Collie Water

Wellington Myalup Water for Food Feasibility Study

Flora and Fauna Survey

February 2017

Executive summary

Background

Collie Water has initiated a Feasibility Phase for the Wellington Myalup Water for Food Project. The aim of the project is to reduce the salinity in the Wellington Dam by extracting saline river flows and provide suitable raw water to the Water Corporation to supplement dwindling potable water supplies in the area. The Project has identified, and is assessing, options for a river extraction site, a river water storage site and a location for the delivery of suitable raw water to the Water Corporation.

Seven storage options and three river extraction locations were examined in terms of relative whole of life cost and risk. In addition, two locations were examined for the delivery of water to the Water Corporation. The preferred configuration is:

- River extraction at Buckingham
- Water storage at “Z system” mining void (previously called MUJA South)
- Delivery of suitable treated (filtered or desalinated) water to the Water Corporation’s Harris Dam.

Scope of service

GHD was commissioned to undertake a biological assessment of the potential pipeline alignments required to implement the preferred configuration option. The survey area was approximately 37 km long and 16 to 60 m wide. A total of 166.2 ha was surveyed. The assessment included a desktop review and a Level 1 (reconnaissance) field survey to identify and record the environmental values of the survey area. The field survey was undertaken in November 2016 and included a detailed flora and fauna assessment.

Summary of findings

The potential pipeline route crosses a number of water courses, including the Collie River and a number of its tributaries and the Hanson Brook. A dampland flat is present within the southern part of the survey area, along Centaur Road.

Vegetation and flora

The majority of the intact vegetation and regrowth vegetation present within the survey area is dominated by Jarrah/Marri forest species, and is well represented in the local and regional areas. None of the vegetation types are representative of TECs or PECs or has less than 30 % of its pre-European extent remaining.

Two vegetation types support dampland and wetland species and some parts of these types are considered to be riparian vegetation. These vegetation types are considered, significant as defined by the EPA (2004a).

Of the 166.2 ha of the survey area, approximately 61.4 ha (37 %) was rated as Excellent to Very Good condition, 23.91 ha (14 %) as Good and 80.88 ha (49 %) as Degraded or Completely Degraded.

Over 228 flora species were recorded during the survey. Of these, one, *Grevillea rara*, is listed as Endangered under the *Environment and Protection Biodiversity Conservation Act 1999* (EPBC Act) and *Wildlife Conservation Act 1950* (WC Act). Over 250 of these plants were recorded along Harris River Dam Road, under and adjacent to the existing powerline. There is also an existing record of a Critically Endangered orchid species, *Caladenia leucochila*

occurring immediately adjacent to the survey area, on Centaur Road. This species would not have been visible at the time of survey.

Four other conservation significant flora species have been recorded in disturbed areas within and adjacent to the corridor. These are:

- *Leucopogon extremus* (P2) – previously recorded in a rehabilitation area east of Centaur Road
- *Synaphea hians* (P3) – over 100 plants recorded along the Coalfields Highway
- *Synaphea petiolaris* subsp. *simplex* (P3)– previously recorded in the same location as *Leucopogon extremus*
- *Grevillea ripicola* (P4) – one plant recorded adjacent to the survey area on an old section of Griggs Road

A further 15 conservation significant species were considered to possibly occur within the survey area, based on their habitat preferences and relative visibility at the time of survey.

Fauna

Six conservation significant fauna species were recorded during the field survey:

- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*), Endangered – WC Act, Endangered – EPBC Act
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*), Vulnerable – WC Act, Vulnerable – EPBC Act
- Baudin's Black Cockatoo (*Calyptorhynchus baudinii*), Endangered – WC Act, Vulnerable – EPBC Act
- Chuditch (*Dasyurus geoffroii*), Vulnerable – WC Act, Vulnerable – EPBC Act
- Western Brush Wallaby (*Macropus irma*), Priority 4 – DPaW listing
- Quenda (*Isoodon obesulus subsp. fusciventer*), Priority 4 DPaW

An additional six species are considered likely to occur in the survey area based on previous records and suitability of habitat:

- Western Ringtail Possum (*Pseudocheirus occidentalis*), Threatened – WC Act, Endangered – EPBC Act
- Southern Brush-tailed Phascogale (*Phascogale tapoatafa subsp. wambenger*), Schedule 6 – WC Act
- Peregrine Falcon (*Falco peregrinus*), Schedule 7 – WC Act
- Western False Pipistrelle (*Falsistrellus mackenziei*) Priority 4 - DPaW
- Dell’s Ctenotus (*Ctenotus Delli*) Priority 4 – DPaW
- Water rat (*Hydromys chrysogaster*) Priority 4 – DPaW

Seventeen eucalypt trees, which are potentially suitable for Black Cockatoo breeding were recorded within the survey area, as well as feeding at a number of trees, but no breeding events were recorded.

The Eucalyptus woodlands, which make up much of the habitat of the survey area, are well represented in the surrounding State Forest and would be utilised by all the conservation significant species known or likely to occur in the area. With the exclusion of the Collie River and Hanson Brook, 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, except for the Water Rat, which may rely on the water bodies of the Collie River and Hanson Brook.

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.

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1. Introduction

1.1 Background

Collie Water has initiated a Feasibility Phase for the Wellington Myalup Water for Food Project. The aim of the project is to reduce the salinity in the Wellington Dam by extracting saline river flows and to provide suitable raw water to the Water Corporation to supplement dwindling potable water supplies in the area. The Project has identified, and is assessing, options for a river extraction site, a river water storage site and a location for the delivery of suitable raw water to the Water Corporation.

Seven storage options and three river extraction locations were examined in terms of relative whole of life cost and risk. In addition, two locations were examined for the delivery of water to the Water Corporation. The preferred configuration is as follows:

- River extraction at Buckingham
- Water storage at “Z system” mining void (previously called MUJA South)
- Delivery of suitable treated (filtered or desalinated) water to the Water Corporation’s Harris Dam

GHD Pty Ltd (GHD) was commissioned to undertake a biological assessment of the potential pipeline alignments required to implement this preferred option.

1.2 Purpose of report

The purpose of the assessment was to delineate key flora, vegetation, fauna and surface water values within the survey area. The outcomes of the assessment will be used to select the final alignment of the pipeline to minimise environmental impact and to assist with the approvals process.

