and <i>Melaleuca viminea</i> subsp. <i>viminea</i> tall shrubland over <i>Cyathochaeta avenacea</i>, <i>Leptocarpus kraussii</i> and <i>Philydrella drummondii</i> low sedgeland.</p> <p>The tall shrubland stratum occurs as a mosaic, with often only one of these species occurring as thickets at various locations. <i>Hypocalymma angustifolium</i> observed within ecotone between riparian vegetation and adjacent Jarrah Forest. Contains occasional <i>Juncus kraussii</i>.</p> <p>Area: 111.60 ha Sites: six releves (4, 5, 8, 14, 15, 18) Species richness: 50 native species</p> |  |



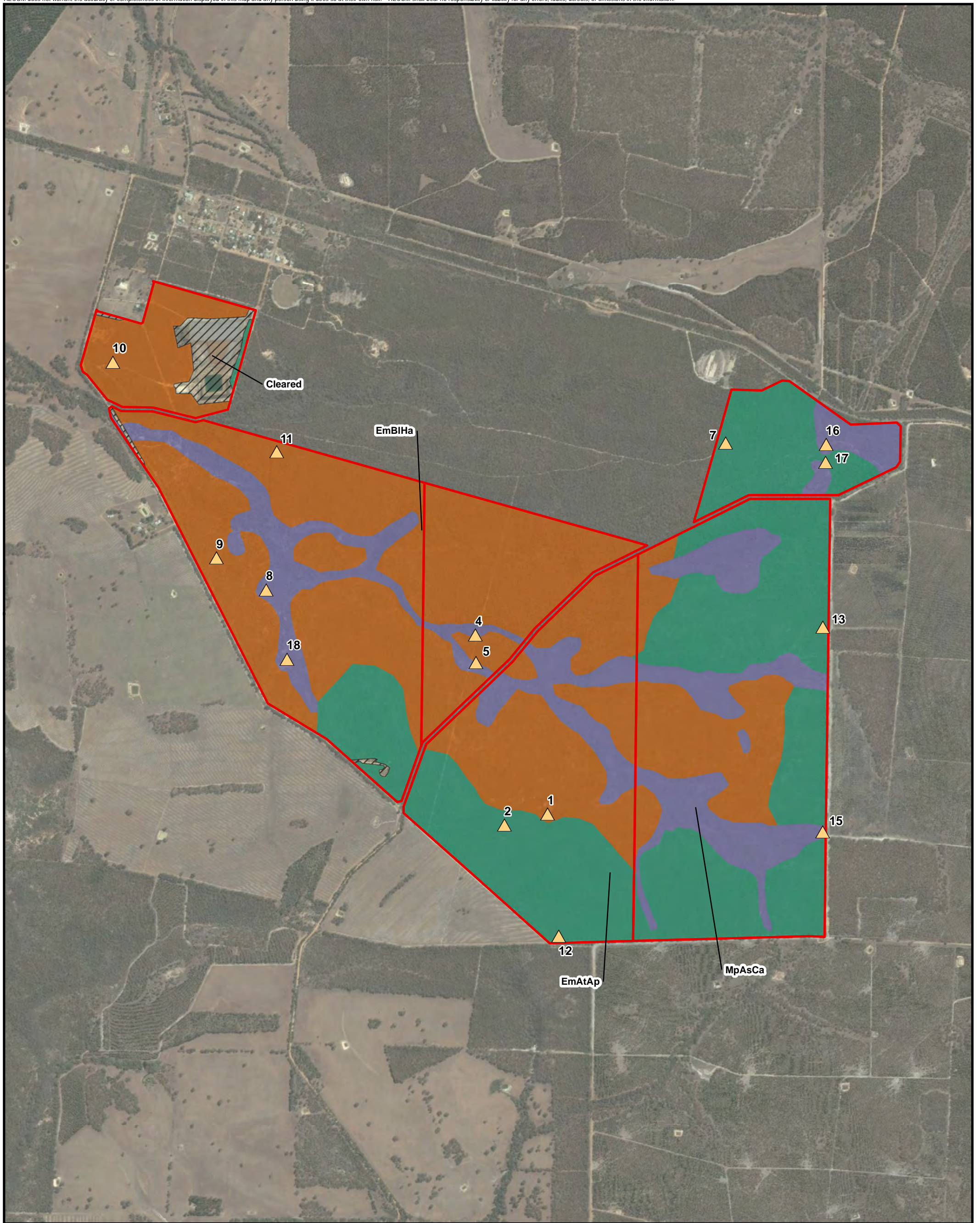
Plate 1 Bare areas in Community EmBIHa



Plate 2 Ecotone grading from wetland to adjacent Jarrah Forest

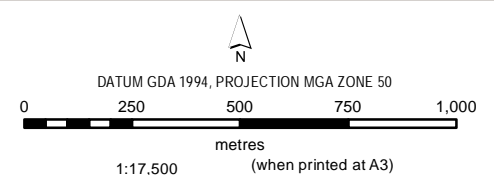


Plate 3 Example of wetland community density and thickets



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LEGEND

- Project Area
- ▲ Survey Effort
- Vegetation Community**
- Cleared
- EmAtAp
- EmBIHa
- MpAsCa

Data sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Geomatics, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Base Data: (c) Based on information provided by and

| | |
|-------------------------------------|-------------------------------|
| Vegetation Community Mapping | |
| Water Corporation | |
| ROCKY GULLY FLORA | |
| VEGETATION AND FAUNA SURVEY | |
| | Figure 6 |

6.1.3 Vegetation Condition

Vegetation condition within the Project area varied from Completely Degraded to Excellent. The majority was mapped as Excellent and extended over 654.25 ha (comprising 97.53 % of the total vegetated area). Completely Degraded vegetation encompassed cleared areas including the existing Water Corporation infrastructure and a gravel pit/rubbish dump. The major contributing factors causing degradation are vegetation clearing. This disturbance however only affected 12.64 ha (1.88 %) of the Project Area. Vegetation condition has been mapped in Figure 7.

Table 19 Vegetation condition mapped within the Project Area

| Condition Rating | Area (ha) | Percentage of Project Area |
|---------------------|-----------|----------------------------|
| Excellent | 654.25 | 97.53 % |
| Very Good | 3.12 | 0.46 % |
| Degraded | 0.83 | 0.12 % |
| Completely Degraded | 12.64 | 1.88 % |

6.2 Flora

6.2.1 Threatened and Priority Flora

There are two flora species that were collected in the field that may represent a Priority flora species. One *Hibbertia* species was collected that may represent the Priority 4 *Hibbertia helianthemoides*. Due to lack of suitable identification material (no flowers), this was not able to be confirmed. This species was not identified in the desktop assessment, however the NatureMap search of the area (including a 20 km buffer) shows records of this species. This specimen was collected at one location and observed at two more locations.

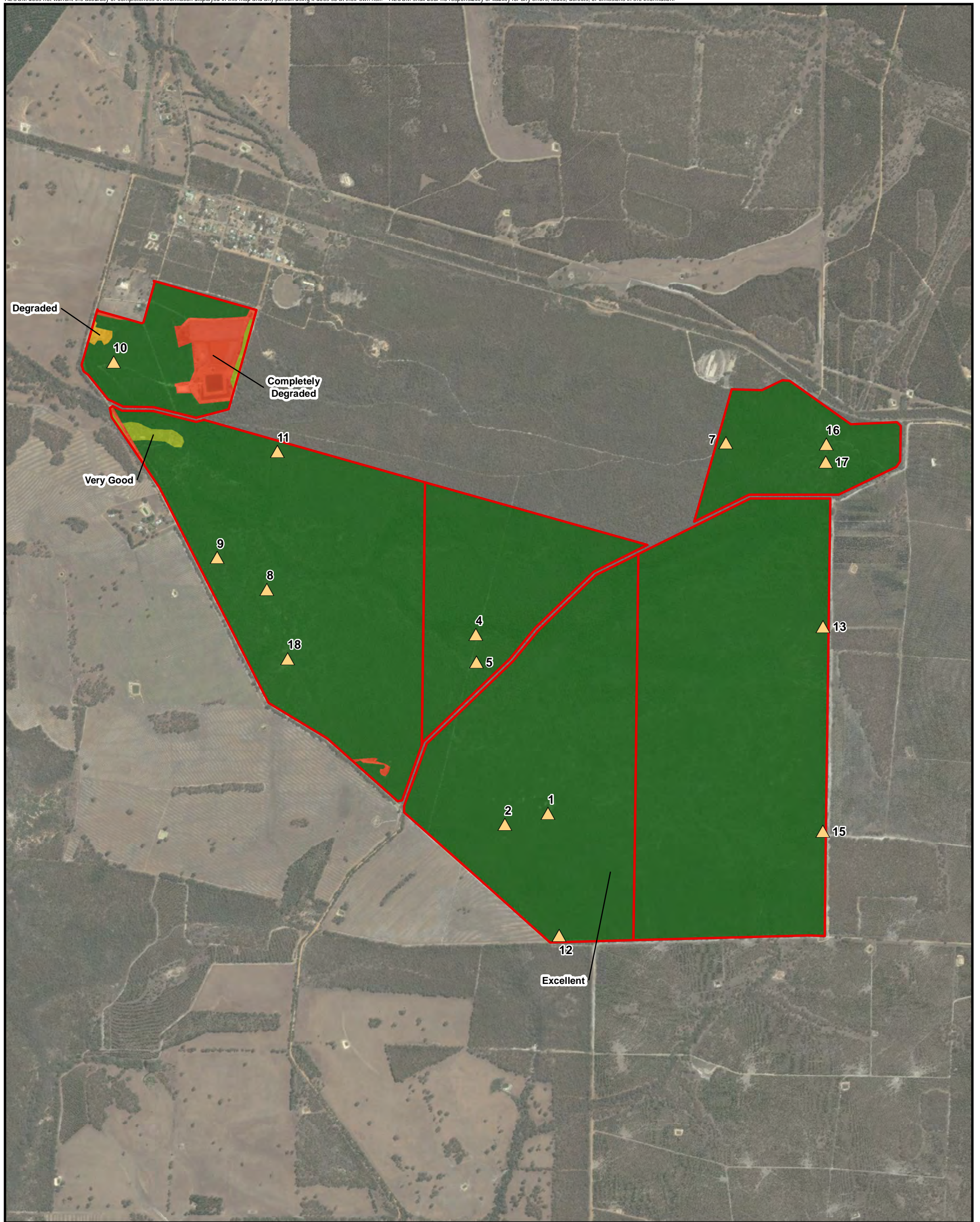
One *Andersonia* collection was made from an open area of white sandy soils. Old flowers and vegetative material were collected and submitted to the WAH for formal identification. There have been two Priority 3 *Andersonia* species collected from the area according to NatureMap and the TPFL database list. This specimen was collected at one location. It is anticipated that WAH identification will be confirmed in time for the submission of the final report.

Due to the survey timing, low-intensity sampling, and lacking quadrat data, it is possible that more Threatened and/or Priority flora species occur in the Project Area, particularly those considered likely to occur in the desktop assessment.

6.2.2 Inventory of Flora Species

A total of 119 species from 69 genera and 35 families were recorded within the Project Area during the field assessment. No weed species were recorded. Families with the highest representation are Fabaceae (16 taxa), Proteaceae (14 taxa), Myrtaceae (12 taxa), and Ericaceae (nine taxa).

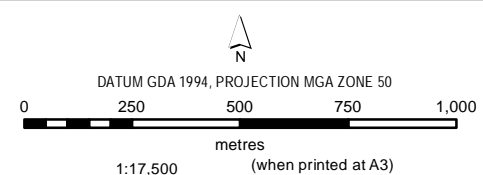
The full list of vascular flora species recorded and representative communities in which they occur in is presented in Appendix D.



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LEGEND
 Project Area
 Survey Effort
Vegetation Condition
 Excellent
 Very Good
 Degraded
 Completely Degraded



Data sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Geomapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Base Data: (c) Based on information provided by and

Vegetation Condition Mapping

Water Corporation
 ROCKY GULLY FLORA
 VEGETATION AND FAUNA SURVEY

Figure
 7

6.3 Fauna

6.3.1 Fauna species

Sixteen fauna species were recorded within the Project Area during the field survey. This comprised 10 bird, four mammal and one amphibian species. The observed species list is presented in Table 20. Of the 16 fauna species observed, one species was of conservation significance, Baudin's Black Cockatoo (listed as Vulnerable under the EPBC Act and Endangered under the WC Act).

Table 20 Fauna species observed in the Project Area

| Name | Common Name | Conservation Status | |
|--|--------------------------|---------------------|-------|
| | | Commonwealth | State |
| Birds | | | |
| <i>Artamus personatus</i> | Masked Woodswallow | - | - |
| <i>Barnardius zonarius semitorquatus</i> | Twenty-eight Parrot | - | - |
| <i>Calyptorhynchus baudinii</i> | Baudin's Black Cockatoo | Vu | V |
| <i>Corvus coronoides</i> | Australian Raven | - | - |
| <i>Cracticus tibicen</i> | Australian Magpie | - | - |
| <i>Dacelo novaeguineae</i> | Laughing Kookaburra* | - | - |
| <i>Dromaius novae-hollandiae</i> | Emu | - | - |
| <i>Pachycephala pectoralis</i> | Golden Whistler | - | - |
| <i>Petroica boodang</i> | Scarlet Robin | - | - |
| <i>Rhipidura albiscapa</i> | Grey Fantail | - | - |
| Mammals | | | |
| <i>Canis lupis familiaris</i> | Dog* | - | - |
| <i>Macropus fuliginosus</i> | Western Grey Kangaroo | - | - |
| <i>Oryctolagus cuniculus</i> | European Wild Rabbit* | - | - |
| <i>Trichosurus vulpecula</i> | Common Brush-tail Possum | - | - |
| <i>Vulpes vulpes</i> | Red Fox* | - | - |
| Amphibians | | | |
| <i>Crinia georgiana</i> | Quacking Frog | - | - |

6.3.2 Introduced Fauna

Four introduced fauna species were recorded in the Project Area. These comprised:

- Dog (*Canis lupis familiaris*)
- European Wild Rabbit (*Oryctolagus cuniculus*) Declared Pest - s22(2) (C3 Prohibited)
- Red Fox (*Vulpes vulpes*) Declared Pest - s22(2) (C3 Exempt)
- Laughing Kookaburra (*Dacelo novaeguineae*).