1.3 Project location

The survey area includes potential pipeline alignments from near Harris Dam, south to the ‘Z system’ mining void near Centaur Road, south of Collie (approximately 37 kilometres (km) long. The majority of the alignment is within or alongside existing powerlines, roads or tracks. The survey area is shown in Figure 1, Appendix A. A larger area, the study area, using a buffer of 20 km around the survey area, was used to identify the local and regional context of the survey findings.

The survey area is divided into four Priority areas, which are relevant to the potential, final alignment.

1.4 Scope of works

The scope of works was to undertake a Level 1 biological survey, as defined in relevant State Government guidelines (EPA 2004a, 2004b).

The following actions were completed to fulfil the scope:

- A desktop assessment of the study area was completed prior to the field survey work to identify all biological features and constraints, which may be in, or near the survey area
- Significant flora, fauna, vegetation /ecological communities, and their potential sensitivity to impact were identified

- Broad pre-European vegetation type(s) using Smith (1974) and Mattiske and Havel (1998) mapping were identified
- A field survey, including a targeted conservation significant flora and fauna survey, was conducted to verify / ground truth the desktop assessment findings
- Vegetation condition mapping was undertaken using the Environmental Protection Agency (EPA) and DPaW (2015) condition ratings
- Ecological community mapping was undertaken to a scale appropriate for the Bioregion
- Relevant environmental constraints mapping was undertaken using Geographic Information Systems (GIS) mapping software
- The survey area was broadly assessed for plant species diversity, density, composition, structure and weed cover
- Biological aspects likely to require referral of the project to the EPA were assessed
- Matters of National Environmental Significance (MNES) recorded during the assessment were considered and potential impacts on MNES as protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) likely to require referral of the project to the Commonwealth Department of the Environment and Energy (DotEE) were noted
- A concise report on the findings of the biological survey was provided

1.5 Relevant legislation, conservation codes and background information

In Western Australia (WA) significant ecological communities, and specific flora and fauna are protected under both Federal and State Government legislation. In addition, regulatory bodies also provide a range of guidance and information on expected standards and protocols for environmental surveys.

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

1.6 Report limitations and assumptions

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

GHD otherwise disclaims responsibility to any person other than Collie Water 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 Collie Water 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 infrastructure, access and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

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

This report has assessed the flora and fauna within the 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 study area and to assist in survey design. This included a review of:

- The Department of the Environment and Energy(DotEE) Protected Matters Search Tool (PMST) to identify communities and species listed under the EPBC Act potentially occurring within the study area (DotEE 2016) (Appendix C)
- The Department of Parks and Wildlife (DPaW) Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs) database to determine the potential for TECs or PECs to be present within the study area
- The DPaW *NatureMap* database for flora and fauna species previously recorded within the study area (DPaW 2007–) (Appendix C)
- The DPaW Threatened (Declared Rare) and Priority Flora (TPFL) database and the Western Australia Herbarium database (WAHERB) for Threatened flora species listed under the *Wildlife Conservation Act 1950* (WC Act) and listed as Priority by the DPaW, previously recorded within the study area
- Existing datasets including previous pre-European vegetation mapping of the survey area (Smith 1974, Mattiske and Havel 1998), aerial photography, geology/soils and hydrology information to provide background information on the variability of the environment, likely vegetation units 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

The field survey was undertaken on the 23rd to 25th of November 2016. The survey was a Level 1 (reconnaissance) survey and was undertaken to describe the dominant vegetation units, assess vegetation condition and identify and record vascular flora taxa present at the time of survey. Opportunistic searches for conservation significant flora identified in the desktop assessment was also undertaken.

The survey methodology employed by GHD was consistent with the EPA Guidance Statement No. 51 Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA 2004a), and Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA and DPaW 2015).

Data collection

Field survey methods involved traversing the survey area by foot and vehicle. Vegetated areas were assessed using transects and Rapid Assessment points, whereby dominant species and vegetation structure were identified. Field data at each assessment point were recorded on a pro-forma data sheet and included the parameters listed in Table 1.

Table 1 Data collected during the flora and vegetation field survey

Aspect	Measurement
Collection attributes	Personnel/recorder; date, photographs of vegetation types and condition.
Physical features	Aspect, soil attributes, ground surface features.
Location	Coordinates recorded in GDA94 datum using a hand-held Global Positioning System (GPS) tool to accuracy approximately ± 5 m.
Vegetation condition	Vegetation condition was assessed using the condition rating scale devised by 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 as well as opportunistic records of all flora species observed.

A flora inventory was compiled from the taxa recorded at the assessment points 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. The units were described based on structure, dominant taxa and cover characteristics as defined in field observations.

Vegetation condition

The vegetation condition of the survey area was assessed and mapped in accordance with the vegetation condition rating scale for the South West and Interzone Botanical Provinces (EPA and DPaW 2015). This scale recognises the intactness of vegetation, which is defined by the following:

- Completeness of structural levels
- Extent of weed invasion
- Historical disturbance from tracks and other clearing or dumping
- The potential for natural or assisted regeneration

The scale consists of six rating levels as outlined in Appendix B.

Flora identification

Species that were well known to the survey botanist were identified in the field; all other species were collected and assigned a unique collection number to facilitate tracking. All plant specimens collected during the field assessment were dried and processed in accordance with the requirements of the WA Herbarium. Plant species were identified by the use of taxonomic literature, electronic keys and online electronic databases.

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 DotEE (2017).

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

Surveys for conservation significant flora

Prior to the field survey, information obtained from the desktop assessments (e.g. aerial photography, geology, soils and topography data, EPBC Act PMST, *Naturemap*) was reviewed to determine conservation significant flora taxa potentially present within the survey area and

locations. Additionally, ecological information (e.g. habitat, associated flora taxa and phenology) was sourced from *FloraBase* (WA Herbarium 1998–) and other relevant publications where available, to provide further details.

Potential habitats were searched by opportunistic sampling. Locations within the survey area with differing hydrology, fire or disturbance history to the surrounding areas were also searched where identified.

The following data was recorded when any known or potential threatened, priority or significant flora was located: GPS location, height (centimetre (cm)), number of plants and corresponding area of population, reproductive state and plant condition.

2.2.2 Fauna

A Level 1 fauna assessment (reconnaissance survey) of the survey area was undertaken on the 23rd – 25th November 2016. The fauna survey was undertaken in conjunction with the vegetation and flora assessment and with reference to *Guidance Statement No. 56* T*errestrial Fauna Survey for Environmental Impact Assessment in Western Australia* (EPA 2004b). The purpose of the reconnaissance survey was to verify the accuracy of the desktop study, and to characterise the fauna and faunal assemblages present in the survey area.

The majority of the survey area was traversed on foot and by vehicle over the course of one day to identify and describe the dominant fauna habitat types present and their condition, assess habitat connectivity, identify and record fauna species within the survey area. An assessment of the likelihood of conservation significant fauna and their habitats occurring within the survey area was also undertaken.

Habitat assessment

A fauna habitat assessment was undertaken to document the type, condition and extent of habitats within the survey area. The following information was recorded:

- Habitat structure (e.g. vegetation type, presence/absence of structural layers such as ground cover and mid storey
- Presence/absence of refuge including: density of ground covers, 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 waterway
- Location of the habitat within the survey area in comparison to the habitat within the surrounding landscape
- Habitat connectivity and identification of wildlife corridors within and immediately adjacent to the survey area
- Current land use and disturbance history
- Evaluation of key habitat features and types identified during the desktop assessment relevant to fauna of conservation significance
- Evaluation of the likelihood of occurrence of conservation significant fauna within the habitat (based on presence of suitable habitat)

Opportunistic fauna searches

Opportunistic fauna searches were also conducted across the survey area, which involved:

- Searching the survey area for tracks, scats, bones, diggings and feeding areas for both native and feral species

- Searching through microhabitats including turning over leaf litter and examining tree hollows and hollow logs
- Visual and aural surveys for species potentially utilising the survey area

Targeted habitat assessment for Black Cockatoo species

A habitat assessment for Black Cockatoo species was conducted in accordance with the EPBC Act referral guidelines (Department of Sustainability, Environment, Water, Populations, and Communities (DSEWPaC 2012). The assessment included the identification, description and recording of:

- Potential and actual breeding habitat (relevant tree species with a DBH of >500 mm for Jarrah, Marri and Flooded Gum (*Eucalyptus rudis*) or DBH of >300 mm for Wandoo or Salmon Gum
- Existing tree hollows and any evidence of use by Black Cockatoos
- The diameter at breast height (DBH) of trees with existing hollows
- Potential night roosting and foraging habitat

Fauna nomenclature

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

2.3 Limitations

2.3.1 Desktop limitations

Desktop investigations use a variety of online resources such as the WA Museum and DPaW *NatureMap* database (DPaW 2007–), and the EPBC Act PMST. The responsibility for the accuracy of such data remains with the issuing authority, not with GHD.

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 cannot 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

The EPA and DPaW (2015) Technical Guide 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 Field survey limitations

Aspect	Constraint	Comment
Sources of information and availability of contextual information.	Minor	Adequate information is available for the survey area; this includes: • Broad scale (1:250,000) mapping by Mattiske and Havel (1998), Smith (1974) and digitised by Shepherd et al. (2002) • Regional biogeography (Hearn et al. 2002, Williams and Mitchell 2001)
Scope (what life forms were sampled etc.)	Nil	Vascular flora and terrestrial vertebrate fauna were sampled during the survey. Non-vascular flora, invertebrate and aquatic fauna were not surveyed.
Proportion of flora collected and identified (based on sampling, timing and intensity) Proportion of fauna identified, recorded and/or collected	Minor (fauna)	The vegetation and flora survey was undertaken in November (late Spring) 2016. The flora recorded from the field survey is detailed in Section 4.2.4 and a full flora species list is provided in Appendix D. The portion of flora collected and identified was considered good; but it is possible that the survey under-recorded some grass species (Poaceae) and herbs due to a late spring field assessment. Not all pasture and weed species were recorded. The fauna survey was undertaken in November 2016 and was a reconnaissance survey only. The fauna assessment sampled those species that can be easily seen, heard or have distinctive signs, such as tracks, scats, diggings, etc. Many cryptic species would not have been identified during a reconnaissance survey. Seasonal variation within species often requires targeted surveys at specific times of the year. Of the fauna species recorded during the survey, all species were identified to species level. The fauna assessment was aimed at identifying habitat types and terrestrial vertebrate fauna utilising the survey area. No sampling for invertebrates or aquatic species occurred. The information available on the identification, distribution and conservation status of invertebrates is generally less extensive than that of vertebrate species.
Flora determination	Minor	Flora determination was undertaken by the GHD botanist in the field and from online and published references for collected specimens. Twelve collections could only be identified to genus level, with a number of these tentative species identifications due to lack of flowering or fruiting material required for identification. None are considered likely to be conservation significant species. A number of introduced species were not identified to species level. The taxonomy and conservation status of WA flora is dynamic. This report was prepared with reliance on taxonomy and conservation status current at the time report development, but it should be noted this may change in response to ongoing research and review of International Union for Conservation Nature criteria.

Aspect	Constraint	Comment
Completeness and further work which might be needed (e.g. was the relevant area fully surveyed)	Minor	The majority of the survey area which supported native vegetation was accessed on foot or traversed by vehicle. The access tracks created as a result of infrastructure development (road and power services) allowed access to the majority of the survey area. Information gained from the survey was extrapolated across those sections of the survey area not accessed on foot during the field survey to assist with determining the vegetation and habitat types for the entire survey area. Extrapolation was based on high quality aerial photography of the area, as well as ground-level visual assessment.
Mapping reliability	Minor	The vegetation was mapped using high resolution Environmental Systems Research Institute aerial imagery obtained from Landgate, topographical features, previous broad scale mapping (Smith 1974) and field data. Data was recorded in the field using hand-held GPS tools (e.g. Samsung Galaxy tablet, with Collector application). Certain atmospheric factors and other sources of error can affect the accuracy of GPS receivers. The GPS units used for this survey are accurate to within ±5 metres on average. Therefore the data points consisting of coordinates recorded from the GPS may contain inaccuracies.
Timing/weather/ season/cycle	Nil	The field survey was conducted during spring (23 to 25 November 2016). In the three months prior to the survey (August-October), Collie weather station (No. 009628, BoM 2017) recorded a total of 365 mm of rainfall. This total is approximately 16% higher than the long-term average (314 mm) for the same period (BoM 2017). The weather conditions recorded during the field survey were: • Average daily maximum temperature of 31.2 °C (Collie East weather station No. 009994). • Average daily minimum temperature of 11.3 °C (Collie East weather station No. 009994) • Daily rainfall 0.0 mm. The weather conditions at the time of survey did not adversely affect the survey outcome.
Disturbances (e.g. fire, flood, accidental human intervention)	Minor	Much of the survey area has been subject to historical disturbance events (e.g. clearing, agricultural activities); however, these disturbances did not impact the efficacy of the survey. Some patches of burnt vegetation were recorded in regrowth Jarrah forest in the north of the survey area, but most species were identifiable.
Intensity (in retrospect, was the intensity adequate)	Nil	The vascular flora of the survey area was sampled in accordance with EPA (2004a) and EPA and DPaW (2015) and terrestrial fauna sampled in accordance to EPA (2004b). The survey area was sufficiently covered during the survey.
Resources	Nil	Adequate resources were employed during the field survey. Six person days were spent undertaking the survey.