The European Wild Rabbit and the Red Fox are both listed as Declared Pests under the BAM Act. Generally these species were recorded intermittently throughout the Project Area, identified either by sight, call, scats, den or tracks.


6.3.3 Fauna habitat



Three main fauna habitats (including Cleared Areas) have been defined and mapped within the Project Area (refer to Table 21 and Figure 8). The delineation of fauna habitats was based on the fauna habitat field assessments and the vegetation mapping.

The most common fauna habitat was the Jarrah and Marri Forest at approximately 81% of the Project Area. This is a Jarrah and Marri dominated habitat that varies in density of understorey. It would generally support many of the common species of the area and would also be utilised by many of the conservation significant fauna species likely to occur in the Project Area such as Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*), Muir's Corella (*Cacatua pastinator pastinator*), Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*), Baudin's Black Cockatoo (*Calyptorhynchus baudinii*), Chuditch (*Dasyurus geoffroii*) and Western Brush Wallaby (*Macropus irma*).

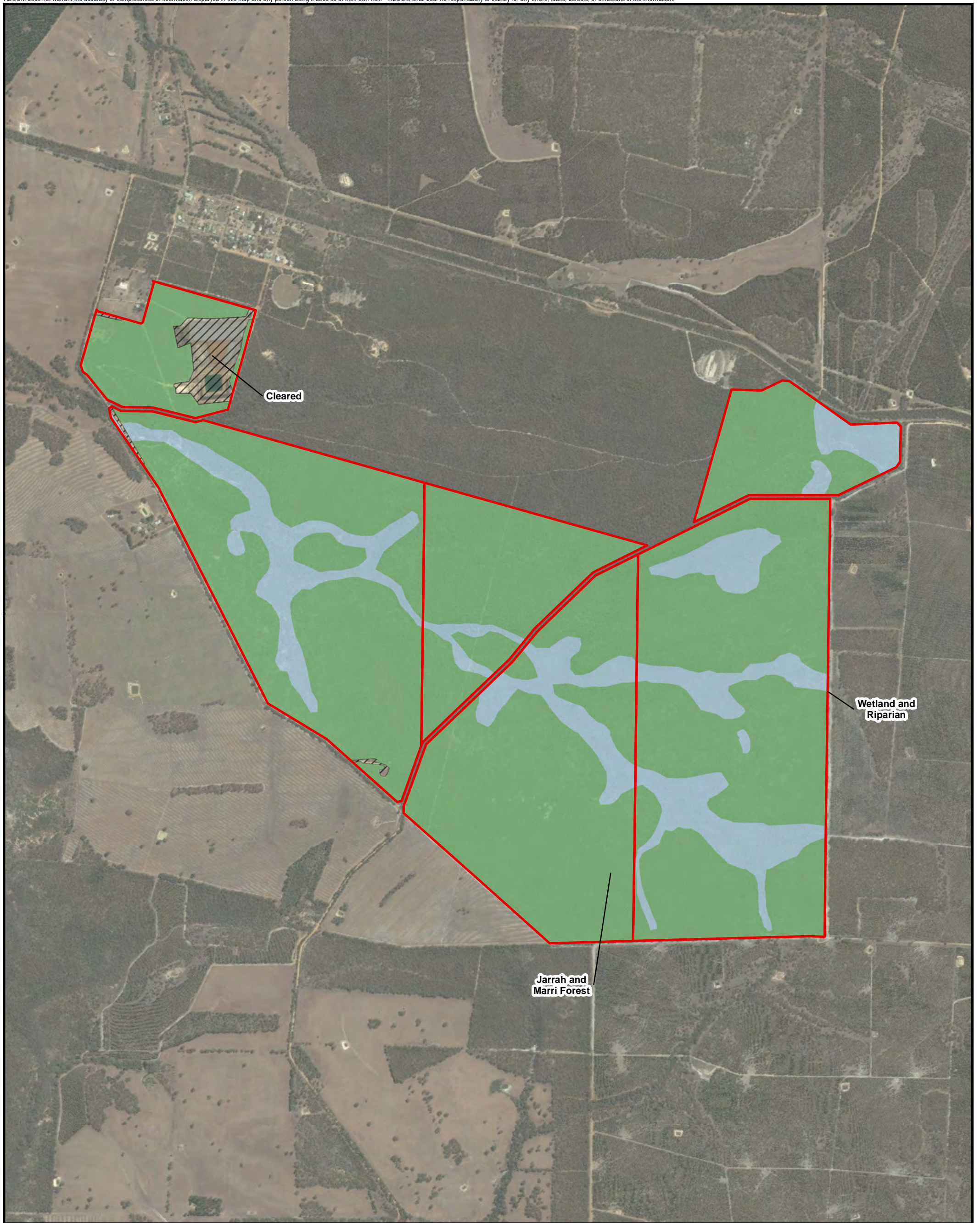
The second most common habitat was the Wetland and Riparian Habitat. This habitat covered approximately 17% of the Project Area. This habitat was varied and contained patches of open *Melaleuca* woodland, patches of tall shrubland and patches of open low sedgeland, with small water bodies and marsh areas. The conservation significant fauna species that would potentially utilise this habitat include Great Egret (*Ardea modesta*), Rainbow Bee-eater (*Merops ornatus*), Chuditch (*Dasyurus geoffroii*) and Western Brush Wallaby (*Macropus irma*).

Table 21 Fauna habitats of the Project Area

| Fauna Habitat | Description | Conservation Significant Species Potentially Utilising Habitat | Area (ha) | Percentage (%) | Photos |
|-------------------------|---|--|-----------|----------------|--|
| Jarrah and Marri Forest | <p>This habitat was varied in density of understory, but generally contained an open Jarrah and Marri dominated overstorey. Habitat features included:</p> <ul style="list-style-type: none"> - mature trees over 30 m were absent - canopy cover of mature trees over 10 m was between 10 and 30% - shrub cover (<2 m) was varied and generally between 10 and 70% - hollows within mature trees were generally occasionally present - fallen logs of varied sizes were generally common to occasionally present - bare ground presence was varied, between rare to common, soils cracks were rare - coarse and fine litter were generally common - stone presence of any size was generally rare to absent - a cryptogamic crust was generally rare and vines were rare to occasionally present - proteaceous plant species cover was low and generally between 1 – 10% - water bodies were generally absent. | <p>Carnaby's Black Cockatoo (<i>Calyptorhynchus latirostris</i>), Muir's Corella (<i>Cacatua pastinator pastinator</i>), Forest Red-tailed Black Cockatoo (<i>Calyptorhynchus banksii naso</i>), Baudin's Black Cockatoo (<i>Calyptorhynchus baudinii</i>), Chuditch (<i>Dasyurus geoffroii</i>) and Western Brush Wallaby (<i>Macropus irma</i>).</p> | 546.60 | 81 |  |

| Fauna Habitat | Description | Conservation Significant Species Potentially Utilising Habitat | Area (ha) | Percentage (%) | Photos |
|----------------------------------|---|---|-----------|----------------|---|
| Wetlands and riparian vegetation | <p>This habitat was varied and contained patches of open <i>Melaleuca</i> woodland, patches of tall shrubland and patches of open low sedgeland, with marshy areas and occasional small water body.</p> <p>Habitat features included:</p> <ul style="list-style-type: none"> - large and medium sized mature trees were generally absent, though some present in the ecotone areas with the Jarrah and Marri forest - low trees presence varied, with canopy cover up to 70% - hollows were absent - fallen logs were rare to occasionally present and were generally <10 cm diameter - coarse and fine litter were generally rare to occasionally present - bare ground presence was varied, from absent to abundant - stones and boulders were absent - dense shrub presence was absent to common - water was generally present, either as marshy areas or a defined drainage line or water body. | Great Egret (<i>Ardea modesta</i>), Rainbow Bee-eater (<i>Merops ornatus</i>), Chuditch (<i>Dasyurus geoffroii</i>) and Western Brush Wallaby (<i>Macropus irma</i>). | 111.61 | 17 |   |

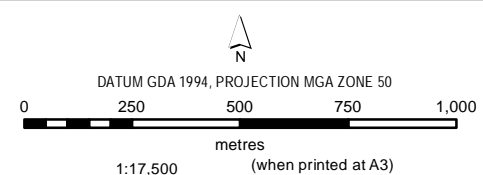
| Fauna Habitat | Description | Conservation Significant Species Potentially Utilising Habitat | Area (ha) | Percentage (%) | Photos |
|---------------|--|---|-----------|----------------|--------|
| Cleared | Completely degraded and cleared areas. | Rainbow Bee-eater (<i>Merops ornatus</i>) and Western Brush Wallaby (<i>Macropus irma</i>). | 12.64 | 2 | |



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LEGEND
 Project Area
Fauna Habitat
 Cleared
 Jarrah and Marri Forest
 Wetland and Riparian



Data sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Geomapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
 Base Data: (c) Based on information provided by and

| | |
|--|----------|
| Fauna Habitat | |
| Water Corporation | |
| ROCKY GULLY FLORA VEGETATION AND FAUNA SURVEY | |
| Figure | 8 |

6.3.4 Black Cockatoos

6.3.4.1 Baudin’s Black Cockatoo

Baudin’s Black Cockatoo is distributed throughout the south-western humid and subhumid zones, from the northern Darling Range and adjacent far east of the SCP (south of the Swan River), south to Bunbury and across to Albany (Johnstone & Storr, 1998). It is a large black cockatoo with rectangular white patches in the tail. Males have a pink eye ring, the female a dark eye ring.

Baudin’s Black Cockatoo forages primarily in eucalypt forest, where it feeds on seeds, flowers, nectar and buds from Marri (*Corymbia calophylla*), and seeds of *Eucalyptus* and proteaceous species (e.g. *Banksia* and *Hakea*), as well as orchard fruits and Pines (*Pinus* sp.). It also takes insect larvae and insects (including beetle, wasp and moth larvae) from under bark and in wood of live and dead trees, from galls and from flower spikes of *Xanthorrhoea* and the pith of *Anigozanthos flavidus* (Johnstone & Kirkby, 2008).

This black cockatoo primarily nests in tree hollows in live or dead Karri (*Eucalyptus diversicolor*), Marri (*Corymbia calophylla*), Wandoo (*Eucalyptus wandoo*) and Tuart (*Eucalyptus gomphocephala* [DSEWPaC, 2012b]). Baudin’s Black Cockatoo nests in spring in the deep southwest of Western Australia.

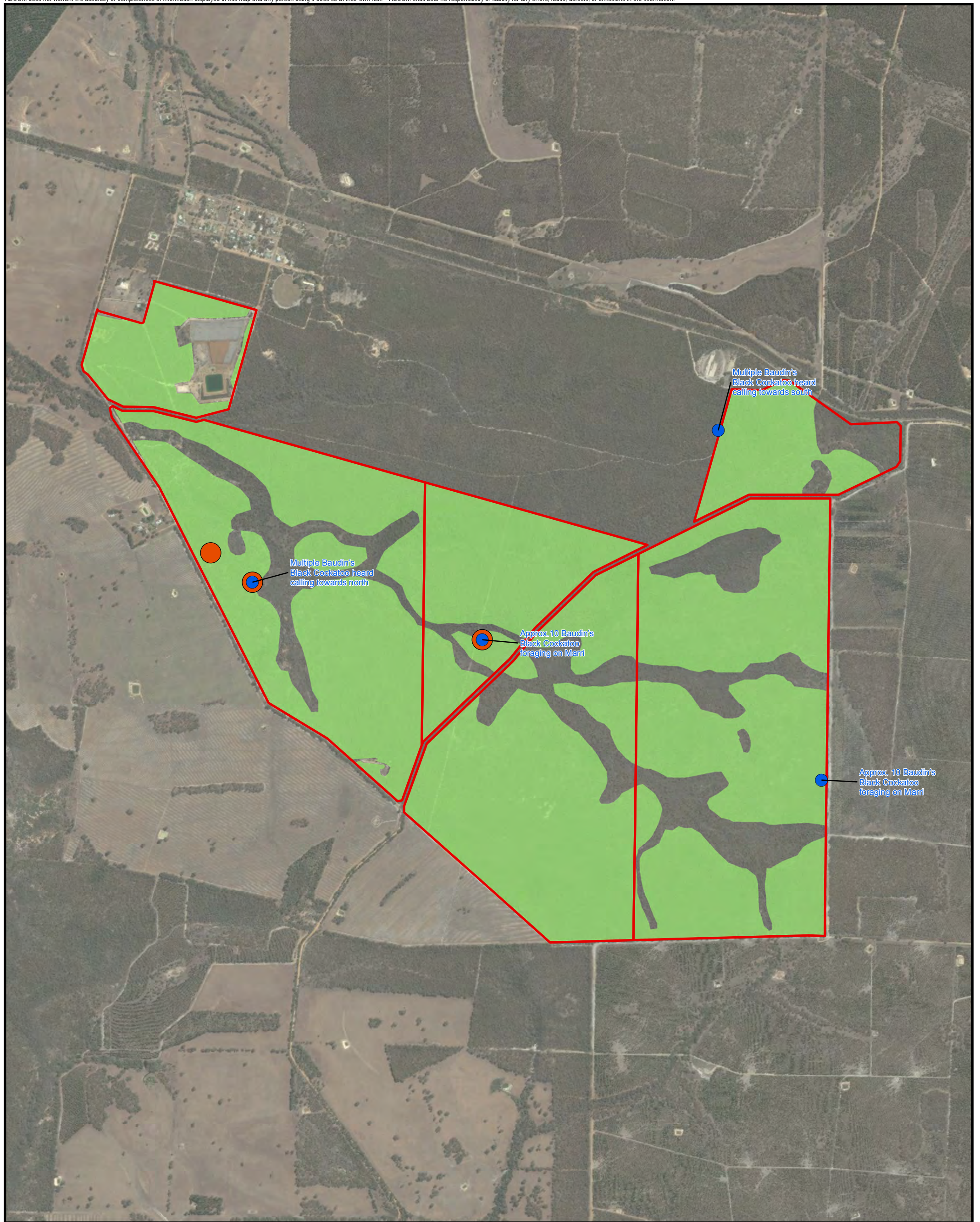
Baudin’s Black Cockatoo were observed four times during the field survey, either flying over the Project Area, foraging on Marri, or heard in close proximity. The details of these records are presented in Table 22 and locations illustrated on Figure 9.