Aspect	Constraint	Comment
Access restrictions	Minor	Minor access problems were encountered during the survey. Some areas on private property and the immediate area surrounding the Muja power station were unable to be accessed, however, these areas were primarily cleared farmlands, with a very small area of river vegetation.
Experience levels	Nil	The GHD staff who executed the survey are practitioners suitably qualified and experienced in their respective fields. Anna Napier (Principal Botanist) has over 32 years' experience undertaking surveys within WA. Glen Gaikhorst (Senior Zoologist) has over 22 years' experience undertaking fauna surveys in WA.

3. Desktop assessment

3.1 Regional biogeography

The survey area is situated in the South West Botanical Province of Western Australia (Beard 1990) within the Jarrah Forest Bioregion and the Northern and Southern Jarrah Forest sub-regions as described by the Interim Biogeographic Regionalisation of Australia (IBRA).

The Northern Jarrah Forest sub-region incorporates the area east of the Darling Scarp, overlying Archaean granite and metamorphic rocks of an average elevation of 300 m, capped by an extensive lateritic duricrust, dissected by later drainage and broken by occasional granite hills. Vegetation comprises Jarrah - Marri forest in the west with Bullich and Blackbutt in the valleys grading to Wandoo and Marri woodlands in the east with Powder bark on breakaways. There are extensive but localised sand sheets with *Banksia* low woodlands. Heath is found on granite rocks and as a common understorey of forests and woodlands in the north and east (Williams and Mitchell 2001).

The Southern Jarrah Forest is described as duricrusted plateau of Yilgarn Craton characterised by Jarrah-Marri forest on laterite gravels and, in the eastern part by Wandoo – Marri woodlands on clayey soils. Elluvial and alluvial deposits support *Agonis* shrublands. In areas of Mesozoic sediments, Jarrah forests occur in a mosaic with a variety of species-rich shrublands. The climate is Warm Mediterranean (Hearn et al. 2002).

3.2 Landform and soils

Landform and soil mapping by Heddle et al. (1980) indicates the survey area traverses a range of types, including uplands and valleys. These are:

- D (Dwellingup) : Gently undulating landscape with duricrust on ridges; sands and gravels in shallow depressions
- Yg (Yarragil): Valleys of the western part of the plateau; sandy gravels on the slopes; orange earths in swampy floors
- Mu (Murray): Deeply incised valleys with red and yellow earths on slopes; narrow alluvial terraces
- Co (Collie): Gently undulating landscape dominated by duricrust, gravels and grey sands
- CR (Cardiff): Broad, shallow swampy depressions dominated by grey sands
- Mu (Muja): Minor valleys with gravelly slopes and sandy swampy valley floors

3.3 Hydrology

A summary of the Department of Water (DoW) Geographic Data Atlas (DoW 2016) queries for the survey area is provided in Table 3.

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

Aspect	Details	Result
Groundwater areas	Groundwater areas proclaimed under the *Rights in Water and Irrigation Act* 1914 (RIWI Act)	Collie Groundwater Area
Surface water areas	Surface water areas proclaimed under the RIWI Act.	None present
Irrigation district	Irrigation Districts proclaimed under the RIWI Act.	Collie River Irrigation District
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 *Metropolitan Water Supply, Sewage and Drainage Act 1909* or the *Country Area Water Supply Act 1947*.	None present
Waterway Management Areas	Areas proclaimed under the *Waterway Conservation Act 1976*.	None present

3.4 Vegetation and flora

3.4.1 Broad vegetation mapping and extents

Broad scale (1:250,000) pre-European vegetation mapping of the Collie area was completed by Smith (1974) at an association level. The mapping indicates that two vegetation associations are present within the survey area:

- Vegetation association 3: Medium forest; jarrah-marri
- Vegetation association 1114: Shrublands tree-heath; paperbark over teatree thickets

As part of the Regional Forest Agreement, Mattiske and Havel (1998) mapped vegetation complexes of the forest regions of south west WA at a scale of 1:50,000. Mattiske and Havel (1998) mapping indicates that six vegetation complexes are present within the survey area:

- CF (Cardiff): Open woodland of *Allocasuarina fraseriana-Banksia* spp. *–Xylomelum occidentale-Nuytsia floribunda* on sandy soils on valley slopes in the subhumid zone
- CI: Open forest of *Eucalypt marginata* subsp. *marginata-Corymbia calophylla-Allocasuarina fraseriana* on gravelly sandy upland soils in the subhumid zone
- MJ (Muja): Open woodland of *Melaleuca preissiana-Banksia littoralis-Banksia ilicifolia* with some *Eucalytpus patens* on moister sites, *Banksia* spp. On drier sites of valley floors in the subhumid zone
- Yg1 (Yarragil 1): Open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla* on slopes with mixtures of *Eucalyptus patens* and *Eucalyptus megacarpa* on the valley floors in humid and subhumid zone
- D1 (Dwellingup 1): Open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla* on lateritic uplands in mainly humid and subhumid zones
- MY1 (Murray 1): Open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla-Eucalyptus patens* on valley slopes to a fringing woodland of *Eucalyptus rudis –Melaleuca rhaphiophylla* on the valley floors in the subhumid zone

The pre-European mapping by Smith (1974) 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 (latest update June 2015–Government of Western Australia (GoWA) 2015). Table 4 presents the current extents remaining of both vegetation associations are greater than 42 % of their pre-European extents at all scales (e.g. State, IBRA bioregion, IBRA sub-region and Local Government Area (LGA)), and are therefore above the 30 % threshold level referenced by the EPA (2000)[1].