Table 22 Baudin’s Black Cockatoo observations

| Observation | Date | Coordinates | |
|--|------------|-------------|------------|
| Approx. 10 birds observed foraging on Marri | 12/07/2016 | -34.535353 | 117.044298 |
| Multiple birds heard calling towards the south | 12/07/2016 | -34.519493 | 117.03838 |
| Multiple birds heard calling towards the north | 13/07/2016 | -34.526662 | 117.012872 |
| Approx.10 birds observed foraging on Marri (Plate 4) | 14/07/2016 | -34.529149 | 117.025547 |



Plate 4 Baudin’s Black Cockatoos observed in the Project Area



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LEGEND

- Project Area
- Black Cockatoo Observations
- Potential Baudin's Black Cockatoo Foraging Evidence

Black Cockatoo Foraging Habitat

- High Quality

N

DATUM GDA 1994, PROJECTION MGA ZONE 50

metres
1:17,500
(when printed at A3)

Data sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Geomatics, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Base Data: (c) Based on information provided by and

Black Cockatoo Foraging Habitat and Observations

| | |
|---|--|
| <p>Water Corporation</p> <p>ROCKY GULLY FLORA</p> <p>VEGETATION AND FAUNA SURVEY</p> | <p>Figure</p> <p style="font-size: 2em; font-weight: bold;">9</p> |
|---|--|

6.3.4.2 Forest Red-tailed Black Cockatoo

The Forest Red-tailed Black Cockatoo is endemic to the south-west humid and semi-humid zones of Western Australia, where it inhabits dense Jarrah, Karri and Marri forests which receive more than 600 mm average annual rainfall (DSEWPaC, 2012b). It has a pair of black central tail feathers and a bright red, orange or yellow barring on the tail.

This species predominantly feeds in eucalypt forests, preferring Marri (*Corymbia calophylla*) and Jarrah (*Eucalyptus marginata*) seeds, but also feeding on Blackbutt (*Eucalyptus patens*), Albany Blackbutt (*Eucalyptus staeri*), Karri (*Eucalyptus diversicolor*), Sheoak (*Allocasuarina fraseriana*) and Snottygobble (*Persoonia longifolia*) (Johnstone, 2016 pers. comm.). Forest Red-tailed Black Cockatoo are monogamous and pairs nest in tree hollows from 6.5–33 m above ground. Most nests are in very large and very old, mature Marri (*Corymbia calophylla*) (Johnstone, Kirkby & Sarti, 2013), though they will nest in other eucalypts such as Tuart (Johnstone, 2016 pers. comm.).

The Forest Red-tailed Black Cockatoo was not recorded during the field survey.

6.3.4.3 Carnaby's Black Cockatoo

Carnaby's Black Cockatoo is endemic to the southwest of Western Australia, extending from the Murchison River to Esperance, and inland to Coorow, Kellerberrin and Lake Cronin (DEC, 2009). This black cockatoo has a white patch on its cheek, white bands on its tail, and a strong curved bill.

Carnaby's Black Cockatoo feed on seeds, nuts and flowers of a variety of native and exotic plants. Feed plants include the various proteaceous species (e.g. *Banksia*, *Grevillea* and *Hakea*), *Corymbia calophylla* (Marri), *Eucalyptus* (e.g. Jarrah [*Eucalyptus marginata*]), and seeds from the cones of Pine trees (*Pinus* sp.).

Carnaby's Black Cockatoo display strong pair bonds and nest in the hollows of live or dead mature eucalypts including Salmon Gum (*Eucalyptus salmonophloia*), York Gum (*Eucalyptus loxophleba* subsp. *loxophleba*), Flooded Gum (*Eucalyptus rudis*), Karri (*Eucalyptus diversicolor*), Marri (*Corymbia calophylla*), Wandoo (*Eucalyptus wandoo*) and Tuart (*Eucalyptus gomphocephala*) [DSEWPaC, 2012b]). Nest hollows generally range from 2.5-12 m above ground, size of entrance from 23-30 cm and depth of hollows from 1-2.5 m (Johnstone and Storr, 1998). The species appears to be expanding its current breeding range westward and south into the Jarrah-Marri forests of the Darling Range and into the Tuart forests of the SCP (Johnstone and Kirkby, 2006). After breeding, Carnaby's Black Cockatoo disperse to the higher rainfall coastal areas of the south-west of Western Australia to feed in late December to July (DEC, 2009). Breeding has been recorded from early July to mid-December.

Carnaby's Black Cockatoo were not observed during the field survey.

6.3.5 Black Cockatoo foraging habitat

The Project Area contains a significant amount of small and mature Marri and Jarrah trees. It also contains and is located adjacent to several freshwater sources. It does not contain habitats dominated by proteaceous species.

6.3.5.1 Baudin's Black Cockatoo

Baudin's Black Cockatoos were observed foraging on Marri within the Project Area on 12th and 14th July 2016. Recent evidence of Baudin's Black Cockatoo foraging within the Project Area was recorded an additional three times during the field survey. Table 23 provides the details regarding these observations, locations are illustrated on Figure 9.

No Baudin's Black Cockatoo breeding or roosting sites are known within 12 km and six kilometres respectively of the Project Area and the site is outside of the known foraging area for Baudin's Black Cockatoo (DSEWPaC, 2012b). The foraging assessment determined that the Project Area contains approximately 547 ha of High quality foraging habitat for Baudin's Black Cockatoo. This 547 ha is comprised of Jarrah and Marri Forest fauna habitat. Refer to Figure 9.

Table 23 Potential Baudin’s Black Cockatoo foraging evidence

| Observation | Date | Coordinates | | Plate |
|------------------------------|--------------|-------------|------------|---------------------|
| Typical chewing on Marri nut | 13 July 2016 | -34.52535 | 117.010553 | Plate 5 and Plate 6 |
| Typical chewing on Marri nut | 13 July 2016 | -34.526662 | 117.012873 | Plate 7 |
| Typical chewing on Marri nut | 12 July 2016 | -34.529149 | 117.025547 | Plate 8 |



Plate 5 Baudin’s Black Cockatoo foraging evidence



Plate 6 Baudin’s Black Cockatoo foraging evidence



Plate 7 Baudin’s Black Cockatoo foraging evidence



Plate 8 Baudin’s Black Cockatoo foraging evidence

6.3.5.2 Forest Red-tailed Black Cockatoo

There is a known Forest Red-tailed Black Cockatoo breeding location within 12 km of the Project Area, and the Marri and Jarrah present exhibit good recruitment. The foraging assessment determined that the 547 ha of the Jarrah and Marri Forest fauna habitat would provide High quality foraging habitat for the Forest Red-tailed Black Cockatoo. Figure 9 illustrates this foraging habitat.

6.3.5.3 Carnaby’s Black Cockatoo

The Project Area contains a significant amount of young and mature Jarrah and Marri trees with breeding potential, but does not contain habitats dominated by proteaceous species and is not within the Swan Coastal Plain (SCP). Both these factors influence the foraging quality assessment, however quality was still recorded as ‘High’ with the assessment showing 547 ha of the Jarrah and Marri forest considered suitable habitat (of High quality). Figure 9 illustrates this foraging habitat.

6.3.6 Breeding habitat

The Jarrah and Marri Forest fauna habitat within the Project Area has been defined as Quality breeding habitat due to the moderate density of potentially suitable breeding eucalypts (with a DBH >500 cm). In total, the Project Area contains approximately 547 ha of Quality Black Cockatoo breeding habitat. Plate 9 illustrates this potential breeding habitat. The mean number of potentially suitable breeding trees per quadrat was 12.625 (n = 8, SD 3.71). Therefore, within the approximate 547 ha of Quality breeding habitat, there is approximately 30,000 potentially suitable breeding trees.

The breeding habitat mapping is illustrated in Figure 10.



Plate 9 High quality breeding habitat

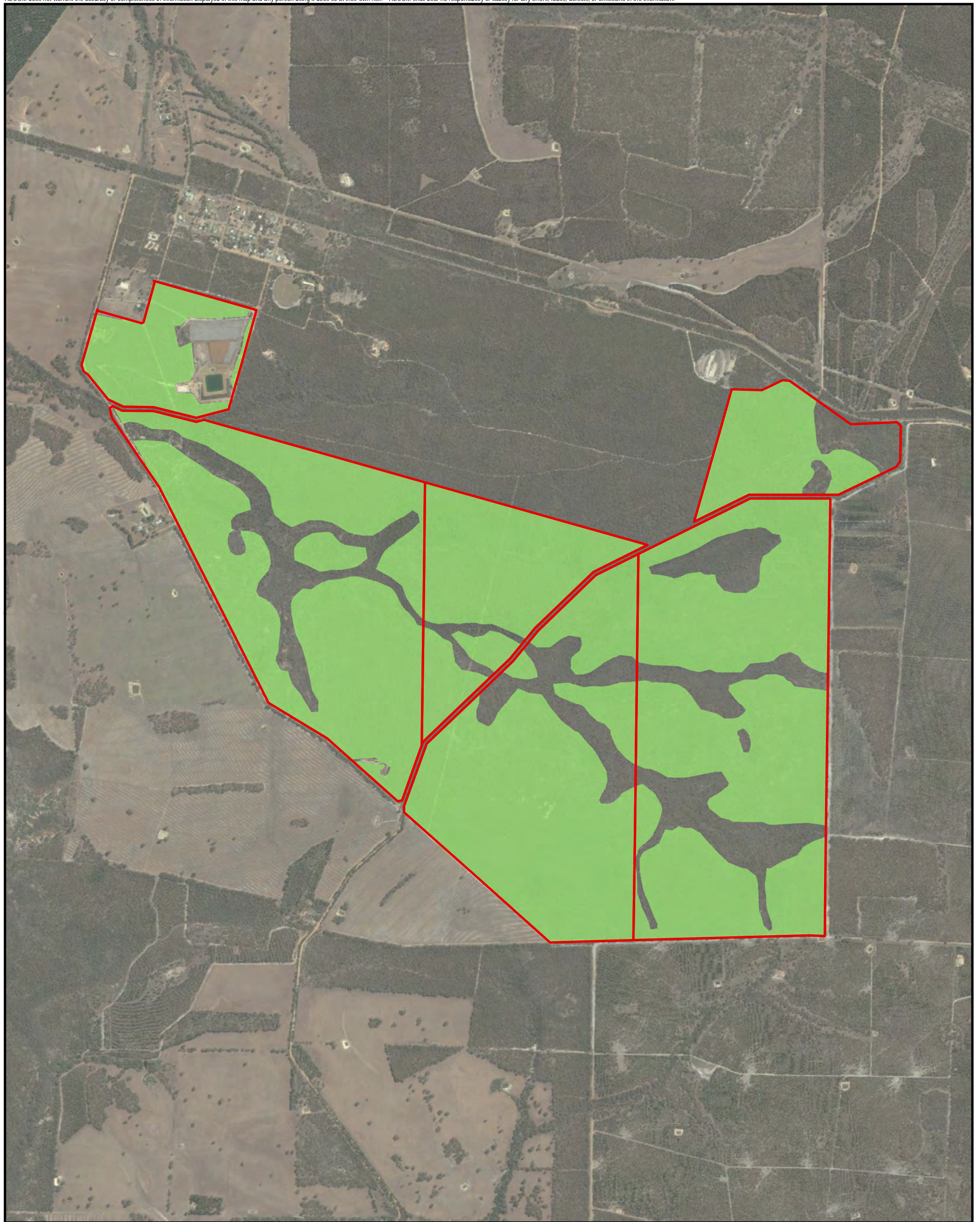
6.3.7 Roosting sites

Both white-tailed Black Cockatoo species typically roost in the tallest trees in the landscape in or near riparian environments or near other permanent water sources. The Forest Red-tailed Black Cockatoo prefers the edges of forests for roosting (DSEWPac, 2012b). Evidence of roosting usually involves large amounts of bird scat beneath a large, mature tree, with a significant amount of broken branches on the ground. Searches for roosting evidence were undertaken alongside the other Black Cockatoo assessments and no Black Cockatoo roost sites were identified.