Table 4 Extents of vegetation associations mapped within the survey area

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	% Current extent in all DPaW managed lands
Jarrah Forest IBRA bioregion		4,506,660.26	2,422,782.9	53.76	69.01
Southern Jarrah Forest IBRA sub-region		2,607,879.53	1,312,477.9	50.33	68.87
Northern Jarrah Forest IBRA sub-region		1,898,780.73	1,110,305.8	58.47	69.17
3	State: Western Australia	2,661,405.06	1,810,489.41	68.03	81.09
	IBRA bioregion: Jarrah Forest	2,390,591.42	1,611,061.04	67.39	80.56
	IBRA sub-region: Southern Jarrah Forest	908,099.68	723,434.99	79.66	83.85
	IBRA sub-region: Northern Jarrah Forest	1,482,491.74	887,626.05	59.87	77.89
	LGA: Collie	158,906.05	131,852.99	82.98	89.06
1114	State: Western Australia	19,836.15	12,083.66	60.92	78.88
	IBRA bioregion: Jarrah Forest	19,836.15	12,083.66	60.92	78.88
	IBRA sub-region: Southern Jarrah Forest	9,835.04	7,784.10	79.15	90.76
	IBRA sub-region: Northern Jarrah Forest	10,001.10	4,299.56	42.99	57.36
	LGA: Collie	8,686.92	7,047.21	81.12	92.43

(Smith 1974, GoWA 2015)

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

The Local Biodiversity Program (2013) has assessed vegetation complexes described and mapped by Mattiske and Havel (1998) against presumed Pre-European extents within the Jarrah Forest IBRA region. The current extents of the vegetation complexes within the Jarrah Forest IBRA bioregion are greater than 60 % of their calculated pre-European extents and are therefore above the 30 % threshold level, Table 5.

Table 5 Extents of vegetation complexes mapped within the survey area for the Jarrah Forest IBRA bioregion

Vegetation complex	Pre-European extent (ha)	2013 native vegetation extent (ha)	% of pre-European extent remaining	% of pre-European extent with some level of formal protection
CF	6,237	3,754.16	60.20	0
CI	11,005	7,650.21	69.52	6.28
MJ	10,201	6,130.85	60.10	2.30
Yg1	80,202	65,804.19	82.05	10.18
D1	20,8516	184,314.73	88.39	8.48
MY1	68,695	531,16.53	77.32	26.95

(Mattiske and Havel 1998, Local Biodiversity Program 2013)

3.4.1 Conservation significant ecological communities

The EPBC Act PMST did not identify any federally listed TECs potentially occurring within the study area (DotEE 2016). Similarly, a search of the State listed TEC and PEC database did not indicate the presence of any communities within the study area (DPaW 2016).

3.4.2 Flora diversity

A search of the *Naturemap* database identified 716 flora taxa previously recorded within the study area. Dominant families included

- Fabaceae (89 taxa)
- Myrtaceae (61 taxa)
- Proteaceae (57 taxa)

3.4.3 Conservation significant flora

Desktop searches of the EPBC Act PMST and *NatureMap* databases identified the presence/potential presence of 36 conservation significant flora taxa within the study area. The desktop searches recorded:

- Eight species listed as Threatened under the EPBC Act and/or as Declared Rare Flora under the WC Act
- One Priority 1 species
- Six Priority 2 species
- Thirteen Priority 3 species
- Eight Priority 4 species

3.5 Fauna

3.5.1 Fauna diversity

NatureMap identified 195 native, vertebrate, fauna taxa previously recorded within the study area. This total included ten amphibians, 113 birds, 37 mammals and 30 reptiles. Non-vertebrate taxa and five fish were excluded from this assessment.

3.5.2 Conservation significant fauna

Searches of the EPBC Act PMST and *NatureMap* database identified the presence/ potential presence of 29 conservation significant fauna species. Species identified by the EPBC Act PMST as marine, migratory marine or migratory wetland were excluded from this assessment as no marine or wetland habitat was present within or nearby the survey area. However, species identified by the PMST as migratory terrestrial were considered as part of this assessment.

3.6 DPaW managed lands

Three DPaW-managed conservation areas are located within the survey area, these are:

- Collie State Forest (Class A), located within the southern portion of the survey area
- Unnamed Estate, located within a small portion in the northern portion of the survey area
- Harris River State Forest (Class A), located within the northern portion of the survey area

DPaW managed reserves are shown in Figure 2, Appendix A.

3.7 Environmentally sensitive areas

No Environmentally Sensitive Areas (ESAs) are located within, or adjacent to, the survey area.

4. Field survey results

4.1 Watercourses and wetlands

The survey corridor crosses a number of minor and larger watercourses. The most significant crossings/intercepts are of the Collie River in Priority Area 2, at which there are permanent pools, and in Priority Area 3, where the survey corridor runs parallel to a southern tributary of the Collie River, which supports a range of dampland vegetation.

The area, where the alignment crosses the Collie River (Figure 2), appears to have permanent water present, based on aerial photography, but could not be accessed during the field survey due to its location on private property.

4.2 Vegetation and flora

4.2.1 Vegetation types

The field survey recorded seven vegetation types, as well as completely disturbed land. One of the vegetation types consists of non-native planted trees in a plantation. The vegetation types are described in Table 6 and mapped at Figure 3, Appendix A

The predominant vegetation within the survey area is Jarrah/Marri forest regrowth (VT1), which occurs within much of the existing powerline corridors in the northern part of the survey area, on upland, heavy lateritic soils. This vegetation was cleared for powerline construction and maintenance and regrowth is in varying stages and conditions, with eucalypt trees largely removed. Occasional mature eucalypt trees remain at the outer edges of the survey corridor. The regrowth shr1.94ubs and herb species have variable dominance in different areas, depending on the soil type and availability of moisture.

Some areas of intact Jarrah/Marri forest remain within the survey area (VT2), primarily within the southern part, from Quinns Road south along the Coalfields Highway and including sections along Centaur Road. This vegetation is generally in a lower lying landform, with a sandy, gravelly soil type, and grades into dampland vegetation types at the lowest points in the landscape.

Two dampland vegetation types are present at a number of locations, including small drainage lines and low points (VT3), as well as on a broader flat, along Centaur Road in the southern part of the survey area (VT4). The dampland vegetation contains Myrtaceous shrubs and trees such as *Melaleuca, Kunzea* and *Taxandria*, as well as *Eucalyptus rudis*.

The remaining vegetation types are indicative of previous disturbance along the powerline corridors and include Kunzea/mixed shrubland regrowth on deep sand (VT5) and scattered native plants over introduced grasses and herbs (VT6).

The vegetation types are representative of the broad vegetation associations across the area described by Smith (1974) and of some vegetation complexes described by Mattiske and Havel (1998).

Table 6 Vegetation types mapped within the survey area

Vegetation Type	Description	Landform and extent (ha)	Representative photograph
Eucalyptus marginata/ Corymbia calophylla forest regrowth (VT1)	Occasional *Banksia grandis, Persoonia longifolia, Hakea prostrata* and *Kunzea glabrescens* over medium shrubland of a range of species including *Hakea prostrata, Acacia pulchella, Taxandria linearifolia, Billardiera fusiformis, Bossiaea linophylla, Xanthorrhoea preissii, Macrozamia riedlei* and *Pteridium esculentum* over low shrubs of *Hypocalymma angustifolium, Hibbertia* spp., *Hemigenia pritzelii, Bossiaea ornata, Tetraria* sp. Jarrah Forest, *Phyllanthus calycinus* and *Desmocladus fasciculatus*. There are occasional mature or regrowth *Eucalyptus marginata* (Jarrah) and/or *Corymbia calophylla* (Marri) trees along the edges of the powerline corridors or roads. Where these areas have not been previously slashed for powerline access and protection the understorey has a scattered taller shrub layer and a denser low shrubland/groundcover layer, with a higher percentage cover of sedges. Small, low lying patches in this vegetation type sometime contain dampland species similar to those described in VT3 but somewhat artificial due to the additional collection of water along the cleared corridors.	Gravelly, lateritic slopes and hilltops with occasional shallow gullies. 55.78 ha	

Vegetation Type	Description	Landform and extent (ha)	Representative photograph
Eucalyptus marginata open forest (VT2)	Open Forest of *Eucalyptus marginata* and scattered *Corymbia calophylla* over very open woodland of *Persoonia longifolia* ± *Allocasuarina fraseriana* over open heathland of *Hibbertia hypericoides*, *Bossiaea obovatus, H. commutata*, *Babingtonia camphorosmae* and *Xanthorrhoea preissii* over *Tetraria* sp. Jarrah Forest and *Desmocladus fasciculatus* sedgeland over mixed herbs. The understorey species of this vegetation type vary depending on its location in the landscape, with some areas on more gravelly soils and others on lower lying, sandy gravelly flats.	Sandy, loamy gentle slopes and flats. 11.77 ha	

Vegetation Type	Description	Landform and extent (ha)	Representative photograph
Eucalyptus rudis/ *Melaleuca* low forest/ shrubland (VT3)	Minor gullies: Scattered to open forest of *Eucalyptus rudis* over woodland of *Melaleuca preissiana* or *Melaleuca rhaphiophylla* over shrubland of *Pericalymma elliptica, Astartea scoparia, Taxandria linearifolia*, over low shrubland of *Hypocalymma angustifolium* over herbs. Damp flats: Open forest of *Eucalyptus rudis* over occasional/ patches *Melaleuca preissiana* over open mixed shrubland *of Pericalymma elliptica*, *Astartea scoparia, Acacia extensa* and / or *Melaleuca pauciflora* over low *shrubland / sedgeland* of *Phlebocarya ciliata, Mesomelaena tetragona, Leptocarpus ?laxus* and *Hibbertia vaginata.*	Sandy, loamy flats or minor gullies with sandy clay base. 12.09 ha	 
Mixed shrubland on damp flats (VT4)	Scattered *Melaleuca preissiana* over mixed shrubland of *Acacia pulchella, Hypocalymma angustifolia, Astartea scoparia, Melaleuca pauciflora* and *Jacksonia furcellata* over sparse heathland of *Patersonia occidentalis, Leptocarpus ? laxus* and *Lepidosperma* sp.	Low lying, seasonally damp flat. 2.72 ha	

Vegetation Type	Description	Landform and extent (ha)	Representative photograph
Kunzea tall shrubland (VT5)	Tall open shrubland of *Kunzea glabrescens* with scattered *Banksia attenuata* over low shrubland of *Hibbertia hypericoides, Phlebocarya ciliata, Hypocalymma angustifolia* and *Dasypogon bromeliifolius* over mixed sedges and herbs.	Low white sand dune / deep sand on gentle slope. 7.68 ha	
Scattered natives (VT6)	Very occasional plants or clumps of a range of native species over introduced grasses and herbs. The native species are representative of the adjacent Jarrah/Marri forest understorey. Occasional trees of *Eucalyptus marginata* or *Corymbia calophylla* over mid and low shrubs are present on some of the outer edges of the survey corridor and the vegetation is representative of VT2.	Gravelly, loamy gentle slope. 10.40 ha	10 
Plantation (VT7)	Non-local Eucalyptus trees in a plantation over pasture.	Gravelly, loamy gentle slope. 1.94 ha	

Vegetation Type	Description	Landform and extent (ha)	Representative photograph
Highly Disturbed (HD)	Agricultural or other cleared land with no native species.	63.91 ha	

4.2.1 Conservation significant ecological communities

No TECs or PECs were recorded during the survey.

4.2.2 Other significant vegetation

All the vegetation types within the survey area are well represented within the local and regional area and are not representative of restricted associations.

However, the survey area supports a number of areas of dampland and riparian (creek edge) vegetation (VT3, VT4). These are defined by the presence of wetland dependent species such as *Melaleuca preissiana, M. rhaphiophylla, M. viminea, Eucalyptus rudis* and *Taxandria linearifolia*. These vegetation types are considered, significant as defined by EPA (2004a) as they represent vegetation that grows in association with watercourses and/or wetlands.

4.2.3 Vegetation condition

The vegetation condition across the survey area varies from Excellent to Completely Degraded, depending on the previous level of clearing or disturbance. Some Jarrah/ Marri forest (VT2) and dampland shrubland (VT4) in the lower lying areas remains in Excellent condition, as it has not been impacted by powerlines, tracks or agriculture. Parts of the survey corridor, particularly those including roads but adjacent to intact forest, contain highly degraded areas, Jarrah/marri forest regrowth and forest in Excellent condition within the same strip. The majority of the survey area is in Highly Degraded (7) condition due to the considerable stretches across farmland and contained within cleared road areas.