6.3.8 Fauna habitat linkages

Habitat linkages are typically areas or corridors of vegetation that link (larger) areas of fauna habitat. Linkages are important as they enable fauna to move freely between remnant bushland patches, therefore increasing gene-flow between populations. A study conducted by Gilbert *et al.* (1998) found that corridors and/or linkages do maintain species richness in the fragmented landscapes.

The Project Area does not provide a significant habitat linkage in terms of it connecting separate and potentially isolated areas of fauna habitat. However, the Project Area is located in an area with vast amounts of historic clearing for agriculture to the north, and significant adjacent areas containing tree plantations. To the south of the Project Area are large areas of State Forest / National Park. The Project Area therefore provides an area of good quality fauna habitat that acts as a buffer from the cleared agricultural lands to the State Forest / National Park.

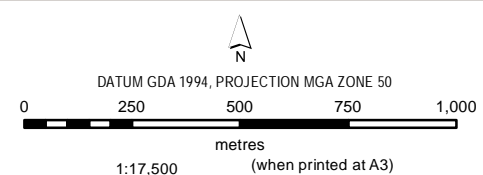


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LEGEND
 Project Area
 Black Cockatoo Breeding Habitat
 Quality



Data sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Geomatics, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Base Data: (c) Based on information provided by and

Black Cockatoo Breeding Habitat

Water Corporation

ROCKY GULLY FLORA
 VEGETATION AND FAUNA SURVEY

Figure

10

6.4 Riparian Assessment

The riparian vegetation was captured as vegetation community MpAsCa, which encompassed both narrow running streams (an expression of recent rains and groundwater rather than a permanent stream), open sumplands where soil was inundated but no water evident on the surface, and adjacent floodplain where riparian vegetation grades into Jarrah Forest communities. No weeds were observed during the field survey in the riparian vegetation. This is surprising as it is likely that some of the water tributaries are from adjacent cleared land. This could be representative of the timing of the field survey (winter rather than spring),

Riparian vegetation was considered as A grade vegetation in the pristine category:

- Pristine. The river embankments and floodway are entirely vegetated with native species, and there is no evidence of human presence or livestock damage

Except near the track, where riparian vegetation was considered in the A2 category:

- Near pristine. Native vegetation dominates. Some introduced weeds may be present in the understorey, but not to the extent that they displace native species. Otherwise there is no evidence of human impact. (A river valley in this condition is as good as will be found today).

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Appendix A

Conservation Code Categories

Appendix A – Conservation Categories

1.1 Western Australia

Plants and animals that are considered threatened and need to be specially protected because they are under identifiable threat of extinction are listed under the *Wildlife Conservation Act (WC Act)*. These categories are defined in Table 1. Threatened species are published as Specially Protected under the Wildlife Conservation Act 1950, 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 (which may also be referred to as Declared Rare Flora). The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as outlined in Table 1.

Species that have not yet been adequately surveyed to warrant being listed under Schedule 1 or 2 are added to the Priority Flora or Fauna Lists under Priority 1, 2 or 3. Species that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list for other than taxonomic reasons, are placed in Priority 4 and require regular monitoring. Conservation Dependent species and ecological communities are placed in Priority 5. Categories and definitions of Priority Flora and Fauna species are provided in Table 2.

Table 1 Conservation codes for WA flora and fauna listed under the *Wildlife Conservation Act 1950* updated November 2015

| Conservation Code | Category |
|-------------------|---|
| CR | <p>Critically endangered species</p> <p>Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.</p> |
| EN | <p>Endangered species</p> <p>Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.</p> |
| VU | <p>Vulnerable species</p> <p>Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.</p> |
| EX | <p>Presumed extinct species</p> <p>Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.</p> |
| IA | <p>Migratory birds protected under an international agreement</p> <p>Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the Wildlife Conservation Act 1950, in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.</p> |

Table 2 Conservation codes for WA flora and fauna (DPaW 2015)

| Conservation Code | Category |
|-------------------|---|
| P1 | <p>Priority One – Poorly Known Species</p> <p>Species that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.</p> |
| P2 | <p>Priority Two – Poorly Known Species</p> <p>Species that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.</p> |
| P3 | <p>Priority Three – Poorly Known Species</p> <p>Species that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities 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 localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.</p> |
| P4 | <p>Priority Four – Rare, Near Threatened and other species in need of monitoring</p> <ul style="list-style-type: none"> a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. b) Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. c) (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy. |
| P5 | <p>Priority Five: Conservation Dependent species</p> <p>Species that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.</p> |

1.2 Commonwealth

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is Australia's central piece of environmental legislation which provides for the listing of nationally Threatened native species and ecological communities, native migratory species and marine species.

Threatened fauna and flora may be listed in any one of seven categories as defined in Section 179 of the EPBC Act. These categories are defined in Table 3.

Table 3 Categories of Species Listed under Schedule 179 of the EPBC Act 1999 [Commonwealth]

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

2.0 Threatened and Priority Ecological Communities

2.1 Western Australia

State listed TECs are not protected under any legislation, rather they are endorsed by the Environment Minister. Categories of TECs are defined in Table 4. Priority Ecological Communities are endorsed by the Environment Minister as having insufficient information available to be considered a TEC, or which are rare but not currently threatened. Categories are described in Table 5.

Table 4 Conservation codes for state-listed Threatened Ecological Communities

| Conservation Code | Category |
|-------------------|---|
| PD | <p>Presumed Totally Destroyed</p> <p>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.</p> <p>An Ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B):</p> <p>A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or</p> <p>B) All occurrences recorded within the last 50 years have since been destroyed</p> |
| CR | <p>Critically Endangered</p> <p>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.</p> <p>An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):</p> <p>A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii):</p> <ol style="list-style-type: none"> i. geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years); ii. modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated. <p>B) Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <ol style="list-style-type: none"> i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years); ii. there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes; iii. there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes. <p>C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).</p> |
| EN | <p>Endangered</p> <p>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</p> |

| Conservation Code | Category |
|-------------------|--|
| | <p>of its range in the near future.</p> <p>An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C).</p> <p>A) The geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 70% and either or both of the following apply (i or ii):</p> <ul style="list-style-type: none"> i. the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 20 years); ii. modification throughout its range is continuing such that in the immediate future (within approximately 20 years) the community is unlikely to be capable of being substantially rehabilitated. <p>B) Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <ul style="list-style-type: none"> i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 20 years); ii. there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes; iii. there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes. <p>The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 20 years).</p> |
| VU | <p>Vulnerable</p> <p>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 threatened processes continue or begin operating throughout its range.</p> <p>An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C).</p> <p>A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.</p> <p>B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.</p> <p>C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium or long term future because of existing or impending threatening processes.</p> |

Table 5 Categories for Priority Ecological Communities

| Conservation | Code Category |
|--------------|---|
| P1 | <p>Priority One: poorly-known ecological communities</p> <p>Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤ 5 occurrences or a total area of ≤ 100ha). 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.</p> |
| P2 | <p>Priority Two: poorly-known ecological communities</p> <p>Communities that are known from few occurrences with a restricted distribution (generally ≤ 10 occurrences or a total area of ≤ 200ha). At least some occurrences are not believed to be under immediate threat 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.</p> |
| P3 | <p>Priority Three: poorly known ecological communities</p> <ul style="list-style-type: none"> 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 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 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. <p>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.</p> |
| P4 | <p>Priority Four: 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.</p> <ul style="list-style-type: none"> 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. |
| P5 | <p>Priority Five: Conservation Dependent ecological communities.</p> <p>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.</p> |

2.2 Commonwealth

Communities can be classified as TECs under the *Environment Protection and Biodiversity Conservation Act 1999*. The EPBC act protects Australia’s ecological communities by providing for:

- Identification and listing of ecological communities as threatened
- Development of conservation advice and recovery plans for listed ecological communities
- Recognition of key threatening processes
- Where appropriate, reducing the impact of these processes through threat abatement plans.

Categories of federally listed TECs are described in Table 6.

Table 6 Categories of TECs that are listed under the EPBC Act

| Conservation Code | Category |
|-------------------|---|
| CE | Critically Endangered If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future. |
| E | Endangered If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future. |
| V | Vulnerable If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future. |

Appendix B

EPBC Act Protected Matters Search Report



EPBC Act Protected Matters Report

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

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

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

Report created: 30/05/16 12:52:04

[Summary](#)

[Details](#)

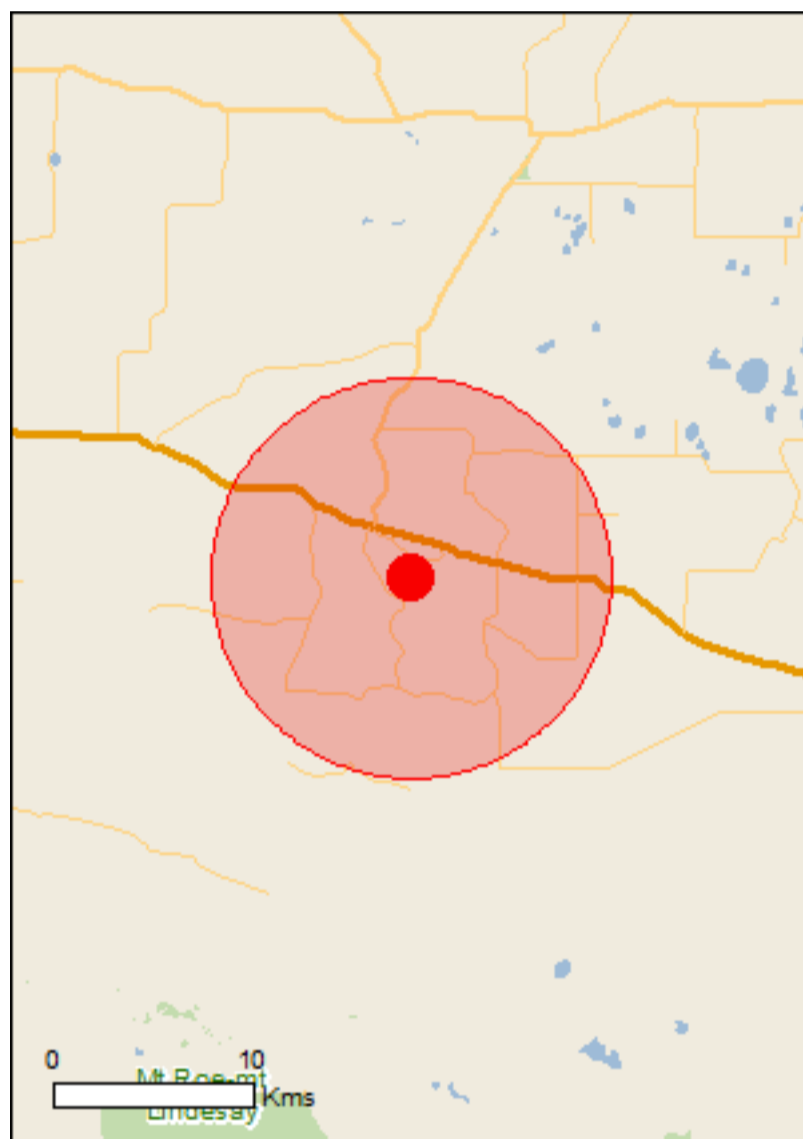
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



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

[Coordinates](#)

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

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

| | |
|---|------|
| World Heritage Properties: | None |
| National Heritage Places: | None |
| Wetlands of International Importance: | None |
| Great Barrier Reef Marine Park: | None |
| Commonwealth Marine Area: | None |
| Listed Threatened Ecological Communities: | 1 |
| Listed Threatened Species: | 16 |
| Listed Migratory Species: | 7 |

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: | 8 |
| Whales and Other Cetaceans: | None |
| 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: | 2 |
| Regional Forest Agreements: | 1 |
| Invasive Species: | 19 |
| Nationally Important Wetlands: | None |
| Key Ecological Features (Marine) | None |

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[\[Resource Information \]](#)

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

| Name | Status | Type of Presence |
|--|------------|---------------------------------|
| Proteaceae Dominated Kwongan Shrublands of the Southeast Coastal Floristic Province of Western Australia | Endangered | Community may occur within area |

Listed Threatened Species

[\[Resource Information \]](#)

| Name | Status | Type of Presence |
|------|--------|------------------|
|------|--------|------------------|

Birds

| | | |
|---|------------|--|
| Botaurus poiciloptilus Australasian Bittern [1001] | Endangered | Species or species habitat may occur within area |
|---|------------|--|

| | | |
|--|------------|--|
| Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034] | Vulnerable | Species or species habitat may occur within area |
|--|------------|--|

| | | |
|--|------------|--------------------------------------|
| Calyptorhynchus baudinii Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-Cockatoo [769] | Vulnerable | Breeding likely to occur within area |
|--|------------|--------------------------------------|

| | | |
|--|------------|--------------------------------------|
| Calyptorhynchus latirostris Carnaby's Cockatoo, Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523] | Endangered | Breeding likely to occur within area |
|--|------------|--------------------------------------|

Fish

| | | |
|--|-----------------------|--|
| Galaxias truttaceus hesperius Spotted Galaxias (western subspecies), Western Spotted Galaxias, Western Trout Galaxias [81282] | Critically Endangered | Species or species habitat likely to occur within area |
|--|-----------------------|--|

| | | |
|--|------------|--|
| Nannatherina balstoni Balston's Pygmy Perch [66698] | Vulnerable | Species or species habitat may occur within area |
|--|------------|--|

Mammals

| | | |
|---|------------|--|
| Dasyurus geoffroii Chuditch, Western Quoll [330] | Vulnerable | Species or species habitat likely to occur within area |
|---|------------|--|

| | | |
|--|------------|--|
| Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911] | Vulnerable | Species or species habitat may occur within area |
|--|------------|--|

| | | |
|--|------------|--|
| Setonix brachyurus Quokka [229] | Vulnerable | Species or species habitat may occur within area |
|--|------------|--|

Plants

| | | |
|--|------------|--|
| Caladenia christineae Christine's Spider Orchid [56716] | Vulnerable | Species or species habitat likely to occur within area |
|--|------------|--|

| Name | Status | Type of Presence |
|---|------------|--|
| Caladenia harringtoniae Harrington's Spider-orchid, Pink Spider-orchid [56786] | Vulnerable | Species or species habitat likely to occur within area |
| Conostylis misera Grass Conostylis [21320] | Endangered | Species or species habitat may occur within area |
| Diuris drummondii Tall Donkey Orchid [4365] | Vulnerable | Species or species habitat likely to occur within area |
| Diuris micrantha Dwarf Bee-orchid [55082] | Vulnerable | Species or species habitat may occur within area |
| Drakaea micrantha Dwarf Hammer-orchid [56755] | Vulnerable | Species or species habitat likely to occur within area |
| Sphenotoma drummondii Mountain Paper-heath [21160] | Endangered | Species or species habitat may occur within area |

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

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

| Name | Threatened | Type of Presence |
|---|------------|--|
| Migratory Marine Birds | | |
| Apus pacificus Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| Migratory Terrestrial Species | | |
| Merops ornatus Rainbow Bee-eater [670] | | Species or species habitat may occur within area |
| Motacilla cinerea Grey Wagtail [642] | | Species or species habitat may occur within area |
| Migratory Wetlands Species | | |
| Ardea alba Great Egret, White Egret [59541] | | Species or species habitat likely to occur within area |
| Ardea ibis Cattle Egret [59542] | | Species or species habitat may occur within area |
| Pandion haliaetus Osprey [952] | | Species or species habitat may occur within area |
| Tringa nebularia Common Greenshank, Greenshank [832] | | Species or species habitat likely to occur within area |

Other Matters Protected by the EPBC Act

Commonwealth Land

[\[Resource Information \]](#)

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

Name

Commonwealth Land -

Listed Marine Species

[\[Resource Information \]](#)

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

| Name | Threatened | Type of Presence |
|------|------------|------------------|
|------|------------|------------------|

Birds

[Apus pacificus](#)

Fork-tailed Swift [678]

Species or species habitat likely to occur within area

[Ardea alba](#)

Great Egret, White Egret [59541]

Species or species habitat likely to occur within area

[Ardea ibis](#)

Cattle Egret [59542]

Species or species habitat may occur within area

[Haliaeetus leucogaster](#)

White-bellied Sea-Eagle [943]

Species or species habitat likely to occur within area

[Merops ornatus](#)

Rainbow Bee-eater [670]

Species or species habitat may occur within area

[Motacilla cinerea](#)

Grey Wagtail [642]

Species or species habitat may occur within area

[Pandion haliaetus](#)

Osprey [952]

Species or species habitat may occur within area

[Tringa nebularia](#)

Common Greenshank, Greenshank [832]

Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves

[\[Resource Information \]](#)

Name

State

Mount Roe

WA

Tootanellup

WA

Regional Forest Agreements

[\[Resource Information \]](#)

Note that all areas with completed RFAs have been included.

Name

State

[South West WA RFA](#)

Western Australia

Invasive Species

[[Resource Information](#)]

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

| Name | Status | Type of Presence |
|--|--------|--|
| 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 |
| 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 habitat likely to occur within area |
| Sus scrofa Pig [6] | | Species or species habitat likely to occur within area |
| Vulpes vulpes Red Fox, Fox [18] | | Species or species habitat likely to occur within area |
| Plants | | |
| Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473] | | Species or species habitat likely to occur within area |
| Genista sp. X Genista monspessulana Broom [67538] | | Species or species habitat may occur within area |
| Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892] | | Species or species habitat likely to occur within area |
| Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding | | Species or species |

| Name | Status | Type of Presence |
|---|--------|--|
| Pine [20780] | | habitat may occur within area |
| Rubus fruticosus aggregate Blackberry, European Blackberry [68406] | | Species or species habitat likely to occur within area |
| Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497] | | Species or species habitat likely to occur within area |
| Ulex europaeus Gorse, Furze [7693] | | Species or species habitat likely to occur within area |

Caveat

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

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

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

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

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-34.5278 117.02475

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](#)
- [-Parks and Wildlife Commission NT, Northern Territory Government](#)
- [-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, Atherton and Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- Other groups and individuals

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

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

Appendix C

Desktop Fauna Assessment

Appendix C Fauna Desktop Results

The fauna desktop assessment identified 48 Threatened and Priority fauna species that could potentially occur in the Project Area. Of these, six species are considered likely to occur, 18 species may occur (or fly over) and 24 species are considered unlikely to inhabit the Project Area, based on the presence of potentially suitable habitat and recent records of these species in the Study Area. The fauna desktop assessment has been provided as Table 1.

Table 1 Desktop fauna assessment for the Rocky Gully Offset Project Area

| Name | Common Name | Conservation Status | | Source | DPaW Records | | Likelihood of Occurrence |
|--------------------------------------|----------------------------------|---------------------|-------|-------------------------------|--------------|--------|-------------------------------|
| | | Commonwealth | State | | Most Recent | Number | |
| Birds | | | | | | | |
| <i>Apus pacificus</i> | Fork-tailed Swift | M / Mig | IA | EPBC Act | - | - | May fly over the project area |
| <i>Ardea modesta</i> | Great Egret, White Egret | Mig | IA | DPaW EPBC Act | 2009 | 13 | May occur |
| <i>Ardea ibis</i> | Cattle Egret | Mig | IA | EPBC Act | - | - | Unlikely |
| <i>Botaurus poiciloptilus</i> | Australasian Bittern | E | EN | DPaW EPBC Act | 2013 | 41 | Unlikely |
| <i>Cacatua pastinator pastinator</i> | Muir's Corella | - | CD | DPaW | 2013 | 6507 | Likely |
| <i>Calidris ruficollis</i> | Red-necked Stint | Mig / M | IA | DPaW | 2013 | 166 | Unlikely |
| <i>Calidris subminuta</i> | Long-toed Stint | Mig | IA | DPaW | 2009 | 1 | Unlikely |
| <i>Calyptorhynchus banksii naso</i> | Forest Red-tailed Black Cockatoo | V | VU | DPaW EPBC Act | 2013 | 271 | Likely |
| <i>Calyptorhynchus baudinii</i> | Baudin's Black Cockatoo | V | EN | DPaW EPBC Act | 2010 | 342 | Likely |
| <i>Calyptorhynchus latirostris</i> | Carnaby's Black Cockatoo | E | EN | DPaW EPBC Act | 2013 | 25 | Likely |
| <i>Falco peregrinus</i> | Peregrine Falcon | - | OS | DPaW Naturemap | 2010 | 2 | May occur |
| <i>Haliaeetus leucogaster</i> | White-bellied Sea-Eagle | M | - | EPBC Act | - | - | Unlikely |
| <i>Ixobrychus minutus</i> | Little Bittern | - | P4 | DPaW | 2009 | 31 | Unlikely |
| <i>Leipoa ocellata</i> | Malleefowl | V | VU | Naturemap | - | - | May occur |
| <i>Merops ornatus</i> | Rainbow Bee-eater | Mig / M | IA | DPaW Naturemap EPBC Act | 2009 | 1 | May occur |

| Name | Common Name | Conservation Status | | Source | DPaW Records | | Likelihood of Occurrence |
|--|----------------------------------|---------------------|-------|-------------------|--------------|--------|--------------------------|
| | | Commonwealth | State | | Most Recent | Number | |
| <i>Motacilla cinerea</i> | Grey Wagtail | Mig / M | IA | EPBC Act | - | - | May occur |
| <i>Oxyura australis</i> | Blue-billed Duck | - | P4 | DPaW | 2013 | 538 | Unlikely |
| <i>Platycercus icterotis</i> subsp. <i>xanthogenys</i> | Western Rosella (inland) | - | P4 | Naturemap | | | May occur |
| <i>Psophodes nigrogularis</i> subsp. <i>oberon</i> | Western Whipbird (Mallee) | - | P4 | Naturemap | - | - | Unlikely |
| <i>Psophodes nigrogularis</i> subsp. <i>nigrogularis</i> | Western Whipbird (western heath) | E | EN | Naturemap | - | - | Unlikely |
| <i>Pandion haliaetus</i> | Osprey | Mig / M | IA | EPBC Act | - | - | Unlikely |
| <i>Tringa glareola</i> | Wood Sandpiper | Mig / M | IA | DPaW | 2006 | 2 | Unlikely |
| <i>Tringa nebularia</i> | Common Greenshank | Mig / M | IA | DPaW EPBC Act | 2013 | 152 | Unlikely |
| <i>Tyto novaehollandiae novaehollandiae</i> | Masked Owl (southwestern) | - | P3 | DPaW | 1999 | 1 | Unlikely |
| Mammals | | | | | | | |
| <i>Bettongia penicillata ogilbyi</i> | Woylie, Brush-tailed Bettong | E | CE | DPaW | - | 1 | Unlikely |
| <i>Dasyurus geoffroii</i> | Chuditch, Western Quoll | V | VU | DPaW EPBC Act | 2010 | 4 | Likely |
| <i>Falsistrellus mackenziei</i> | Western False Pipistrelle | - | P4 | DPaW | 1974 | 1 | Unlikely |
| <i>Isoodon obesulus fusciventer</i> | Quenda, Southern Brown Bandicoot | - | P4 | DPaW | 2000 | 2 | May occur |
| <i>Macropus eugenii</i> subsp. <i>derbianus</i> | Tammar Wallaby (WA subsp) | - | P5 | Naturemap | - | - | Unlikely |
| <i>Macropus irma</i> | Western Brush Wallaby | - | P4 | DPaW Naturemap | 2012 | 5 | Likely |
| <i>Macrotis lagotis</i> | Bilby | V | VU | DPaW | 1975 | 3 | Unlikely |
| <i>Myrmecobius fasciatus</i> | Numbat | V | EN | DPaW | 2014 | 1 | May occur |

| Name | Common Name | Conservation Status | | Source | DPaW Records | | Likelihood of Occurrence |
|---|--|---------------------|-------|------------------|--------------|--------|--------------------------|
| | | Commonwealth | State | | Most Recent | Number | |
| <i>Phascogale tapoatafa</i> subsp. (WAM M434) | South-western Brush-tailed Phascogale, Wambenger | - | VU | DPaW | 1992 | 9 | May occur |
| <i>Pseudocheirus occidentalis</i> | Western Ringtail Possum | V | EN | EPBC Act | - | - | May occur |
| <i>Pseudomys occidentalis</i> | Western Mouse | - | P4 | Naturemap | - | - | Unlikely |
| <i>Setonix brachyurus</i> | Quokka | V | VU | DPaW EPBC Act | 1997 | 1 | Unlikely |
| Reptiles | | | | | | | |
| <i>Elapognathus minor</i> | Short-nosed Snake | - | P2 | DPaW | 1997 | 4 | Unlikely |
| Fish | | | | | | | |
| <i>Galaxias truttaceus hesperius</i> | Western Trout Minnow | CE | EN | EPBC Act | - | - | May occur |
| <i>Galaxiella munda</i> | Mud Minnow, Western Mud Minnow | - | VU | DPaW | 1997 | 12 | May occur |
| <i>Galaxiella nigrostriata</i> | Black-stripe Minnow | - | P3 | DPaW | 1997 | 4 | May occur |
| <i>Geotria australis</i> | Pouched Lamprey | - | P1 | DPaW | 1945 | 1 | Unlikely |
| <i>Nannatherina balstoni</i> | Balston's Pygmy Perch | V | VU | DPaW EPBC Act | 1997 | 4 | May occur |
| Amphibians | | | | | | | |
| <i>Spicospina flammocaerulea</i> | Sunset Frog | E | VU | DPaW | 2008 | 78 | Unlikely |
| Invertebrates | | | | | | | |
| <i>Austromerope poultoni</i> | a scorpionfly | - | P2 | DPaW | 2004 | 2 | May occur |
| <i>Hylaeus globuliferus</i> | a bee | - | P3 | Naturemap | - | - | May occur |
| <i>Pseudohydryphantes doegi</i> | Doeg's Watermite | - | P2 | DPaW | 1998 | 2 | May occur |
| <i>Synemon gratiosa</i> | Graceful Sunmoth | - | P4 | Naturemap | - | - | Unlikely |