Table 7 Extent of vegetation condition ratings within the survey area

Condition rating	Extent (ha)
Excellent	15.24
Excellent to Very Good	3.88
Very Good	42.28
Good to Very Good	3.95
Good	13.60
Good to Completely Degraded	6.36
Degraded	13.04
Degraded to Completely Degraded	1.16
Completely Degraded	66.68
Total	**166.20 ha**

4.2.4 Flora diversity

Two hundred and twenty-eight flora species were recorded during the survey. This total comprised 209 native and 19 introduced and/or naturalised flora. Dominant families recorded from the survey area included:

- Fabaceae (41 species, 4 introduced)
- Proteaceae (25 species, none introduced)
- Myrtaceae (23 species, 1 introduced)
- Dilleniaceae (11 species, none introduced)

Dominant genera recorded from the survey area included:

- *Acacia* (17 species, 2 introduced)

- *Hibbertia (*11 species)
- *Hakea* (9 species)
- Gompholobium (6 species)

A list of the flora identified within the survey area is provided in Appendix D.

4.2.5 Conservation significant flora

Three species of conservation significant flora were recorded within, or immediately adjacent to, the survey area during the survey. One, *Grevillea rara*, is listed as Endangered under the EPBC Act and WC Act.

Grevillea rara (Endangered)

Grevillea rara grows within the Jarrah/Marri forest in the vicinity of Harris River Dam near Collie. It is a shrub to 2 m high, and appears to be a disturbance opportunist, growing in dense stands after clearing or ground disturbance. It has previously been recorded at a number of locations along Harris River Dam Road (WA Herbarium 1998–).

This species was recorded in the same locations along a section of Harris River Dam Road during the survey (see Figure 3, Appendix A, Plate 1). Approximately 250 plants were recorded, spread along disturbed areas under the existing powerline or near the road edge. Many of the plants were already marked with flagging tape.

Plate 1 Grevillea rara on Harris River Road

Synaphea hians (Priority 3)

Synaphea hians is a low growing, spreading shrub (up to 1 m) with yellow flowers in September to November. It grows in a range of soils on rises in woodland or upslope of damp areas.

Over 100 plants were recorded adjacent to Coalfields Highway above an embankment in sandy/gravelly soil (Figure 3, Appendix A and Plate 2).

Plate 2 *Synaphea hians*

Grevillea ripicola (Priority 4)

Grevillea ripicola is a spreading shrub to 2 m high with distinctive foliage. It grows on a range of soils on swampy flats, granite outcrops, or along watercourses within the Jarrah Forest Bioregion (WA Herbarium 1998–).

One plant of this species was recorded along an old section of Griggs road, in the southern part of the survey area. It is approximately 13 m from the edge of the survey corridor.

Other Priority flora

A further three conservation significant species have been previously recorded within or immediately adjacent to the survey area. These are discussed below.

Caladenia leucochila (Critically Endangered)

This orchid species has previously been recorded immediately adjacent to the survey area, on the western side of Centaur Road. It is a small, white orchid, growing on grey sandy soil in Jarrah – Marri forest. It flowers between September and October (DPaW 2015) and would therefore not have been visible or identifiable at the time of the survey.

*Leucopogon extremus (*Priority 2)

This species is a low shrub to 0.5 m high with greenish-white flowers. It grows in wet, sandy clay to sandy loam and flowers between September and October. It has previously been recorded within a rehabilitation area in proximity to the artificial wetland adjacent to Centaur Road to the east (DPaW 2007–) but was not observed during the current survey.

Synaphea petiolaris subsp. *simplex* (Priority 3)

This low shrub species grows to 0.6 m high, and has yellow flowers from September to October. It grows on sandy soils on flats in winter-wet areas. The species was not seen during the field survey although *Synaphea* species were targeted, collected and identified at the WA Herbarium.

Likelihood of occurrence

A likelihood of occurrence assessment (based on the range, habitat requirements and previous records of the species) was conducted for all conservation significant taxa identified in the desktop assessment (Appendix D). The likelihood of assessment concluded that four species were present (*Grevillea rara* Endangered*, Synaphea hians* P3) with *Leucopogon extremus* P2 and *Synaphea petiolaris* subsp. simplex P3 having been previously recorded within the survey area. One species is likely to occur (*Caladenia leucochila* Critically Endangered) and *Grevillea ripicola* P4 was recorded adjacent to survey area. In addition, it was considered that 15 species could possibly occur and 15 species were unlikely or highly unlikely to occur.

4.2.6 Introduced flora

A range of introduced species are present within the survey area, primarily consisting of introduced grasses and herbs, generally in lower lying areas and areas with sandy or sandy gravelly soils. Few introduced species are present on heavy lateritic soils on uplands. Few introduced shrub or tree species were recorded, except for non-endemic eucalypt trees in a plantation area and a small patch of Victoria Teatree (**Leptospermum laevigatum*) and **Acacia pycnantha* in a roadside drain on Centaur Road.

No species listed as a Declared Pest under the *Biosecurity and Agriculture Management Act 2007* were recorded nor were there any Weeds of National Significance (WONS).

4.3 Fauna

4.3.1 Fauna habitats

Five fauna habitat types were identified and described within the survey area (Table 8) and include *Eucalyptus* (Jarrah/Marri) Forest, Jarrah/Marri/*Allocasuarina* Forest on sandy soils, Shrublands in ephemeral damplands, Collie River, Minor drainage lines and *Eucalyptus* Forest regrowth. Most of the survey area is existing cleared areas/plantation or of *Eucalyptus* regrowth.

The *Eucalyptus* Woodland habitat type is well represented in the immediate vicinity of the survey area and in the broader Collie district. The Shrubland and Damplands appear to be less common in the local and broader area.

The values of each habitat type are discussed below in Table 8.

Table 8 Fauna habitats within the survey area

Habitat description	Indicative images
Eucalyptus (Jarrah/Marri) Forest This habitat is comprised of *Eucalyptus marginata* open forest (VT2) These vegetation types all had a shrub layer understorey with thick leaf litter and woody debris. Large logs scattered the forest floor and the vegetation was mostly long unburnt. The above *Eucalyptus* species are recognised as valuable habitat for Black Cockatoo for breeding, feeding and roosting. Hollows suitable for breeding for a variety of fauna taxa were recorded in the Eucalypts within the Survey area. <u>Conservation Significant Species</u> Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*), Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*), Baudin's Black Cockatoo (*Calyptorhynchus baudinii*), Western Brush Wallaby (*Macropus irma*) and Chuditch (*Dasyurus geoffroii*) (via scats) were al recorded in this habitat type. The Black cockatoos were recorded feeding, loafing and roosting in the survey area with numerous potential breeding trees recorded. This habitat would also provide resources for threatened mammals such as Western Ringtail Possum (*Pseudocheirus occidentalis*), Southern Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*), Western False Pipistrelle (*Falsistrellus mackenziei),* Southern Brown Bandicoot *(Isoodon obesulus fusciventer)* and Dell's Skink (*Ctenotus delli*). The Peregrine Falcon (*Falco peregrinus*) may utilise the area opportunistically. This fauna habitat type covers approximately 10.87 ha and is of high value to fauna.	  