Appendix D

Vascular Flora Species Recorded within each Community

Appendix D Vascular Flora Species Recorded within each Community, Rocky Gully 2016

| Family | Taxon | EmBIHa | EmAtAp | MpAsCa |
|----------------------------|--|--------|--------|--------|
| Anarthriaceae | <i>Anarthria prolifera</i> | x | x | |
| | <i>Lyginia barbata</i> | | | x |
| Apiaceae | <i>Xanthosia atkinsoniana</i> | x | | |
| | <i>Xanthosia candida</i> | x | | |
| | <i>Xanthosia rotundifolia</i> | x | | |
| Asparagaceae | <i>Acanthocarpus preissii</i> | x | | |
| | <i>Chamaescilla corymbosa</i> | x | | x |
| | <i>Lomandra hermaphrodita</i> | x | x | |
| | <i>Lomandra nigricans</i> | | x | |
| | <i>Lomandra sericea</i> | | x | |
| | <i>Lomandra sonderi</i> | | x | x |
| Asteraceae | <i>Craspedia variabilis</i> | | | |
| | <i>Lagenophera huegelii</i> | x | x | x |
| | <i>Senecio diaschides</i> | | | x |
| Boryaceae | <i>Borya sphaerocephala</i> | x | | |
| Cyperaceae | <i>Cyathochaeta avenacea</i> | x | x | x |
| | <i>Lepidosperma gracile</i> | x | x | |
| | <i>Lepidosperma pubisquameum</i> | x | | |
| | <i>Lepidosperma squameum</i> | x | x | |
| | <i>Mesomelaena tetragona</i> | x | | |
| | <i>Tetragonia octandra</i> | | x | |
| Dasyopogonaceae | <i>Dasyopogon bromeliifolius</i> | | x | |
| Dilleniaceae | <i>Hibbertia amplexicaulis</i> | x | | x |
| | <i>Hibbertia commutata</i> | x | | |
| | <i>Hibbertia cunninghamii</i> | x | | x |
| | <i>Hibbertia hypericoides</i> | x | x | |
| | <i>Hibbertia hypericoides/helianthemoides</i> (P4) | x | x | |
| Droseraceae | <i>Drosera erythrorhiza</i> | x | | x |
| | <i>Drosera glanduligera</i> | x | | |
| | <i>Drosera macrantha</i> subsp. <i>macrantha</i> | x | x | |
| Ericaceae | <i>Andersonia caerulea</i> | | | |
| | <i>Astroloma ciliatum</i> | x | | x |
| | <i>Astroloma pallidum</i> | x | x | x |
| | <i>Leucopogon australis</i> | | x | x |
| | <i>Leucopogon capitellatus</i> | x | x | x |
| | <i>Leucopogon obovatus</i> subsp. <i>revolutus</i> | x | x | |
| | <i>Leucopogon pendulus</i> | x | x | x |
| | <i>Leucopogon</i> sp. | | x | |
| | <i>Leucopogon verticillatus</i> | x | x | x |
| SUBMIT - <i>Andersonia</i> | x | | | |

| Family | Taxon | EmBIHa | EmAtAp | MpAsCa |
|----------------------------|--|-------------------------|--------|--------|
| Fabaceae | <i>Acacia alata</i> | | X | |
| | <i>Acacia browniana</i> | X | X | |
| | <i>Acacia divergens</i> | | | X |
| | <i>Acacia drummondii</i> subsp. <i>drummondii</i> | | X | |
| | <i>Acacia extensa</i> | X | X | X |
| | <i>Acacia myrtifolia</i> | | X | X |
| | <i>Acacia saligna</i> | | | X |
| | <i>Acacia stenoptera</i> | X | | X |
| | <i>Bossiaea linophylla</i> | X | X | X |
| | <i>Bossiaea ornata</i> | X | X | |
| | <i>Daviesia incrassata</i> subsp. <i>incrassata</i> | X | X | X |
| | <i>Gompholobium knightianum</i> | | X | |
| | <i>Gompholobium marginatum</i> | X | X | |
| | <i>Hovea chorizemifolia</i> | X | X | |
| | <i>Isotropis cuneifolia</i> subsp. <i>cuneifolia</i> | X | X | |
| | <i>Kennedia coccinea</i> | X | | |
| Goodeniaceae | <i>Dampiera linearis</i> | X | X | |
| | <i>Lechenaultia ?biloba</i> | X | X | |
| Haemodoraceae | <i>Conostylis ?aculeata</i> | X | | |
| | <i>Conostylis laxiflora</i> | X | | |
| | <i>Conostylis setigera</i> subsp. <i>setigera</i> | X | X | |
| Hemerocallidaceae | <i>Dianella revoluta</i> | X | | X |
| Iridaceae | | X | X | X |
| | <i>Patersonia juncea</i> | X | | |
| | <i>Patersonia occidentalis</i> | X | X | X |
| Juncaceae | <i>Juncus kraussii</i> | | | X |
| Lauraceae | | | | X |
| | <i>Cassytha glabella</i> | | | X |
| Myrtaceae | <i>Agonis theiformis</i> | X | X | |
| | <i>Astartea scoparia</i> | | | X |
| | <i>Babingtonia camphorosmae</i> | X | | X |
| | <i>Corymbia calophylla</i> | X | X | X |
| | <i>Eucalyptus marginata</i> subsp. <i>marginata</i> | X | X | X |
| | <i>Eucalyptus rudis</i> | | | X |
| | <i>Hypocalymma angustifolium</i> | X | | X |
| | <i>Kunzea micrantha</i> subsp. <i>micrantha</i> | | | X |
| | <i>Melaleuca densa</i> | | | X |
| | <i>Melaleuca preissiana</i> | X | | X |
| | <i>Melaleuca viminea</i> subsp. <i>viminea</i> | | | X |
| | <i>Taxandria parviceps</i> | | X | X |
| | Orchidaceae | <i>Pterostylis nana</i> | | X |
| <i>Pyrorchis nigricans</i> | | X | X | |
| Philydraceae | <i>Philydrella drummondii</i> | | | X |
| Phyllanthaceae | <i>Phyllanthus calycinus</i> | X | | |
| Pittosporaceae | <i>Billardiera laxiflora</i> | | | X |
| Poaceae | <i>Tetrarrhena laevis</i> | X | X | X |
| Polygalaceae | | | X | |
| | <i>Comesperma calymega</i> | | X | |

| Family | Taxon | EmBIHa | EmAtAp | MpAsCa |
|------------------|--|--------|--------|--------|
| Proteaceae | <i>Banksia dallanneyi</i> var. <i>dallanneyi</i> | x | x | |
| | <i>Banksia formosa</i> | x | | |
| | <i>Banksia grandis</i> | | x | |
| | <i>Grevillea depauperata</i> | x | x | x |
| | <i>Hakea amplexicaulis</i> | x | x | |
| | <i>Hakea lissocarpa</i> | x | x | |
| | <i>Hakea prostrata</i> | | | x |
| | <i>Hakea trifurcata</i> | x | | x |
| | <i>Hakea undulata</i> | x | | |
| | <i>Hakea varia</i> | x | | x |
| | <i>Persoonia longifolia</i> | x | x | |
| | <i>Petrophile diversifolia</i> | | x | |
| | <i>Petrophile serruriae</i> | x | | |
| | <i>Synaphea petiolaris</i> subsp. <i>petiolaris</i> | x | | |
| Pteridaceae | <i>Cheilanthes austrotenuifolia</i> | | x | |
| Ranunculaceae | <i>Clematis pubescens</i> | x | | |
| Restionaceae | <i>Alexgeorgea nitens</i> | x | | |
| | <i>Desmocladius fasciculatus</i> | x | x | |
| | <i>Hypolaena exsulca</i> | x | | x |
| | <i>Leptocarpus kraussii</i> | x | | x |
| Rubiaceae | <i>Opercularia echinocephala</i> | x | x | |
| | <i>Opercularia</i> sp. | | x | |
| | <i>Opercularia vaginata</i> | x | | |
| Rutaceae | <i>Boronia fastigiata</i> | x | | |
| Stylidiaceae | <i>Stylidium brunonianum</i> | x | x | x |
| | <i>Stylidium amoenum</i> | x | x | x |
| | <i>Stylidium piliferum</i> | x | | |
| | <i>Stylidium repens</i> | x | x | |
| | <i>Stylidium tenue</i> | x | | |
| Thymeliaceae | <i>Pimelea ?suaveolens</i> | x | x | |
| Violaceae | <i>Hybanthus floribundus</i> subsp. <i>floribundus</i> | x | | |
| | | | | |
| Xanthorrhoeaceae | <i>Xanthorrhoea gracilis</i> | | x | |
| | <i>Xanthorrhoea preissii</i> | | | |
| Zamiaceae | | x | x | x |
| | <i>Macrozamia riedlei</i> | x | x | x |



Appendix D

Certificate of Title – Rocky Gully



| | |
|---|-------------------------------------|
| REGISTER NUMBER 1940/DP203465 | |
| DUPLICATE EDITION N/A | DATE DUPLICATE ISSUED N/A |

RECORD OF QUALIFIED CERTIFICATE
OF
CROWN LAND TITLE
UNDER THE TRANSFER OF LAND ACT 1893
AND THE LAND ADMINISTRATION ACT 1997
NO DUPLICATE CREATED

VOLUME **LR3168** FOLIO **362**

The undermentioned land is Crown land in the name of the STATE OF WESTERN AUSTRALIA, subject to the interests and Status Orders shown in the first schedule which are in turn subject to the limitations, interests, encumbrances and notifications shown in the second schedule.



REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 1940 ON DEPOSITED PLAN 203465

**STATUS ORDER AND PRIMARY INTEREST HOLDER:
(FIRST SCHEDULE)**

STATUS ORDER/INTEREST: RESERVE VESTED UNDER STATUTE

PRIMARY INTEREST HOLDER: CONSERVATION AND PARKS COMMISSION OF 17 DICK PERRY AVENUE
KENSINGTON WA 6151

(XE N653886) REGISTERED 22/6/2017

**LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)**

1. N653885 PART RESERVE 52970 FOR THE PURPOSE OF CONSERVATION PARK REGISTERED 22/6/2017.
2. N653886 VESTED. PURSUANT TO SECTION 7 OF THE CONSERVATION AND LAND MANAGEMENT ACT 1984. REGISTERED 22/6/2017.

- Warning:
- (1) A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.
 - (2) The land and interests etc. shown hereon may be affected by interests etc. that can be, but are not, shown on the register.
 - (3) The interests etc. shown hereon may have a different priority than shown.

-----END OF CERTIFICATE OF CROWN LAND TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: DP203465
 PREVIOUS TITLE: LR3021-931
 PROPERTY STREET ADDRESS: NO STREET ADDRESS INFORMATION AVAILABLE.
 LOCAL GOVERNMENT AUTHORITY: SHIRE OF PLANTAGENET
 RESPONSIBLE AGENCY: DEPARTMENT OF PARKS AND WILDLIFE

END OF PAGE 1 - CONTINUED OVER

ORIGINAL CERTIFICATE OF CROWN LAND TITLE
QUALIFIED

REGISTER NUMBER: 1940/DP203465 VOLUME/FOLIO: LR3168-362

PAGE 2

NOTE 1: N653882 CORRESPONDENCE FILE 00358-2017-01RO.



| | |
|---|-------------------------------------|
| REGISTER NUMBER 1941/DP203465 | |
| DUPLICATE EDITION N/A | DATE DUPLICATE ISSUED N/A |

**RECORD OF QUALIFIED CERTIFICATE
OF
CROWN LAND TITLE
UNDER THE TRANSFER OF LAND ACT 1893
AND THE LAND ADMINISTRATION ACT 1997
NO DUPLICATE CREATED**

VOLUME **LR3168** FOLIO **363**

The undermentioned land is Crown land in the name of the STATE OF WESTERN AUSTRALIA, subject to the interests and Status Orders shown in the first schedule which are in turn subject to the limitations, interests, encumbrances and notifications shown in the second schedule.



REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 1941 ON DEPOSITED PLAN 203465

**STATUS ORDER AND PRIMARY INTEREST HOLDER:
(FIRST SCHEDULE)**

STATUS ORDER/INTEREST: RESERVE VESTED UNDER STATUTE

PRIMARY INTEREST HOLDER: CONSERVATION AND PARKS COMMISSION OF 17 DICK PERRY AVENUE
KENSINGTON WA 6151

(XE N653886) REGISTERED 22/6/2017

**LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)**

- 1. N653885 PART RESERVE 52970 FOR THE PURPOSE OF CONSERVATION PARK REGISTERED 22/6/2017.
- 2. N653886 VESTED. PURSUANT TO SECTION 7 OF THE CONSERVATION AND LAND MANAGEMENT ACT 1984. REGISTERED 22/6/2017.

- Warning:
- (1) A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.
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 - (3) The interests etc. shown hereon may have a different priority than shown.

-----END OF CERTIFICATE OF CROWN LAND TITLE-----

STATEMENTS:

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SKETCH OF LAND: DP203465
 PREVIOUS TITLE: LR3021-931
 PROPERTY STREET ADDRESS: NO STREET ADDRESS INFORMATION AVAILABLE.
 LOCAL GOVERNMENT AUTHORITY: SHIRE OF PLANTAGENET
 RESPONSIBLE AGENCY: DEPARTMENT OF PARKS AND WILDLIFE

END OF PAGE 1 - CONTINUED OVER

ORIGINAL CERTIFICATE OF CROWN LAND TITLE
QUALIFIED

REGISTER NUMBER: 1941/DP203465 VOLUME/FOLIO: LR3168-363

PAGE 2

NOTE 1: N653882 CORRESPONDENCE FILE 00358-2017-01RO.



| | |
|---|-------------------------------------|
| REGISTER NUMBER 1942/DP203465 | |
| DUPLICATE EDITION N/A | DATE DUPLICATE ISSUED N/A |

**RECORD OF QUALIFIED CERTIFICATE
OF
CROWN LAND TITLE
UNDER THE TRANSFER OF LAND ACT 1893
AND THE LAND ADMINISTRATION ACT 1997
NO DUPLICATE CREATED**

VOLUME **LR3168** FOLIO **364**

The undermentioned land is Crown land in the name of the STATE OF WESTERN AUSTRALIA, subject to the interests and Status Orders shown in the first schedule which are in turn subject to the limitations, interests, encumbrances and notifications shown in the second schedule.



REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 1942 ON DEPOSITED PLAN 203465

**STATUS ORDER AND PRIMARY INTEREST HOLDER:
(FIRST SCHEDULE)**

STATUS ORDER/INTEREST: RESERVE VESTED UNDER STATUTE

PRIMARY INTEREST HOLDER: CONSERVATION AND PARKS COMMISSION OF 17 DICK PERRY AVENUE
KENSINGTON WA 6151

(XE N653886) REGISTERED 22/6/2017

**LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)**

- 1. N653885 PART RESERVE 52970 FOR THE PURPOSE OF CONSERVATION PARK REGISTERED 22/6/2017.
- 2. N653886 VESTED. PURSUANT TO SECTION 7 OF THE CONSERVATION AND LAND MANAGEMENT ACT 1984. REGISTERED 22/6/2017.

- Warning:
- (1) A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required. Lot as described in the land description may be a lot or location.
 - (2) The land and interests etc. shown hereon may be affected by interests etc. that can be, but are not, shown on the register.
 - (3) The interests etc. shown hereon may have a different priority than shown.

-----END OF CERTIFICATE OF CROWN LAND TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: DP203465
 PREVIOUS TITLE: LR3021-931
 PROPERTY STREET ADDRESS: NO STREET ADDRESS INFORMATION AVAILABLE.
 LOCAL GOVERNMENT AUTHORITY: SHIRE OF PLANTAGENET
 RESPONSIBLE AGENCY: DEPARTMENT OF PARKS AND WILDLIFE

END OF PAGE 1 - CONTINUED OVER

ORIGINAL CERTIFICATE OF CROWN LAND TITLE
QUALIFIED

REGISTER NUMBER: 1942/DP203465 VOLUME/FOLIO: LR3168-364

PAGE 2

NOTE 1: N653882 CORRESPONDENCE FILE 00358-2017-01RO.



| | |
|---|-------------------------------------|
| REGISTER NUMBER 1943/DP203465 | |
| DUPLICATE EDITION N/A | DATE DUPLICATE ISSUED N/A |

**RECORD OF QUALIFIED CERTIFICATE
OF
CROWN LAND TITLE
UNDER THE TRANSFER OF LAND ACT 1893
AND THE LAND ADMINISTRATION ACT 1997
NO DUPLICATE CREATED**

VOLUME **LR3168** FOLIO **365**

The undermentioned land is Crown land in the name of the STATE OF WESTERN AUSTRALIA, subject to the interests and Status Orders shown in the first schedule which are in turn subject to the limitations, interests, encumbrances and notifications shown in the second schedule.



REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 1943 ON DEPOSITED PLAN 203465

**STATUS ORDER AND PRIMARY INTEREST HOLDER:
(FIRST SCHEDULE)**

STATUS ORDER/INTEREST: RESERVE VESTED UNDER STATUTE

PRIMARY INTEREST HOLDER: CONSERVATION AND PARKS COMMISSION OF 17 DICK PERRY AVENUE
KENSINGTON WA 6151

(XE N653886) REGISTERED 22/6/2017

**LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
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SKETCH OF LAND: DP203465
 PREVIOUS TITLE: LR3021-931
 PROPERTY STREET ADDRESS: NO STREET ADDRESS INFORMATION AVAILABLE.
 LOCAL GOVERNMENT AUTHORITY: SHIRE OF PLANTAGENET
 RESPONSIBLE AGENCY: DEPARTMENT OF PARKS AND WILDLIFE

END OF PAGE 1 - CONTINUED OVER

ORIGINAL CERTIFICATE OF CROWN LAND TITLE
QUALIFIED

REGISTER NUMBER: 1943/DP203465 VOLUME/FOLIO: LR3168-365

PAGE 2

NOTE 1: N653882 CORRESPONDENCE FILE 00358-2017-01RO.





Appendix E

Offsets Calculator

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

| Matter of National Environmental Significance | |
|--|-------------------------|
| Name | Western Ringtail Possum |
| EPBC Act status | Critically Endangered |
| Annual probability of extinction Based on IUCN category definitions | 6.8% |

| Key to Cell Colours |
|-----------------------------|
| User input required |
| Drop-down list |
| Calculated output |
| Not applicable to attribute |

| Impact calculator | | | | | | |
|--|-----------------------------|---|-------------------------|-------|--------------------|----------|
| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | Units | Information source | |
| <i>Ecological communities</i> | | | | | | |
| Area of community | No | | Area | | | |
| | | | Quality | | | |
| | | | Total quantum of impact | 0.00 | | |
| <i>Threatened species habitat</i> | | | | | | |
| Area of habitat | Yes | Clearing of up to 4.31 ha of primary corridor and supportive habitat for the Western Ringtail Possum habitat, including 2.96 ha of moderate value habitat and the remainder as low. | Area | 4.31 | Hectares | GHD 2018 |
| | | | Quality | 5 | Scale 0-10 | |
| | | | Total quantum of impact | 2.16 | Adjusted hectares | |
| <i>Threatened species</i> | | | | | | |
| Birth rate e.g. Change in nest success | No | | | | | |
| Mortality rate e.g. Change in number of road kills per year | No | | | | | |
| Number of individuals e.g. Individual plants/animals | No | | | | | |

| Offset calculator | | | | | | | | | | | | | | | | | | | | | | |
|--|-----------------------------|-------------------------|-------------------|-------------------------------------|----------------------|--|------------------------|--|--|---|-------------------------------------|------|----------|--------------------------|---------------|---------------------------------------|--------------------|--|-----------------|--------------------|---|-----|
| Protected matter attributes | Attribute relevant to case? | Total quantum of impact | Units | Proposed offset | Time horizon (years) | | Start area and quality | | Future area and quality without offset | | Future area and quality with offset | | Raw gain | Confidence in result (%) | Adjusted gain | Net present value (adjusted hectares) | % of impact offset | Minimum (90%) direct offset requirement met? | Cost (\$ total) | Information source | | |
| <i>Ecological Communities</i> | | | | | | | | | | | | | | | | | | | | | | |
| Area of community | No | | | | | Risk-related time horizon (max. 20 years) | Start area (hectares) | Risk of loss (% without offset) | 0.0 | Risk of loss (% with offset) | 0.0 | | | | | | | | | | | |
| | | | | | | Future area without offset (adjusted hectares) | | Future area with offset (adjusted hectares) | | | | | | | | | | | | | | |
| | | | | | | Time until ecological benefit | | Start quality (scale of 0-10) | | Future quality without offset (scale of 0-10) | | | | | | | | | | | Future quality with offset (scale of 0-10) | |
| <i>Threatened species habitat</i> | | | | | | | | | | | | | | | | | | | | | | |
| Area of habitat | Yes | 2.16 | Adjusted hectares | Currently unprotected forested area | 5 | Start area (hectares) | 9.8 | Risk of loss (% without offset) | 40% | Risk of loss (% with offset) | 5% | 3.43 | 90% | 3.09 | 2.22 | 2.16 | 100.36% | Yes | | | | |
| | | | | | | | | Future area without offset (adjusted hectares) | | 5.9 | | | | | | | | | | | Future area with offset (adjusted hectares) | 9.3 |
| | | | | | | | | Time until ecological benefit | | 1 | | | | | | | | | | | Start quality (scale of 0-10) | 8 |
| <i>Threatened species</i> | | | | | | | | | | | | | | | | | | | | | | |
| Birth rate e.g. Change in nest success | No | | | | | | | | | | | | | | | | | | | | | |
| Mortality rate e.g. Change in number of road kills per year | No | | | | | | | | | | | | | | | | | | | | | |
| Number of individuals e.g. Individual plants/animals | No | | | | | | | | | | | | | | | | | | | | | |

| Summary | | | | | | | |
|-----------------------------|-------------------|-----------------------------|--------------------|-------------------------|--------------------|----------------------------------|---------------|
| Protected matter attributes | Quantum of impact | Net present value of offset | % of impact offset | Direct offset adequate? | Cost (\$) | | |
| | | | | | Direct offset (\$) | Other compensatory measures (\$) | Total (\$) |
| Birth rate | 0 | | | | \$0.00 | | \$0.00 |
| Mortality rate | 0 | | | | \$0.00 | | \$0.00 |
| Number of individuals | 0 | | | | \$0.00 | | \$0.00 |
| Number of features | 0 | | | | \$0.00 | | \$0.00 |
| Condition of habitat | 0 | | | | \$0.00 | | \$0.00 |
| Area of habitat | 2.155 | 2.16 | 100.36% | Yes | \$0.00 | N/A | \$0.00 |
| Area of community | 0 | | | | \$0.00 | | \$0.00 |
| | | | | | \$0.00 | \$0.00 | \$0.00 |

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

| Matter of National Environmental Significance | |
|--|--------------------------|
| Name | Carnaby's Black Cockatoo |
| EPBC Act status | Endangered |
| Annual probability of extinction Based on IUCN category definitions | 1.2% |

| Key to Cell Colours |
|-----------------------------|
| User input required |
| Drop-down list |
| Calculated output |
| Not applicable to attribute |

| Impact calculator | | | | | | |
|--|-----------------------------|--|-------------------------|-------|--------------------|----------|
| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | Units | Information source | |
| <i>Ecological communities</i> | | | | | | |
| Area of community | No | | Area | | | |
| | | | Quality | | | |
| | | | Total quantum of impact | 0.00 | | |
| <i>Threatened species habitat</i> | | | | | | |
| Area of habitat | Yes | Clearing of up to 4.31 ha of foraging habitat (1.2 ha high value habitat and 3.1 ha of low value (degraded <i>Agonis flexuosa</i>)) | Area | 4.31 | Hectares | GHD 2018 |
| | | | Quality | 5 | Scale 0-10 | |
| | | | Total quantum of impact | 2.16 | Adjusted hectares | |
| <i>Threatened species</i> | | | | | | |
| Birth rate e.g. Change in nest success | No | | | | | |
| Mortality rate e.g. Change in number of road kills per year | No | | | | | |
| Number of individuals e.g. Individual plants/animals | No | | | | | |

| Offset calculator | | | | | | | | | | | | | | | | | | | | | |
|--|-----------------------------|-------------------------|-------------------|-------------------------------------|---|-------------------------------|---|--|---|--------------------------|--|---------------------------------------|--------------------|--|-----------------|--------------------|------|---------|-----|--|--|
| Protected matter attributes | Attribute relevant to case? | Total quantum of impact | Units | Proposed offset | Time horizon (years) | Start area and quality | Future area and quality without offset | Future area and quality with offset | Raw gain | Confidence in result (%) | Adjusted gain | Net present value (adjusted hectares) | % of impact offset | Minimum (90%) direct offset requirement met? | Cost (\$ total) | Information source | | | | | |
| <i>Ecological Communities</i> | | | | | | | | | | | | | | | | | | | | | |
| Area of community | No | | | | Risk-related time horizon (max. 20 years) | Start area (hectares) | Risk of loss (%) without offset | Risk of loss (%) with offset | | | | | | | | | | | | | |
| | | | | | Future area without offset (adjusted hectares) | 0.0 | Future area with offset (adjusted hectares) | 0.0 | | | | | | | | | | | | | |
| | | | | | Time until ecological benefit | Start quality (scale of 0-10) | Future quality without offset (scale of 0-10) | Future quality with offset (scale of 0-10) | | | | | | | | | | | | | |
| <i>Threatened species habitat</i> | | | | | | | | | | | | | | | | | | | | | |
| Area of habitat | Yes | 2.16 | Adjusted hectares | Currently unprotected forested area | Time over which loss is averted (max. 20 years) | 5 | Start area (hectares) | 7.75 | Risk of loss (%) without offset | 40% | Risk of loss (%) with offset | 5% | 2.71 | 90% | 2.44 | 2.30 | 2.16 | 100.30% | Yes | | |
| | | | | | Future area without offset (adjusted hectares) | 4.7 | Future area with offset (adjusted hectares) | 7.4 | | | | | | | | | | | | | |
| | | | | | Time until ecological benefit | 1 | Start quality (scale of 0-10) | 8 | Future quality without offset (scale of 0-10) | 7 | Future quality with offset (scale of 0-10) | 8 | 1.00 | 70% | 0.70 | 0.69 | | | | | |
| <i>Threatened species</i> | | | | | | | | | | | | | | | | | | | | | |
| Birth rate e.g. Change in nest success | No | | | | | | | | | | | | | | | | | | | | |
| Mortality rate e.g. Change in number of road kills per year | No | | | | | | | | | | | | | | | | | | | | |
| Number of individuals e.g. Individual plants/animals | No | | | | | | | | | | | | | | | | | | | | |

| Summary | | | | | | | |
|-----------------------------|-------------------|-----------------------------|--------------------|-------------------------|--------------------|----------------------------------|---------------|
| Protected matter attributes | Quantum of impact | Net present value of offset | % of impact offset | Direct offset adequate? | Cost (\$) | | |
| | | | | | Direct offset (\$) | Other compensatory measures (\$) | Total (\$) |
| Birth rate | 0 | | | | \$0.00 | | \$0.00 |
| Mortality rate | 0 | | | | \$0.00 | | \$0.00 |
| Number of individuals | 0 | | | | \$0.00 | | \$0.00 |
| Number of features | 0 | | | | \$0.00 | | \$0.00 |
| Condition of habitat | 0 | | | | \$0.00 | | \$0.00 |
| Area of habitat | 2.155 | 2.16 | 100.30% | Yes | \$0.00 | N/A | \$0.00 |
| Area of community | 0 | | | | \$0.00 | | \$0.00 |
| | | | | | \$0.00 | \$0.00 | \$0.00 |

Offsets Assessment Guide

For use in determining offsets under the Environment Protection and Biodiversity Conservation Act 1999
2 October 2012

This guide relies on Macros being enabled in your browser.

| Matter of National Environmental Significance | |
|--|----------|
| Name | Wetlands |
| EPBC Act status | Other |
| Annual probability of extinction Based on IUCN category definitions | 0.0% |

| | |
|--|--------------------|
| Other annual probability of extinction | Information source |
|--|--------------------|

| Key to Cell Colours |
|-----------------------------|
| User input required |
| Drop-down list |
| Calculated output |
| Not applicable to attribute |

| Impact calculator | | | | | | |
|--|-----------------------------|-------------|-------------------------|-------|--------------------|--|
| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | Units | Information source | |
| <i>Ecological communities</i> | | | | | | |
| Area of community | No | | Area | | | |
| | | | Quality | | | |
| | | | Total quantum of impact | 0.00 | | |
| <i>Threatened species habitat</i> | | | | | | |
| Area of habitat | Yes | | Area | 0.7 | Hectares | |
| | | | Quality | 4 | Scale 0-10 | |
| | | | Total quantum of impact | 0.28 | Adjusted hectares | |
| <i>Threatened species</i> | | | | | | |
| Protected matter attributes | Attribute relevant to case? | Description | Quantum of impact | Units | Information source | |
| Number of features e.g. Nest hollows, habitat trees | No | | | | | |
| Condition of habitat Change in habitat condition, but no change in extent | No | | | | | |
| Birth rate e.g. Change in nest success | No | | | | | |
| Mortality rate e.g. Change in number of road kills per year | No | | | | | |
| Number of individuals e.g. Individual plants/animals | No | | | | | |

| Offset calculator | | | | | | | | | | | | | | | | | | | | | |
|--|-----------------------------|-------------------------|-------------------|--------------------|---|-------------------------------|---|--|---|--------------------------|--|---------------------------------------|--------------------|--|--------------------------|--------------------|---------------|------|---------------------------------------|------|--|
| Protected matter attributes | Attribute relevant to case? | Total quantum of impact | Units | Proposed offset | Time horizon (years) | Start area and quality | Future area and quality without offset | Future area and quality with offset | Raw gain | Confidence in result (%) | Adjusted gain | Net present value (adjusted hectares) | % of impact offset | Minimum (90%) direct offset requirement met? | Cost (\$ total) | Information source | | | | | |
| <i>Ecological Communities</i> | | | | | | | | | | | | | | | | | | | | | |
| Area of community | No | | | | Risk-related time horizon (max. 20 years) | Start area (hectares) | Risk of loss (% without offset) | Risk of loss (% with offset) | | | | | | | | | | | | | |
| | | | | | Future area without offset (adjusted hectares) | 0.0 | Future area with offset (adjusted hectares) | 0.0 | | | | | | | | | | | | | |
| | | | | | Time until ecological benefit | Start quality (scale of 0-10) | Future quality without offset (scale of 0-10) | Future quality with offset (scale of 0-10) | | | | | | | | | | | | | |
| <i>Threatened species habitat</i> | | | | | | | | | | | | | | | | | | | | | |
| Area of habitat | Yes | 0.28 | Adjusted hectares | agreed offset area | Time over which loss is averted (max. 20 years) | 20 | Start area (hectares) | 4 | Risk of loss (% without offset) | 40% | Risk of loss (% with offset) | 5% | Raw gain | 1.40 | Confidence in result (%) | 90% | Adjusted gain | 1.26 | Net present value (adjusted hectares) | 1.26 | |
| | | | | | Future area without offset (adjusted hectares) | 2.4 | Future area with offset (adjusted hectares) | 3.8 | | | | | | | | | | | | | |
| | | | | | Time until ecological benefit | 1 | Start quality (scale of 0-10) | 8 | Future quality without offset (scale of 0-10) | 7 | Future quality with offset (scale of 0-10) | 8 | Raw gain | 1.00 | Confidence in result (%) | 0.00 | Adjusted gain | 0.00 | Net present value (adjusted hectares) | 0.00 | |
| <i>Threatened species</i> | | | | | | | | | | | | | | | | | | | | | |
| Protected matter attributes | Attribute relevant to case? | Total quantum of impact | Units | Proposed offset | Time horizon (years) | Start value | Future value without offset | Future value with offset | Raw gain | Confidence in result (%) | Adjusted gain | Net present value | % of impact offset | Minimum (90%) direct offset requirement met? | Cost (\$ total) | Information source | | | | | |
| Number of features e.g. Nest hollows, habitat trees | No | | | | | | | | | | | | | | | | | | | | |
| Condition of habitat Change in habitat condition, but no change in extent | No | | | | | | | | | | | | | | | | | | | | |
| Birth rate e.g. Change in nest success | No | | | | | | | | | | | | | | | | | | | | |
| Mortality rate e.g. Change in number of road kills per year | No | | | | | | | | | | | | | | | | | | | | |
| Number of individuals e.g. Individual plants/animals | No | | | | | | | | | | | | | | | | | | | | |

| Summary | | | | | | | |
|-----------------------------|-------------------|-----------------------------|--------------------|-------------------------|--------------------|----------------------------------|---------------|
| Protected matter attributes | Quantum of impact | Net present value of offset | % of impact offset | Direct offset adequate? | Cost (\$) | | |
| | | | | | Direct offset (\$) | Other compensatory measures (\$) | Total (\$) |
| Birth rate | 0 | | | | \$0.00 | | \$0.00 |
| Mortality rate | 0 | | | | \$0.00 | | \$0.00 |
| Number of individuals | 0 | | | | \$0.00 | | \$0.00 |
| Number of features | 0 | | | | \$0.00 | | \$0.00 |
| Condition of habitat | 0 | | | | \$0.00 | | \$0.00 |
| Area of habitat | 0.28 | 1.01 | 360.00% | Yes | \$0.00 | N/A | \$0.00 |
| Area of community | 0 | | | | \$0.00 | | \$0.00 |
| | | | | | \$0.00 | \$0.00 | \$0.00 |



Appendix F

Stakeholder Consultation



Government of **Western Australia**
Department of **Lands**

Regional and Metropolitan Services

Our ref: 04587-1953 Job No: 161850
Your ref: JT1 2009 12102 V02
Enquires: John Andrioff
Ph: (08) 6552 4471 Fax: (08) 6552 4417
Email: john.andrioff@lands.wa.gov.au

7 October 2016

Brian Handcock
Manager – Procurement & Property Branch
Water Corporation
PO Box 100
LEEDERVILLE WA 6902

RESERVE 24734, ROCKY GULLY – SHIRE OF PLANTAGENET

I refer to our meeting on 3 October 2016 regarding the proposed amendment of Reserve 24734, including other priority elements identified by Water Corporation (WC).

It is Department of Lands (DoL) understanding that this proposal will endeavour to achieve the following actions:

- a) The excision of lots 1940, 1941, 1942 and 1943 on Deposited Plan 203465 from Reserve 24734, which will result the reserve comprising Lot 133 on Deposited Plan 91123, and
- b) The creation of an 'A' class reserve over Lots 1940, 1941, 1942 and 1943 for the purpose of Conservation of Flora and Fauna vested in the Conservation and Parks Commission under the *Conservation and Land Management Act 1984*.

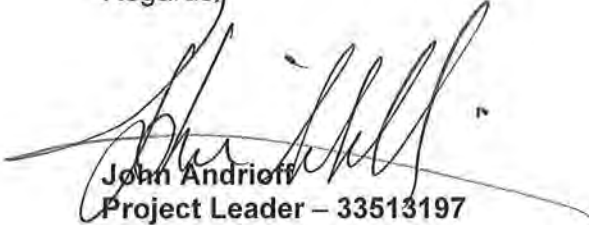
Under DoL's current Memorandum of Understanding with the Department of Mines and Petroleum (DMP), comment has been sought from DMP regarding this proposal.

In this instance DoL is able to confirm that it supports this proposal subject to:

1. Receipt of DMP comments and the resolution of any issues that may arise, if required;
2. Prior to DoL seeking statutory approval for 'A' classification further details will be required on the nature of the project(s) that will benefit from the offset approval;
3. DoL has received from DPaW a copy of Shire of Plantagenet approval of this proposal.

If you require contacting me regarding the above subject item, please do so on the details provided below.

Regards,


John Andrioff
Project Leader – 33513197
Case Management
South West and Great Southern



Ms Suzanne Brown
 Manager Environment & Aboriginal Affairs Branch
 Water Corporation
 PO Box 100
 LEEDERVILLE WA 6902

Dear Ms Brown

PROPOSED LAND TRANSFER FOR ENVIRONMENTAL OFFSETS - ROCKY GULLY RESERVE 24734

I refer to your letter of 12 June 2015, in relation to Water Corporation's proposal to use Reserve 24734 at Rocky Gully as a strategic environmental offset to satisfy future clearing permit conditions. I understand that Water Corporation proposes to transfer the reserve to the Department of Parks and Wildlife (Parks and Wildlife) for inclusion in the conservation estate.

The Department of Environment Regulation (DER) has reviewed the information provided and I can advise that I agree to the use of Reserve 24734 as a strategic offset, subject to the following conditions:

1. Use of the offset site will not be automatically accepted in every instance. In each case Water Corporation must demonstrate how the offset counterbalances the significant residual impacts of the associated clearing. Where relevant, this may include a requirement to provide site level information verifying the environmental values of the offset site.
2. The quantification of each offset will be determined in accordance with the *WA Environmental Offsets Guidelines August 2014* and the *WA Environmental Offsets Policy September 2011*, as amended. For indicative purposes, the application of the Department of the Environment's (DotE) offset calculator would likely involve the use of the following standard values for the offset site:

| DotE offset calculator field | Standard value for offset calculations |
|---|---|
| Time over which loss is averted | 20 – Maximum. Vegetation will be secured in perpetuity. |
| Time until ecological benefit | 1 – 1 year to transfer the reserve to conservation estate. |
| Risk of loss without offset | 20% – Site reserved for water services. |
| Risk of loss with offset | 10% – Site will be transferred to conservation estate. |
| Confidence in result (averted risk of loss) | 90% – High level of confidence. |



Government of **Western Australia**
Department of **Parks and Wildlife**
Parks and Visitor Services Division

Your ref: JT1 2009 12102 V02
Our ref: 2009/2702
Enquiries: Ms Shannon Hassell
Phone: 9219 8770
Email: Shannon.hassell@dpaw.wa.gov.au

Mr Brian Handcock
Manager, Property Portfolio
Corporate Real Estate Branch
Water Corporation
PO Box 100,
LEEDERVILLE WA 6902

Dear Brian

PROPOSED TRANSFER OF ROCK GULLY RESERVE No. 24734

I refer to your letter of 6 October 2015 to the Department of Lands Mr Ron Pumphrey and our meeting of 21 October 2015 concerning the relinquishment and transfer of the Rocky Gully Reserve No. 24734.

The Department of Parks and Wildlife (Parks and Wildlife) confirms that it would accept the transfer of this reserve to be vested in the Conservation Commission of WA as a conservation reserve. Water Corporation's excision and retention of part of the reserve (on Lot 133) containing water infrastructure is agreed by Parks and Wildlife.

Preferably, Parks and Wildlife seeks a change in purpose from "Water" to "Conservation of Flora and Fauna" and a reclassification as Class A. However, any change in the vesting and purpose of this reserve would need to be supported by the Departments of Lands and Mines and Petroleum.

I would appreciate your assistance with seeking agreement from Mr Pumphrey to the transfer and his advice on how the support of the Department of Mines and Petroleum could be achieved in a timely manner.

Yours sincerely

Shannon Hassell
Land Administration Officer

21 October 2015
Cc: Mr Ron Pumphrey
Department of Lands
Via email: ron.pumphrey@lands.wa.gov.au

3. Prior to use of the offset site, Water Corporation must provide the following:
- evidence that the reserve has been transferred to Parks and Wildlife for conservation; or
 - written evidence from the Departments of Lands and Parks and Wildlife that demonstrates, to the satisfaction of DER, the timeframe within which the reserve will be transferred to Parks and Wildlife for conservation.

I would appreciate Water Corporation's acknowledgement of the terms set out above.

In relation to Water Corporation's proposed land bank model, I note your reference to the use of the WA Environmental Offsets Register (EOR) (<https://offsetsregister.wa.gov.au/>) which provides a central public record of offset agreements in WA. I agree to the use of the EOR as a means for recording the progressive use of the offset site including the recording of corresponding GIS spatial information.

If you have any queries regarding the matters raised above please contact Senior Clearing Regulation Officer, Ms Samara Rogers on 6467 5046.

Yours sincerely



M Warnock
SENIOR MANAGER
CLEARING REGULATION

*Officer delegated under Section 20
of the Environmental Protection Act 1986*

16 September 2015