Habitat description	Indicative images
***Kunzea* tall shrubland on sandy soils** This habitat is comprised of: *Kunzea* tall shrubland (VT5) This vegetation type is very dense with a fine leaf and woody debris layer. The area was long unburnt and was mostly present on the outer edges of the survey area. Tall Shrubland of *Kunzea glabrescens* regrowth was dominant in areas where previous clearing had occurred. This habitat provides excellent cover for small bush birds and species that require typically dense areas such as Southern Brown Bandicoots. <u>Conservation Significant Species</u> Black Cockatoo feeding evidence was recorded in this habitat type from Forest Red-tailed Black Cockatoo or Baudin's Black Cockatoo. A Western Brush Wallaby was recorded in this area and several digs of Southern Brown Bandicoot. The dense understorey provides habitat for Chuditch. Additional habitat is present for Western Ringtail Possum, Southern Brush-tailed Phascogale, Western False Pipistrelle, Peregrine Falcon and Dell's Skink. This fauna habitat type covers approximately 7.68 ha and is of high value to fauna.	 
Shrublands in ephemeral damplands This habitat type is comprised of the vegetation type: Mixed Shrubland (VT4). This vegetation type is very dense with a fine leaf and woody debris layer to 3 meters. This habitat is low lying in the environment and dry at the time of the survey. Dried cracking clays were present in low areas where water had been sitting. Digs were present in the softer areas of Rosenberg's Monitors (sighted), rabbits and Southern Brown Bandicoots. The area was dense and long unburnt. <u>Conservation Significant Fauna</u> Southern Brown Bandicoot were recorded in this habitat type via numerous digs. The dense understorey provides habitat for Western Brush Wallaby and Chuditch. Peregrine Falcon may utilise the area for foraging. This fauna habitat type covers approximately 2.72 ha and is of high value to fauna.	
Collie River	No Image

Habitat description	Indicative images
The Collie River is positioned in the northern portion of the survey area on private property. The actual crossing location could not be accessed during the survey, however vegetation present appeared to be Flooded Gum (*Eucalyptus rudis*), Melaleuca sp. and sedges surrounded by cleared lands. Aerial photography identifies numerous large pools of water in the area indicating permanent water bodies. <u>Conservation Significant Fauna</u> The Collie River is known to have Water Rats (*Hydromys chrysogaster*) present and may persist in the water bodies. The water resource may also be used by Black Cockatoo, Western Brush Wallaby, Peregrine Falcon and Chuditch. This fauna habitat type covers approximately 0.77 ha and is of high value to fauna.	
Minor Drainage lines This habitat type is comprised of *Eucalyptus rudis/Melaleuca* low forest/shrubland (VT3) This vegetation type is very dense with a fine leaf and woody debris layer. This habitat is low lying in the environment and dry at the time of the survey. Some areas were regrowth and comprised of dense sedges and shrubs and young Flooded Gum. Undisturbed portions contained large Flooded Gum, Melaleuca and sedges. The area was dense and long unburnt. <u>Conservation Significant Fauna</u> No conservation significant species were recorded in this habitat however Southern Brown Bandicoot, Western Brush Wallaby, Chuditch, Western Ringtail Possum, Southern Brush-tailed Phascogale and Western False Pipistrelle may all utilise this habitat, both regrowth and remnant. Peregrine Falcon may utilise the area for foraging. This fauna habitat type covers approximately 11.31 ha and is of high value to fauna.	

Habitat description	Indicative images
Eucalyptus Forest Regrowth This habitat type is comprised of *Eucalyptus marginata/ Corymbia calophylla* forest regrowth (VT1) This vegetation type supports some dense patches with sedges and shrubs but with limited leaf litter and woody debris layers. Historically the remnant vegetation was Jarrah/Marri forest however the regrowth primarily consists of shrubs and ground covers and the dominant species present is partially dependent on soil type and location in the environment. The area is mostly long unburnt although emergent Eucalypts appear to be poisoned or slashed and other areas driven over and disturbed by off road vehicles. <u>Conservation Significant Fauna</u> The small areas of dense habitat provides cover to Western Brush Wallaby (scats found in this habitat). A number of other species may utilise this habitat opportunistically but it would not be considered significant for them. This habitat would provide diverse resources for a range of species. This fauna habitat type covers approximately 55.18 ha and is of medium value to fauna.	 
Cleared areas and Plantation (VT6, VT7, VT8) This habitat type is comprised of previously cleared areas for power corridors, roads, tracks, pipelines and agriculture. The habitat provides very little resources for fauna however in the regrowth of some areas showed evidence of feeding by Western Grey Kangaroo (*Macropus fuliginosus*). This fauna habitat type covers approximately 65.91 ha and is of low value to fauna.	

4.3.2 Regional linkages and habitat corridors

There are areas of highly disturbed lands in and immediately adjacent to the survey area including paddocks, mines, power stations and agricultural lands. However, the survey area intersects areas of state forest. These include large tracts of remnant vegetation in the Harris River State Forest in the north, Collie State Forest in the central and southern portions of the survey area and small portions of Muja State Forest. Other small patches of scattered remnant vegetation are scattered throughout and adjacent to other portions of the survey area that is mostly continuous habitat in the region. The survey area is mostly cleared land within existing power easement corridors and only includes fauna habitat outside of these areas.

4.3.3 Fauna diversity

The list of fauna species encountered during the field survey is presented in Appendix E. Fauna recorded include 44 birds, nine mammals (three of which are introduced taxa), 10 reptiles and one amphibians.

4.3.4 Conservation significant fauna

The conservation of fauna species and their significance status is currently assessed under both Federal (EPBC Act) and State Acts (WC Act). Conservation significant fauna include those fauna listed under the EPBC Act, WC Act and the Priority list of fauna produced by DPaW.

Six conservation significant species were recorded during the field survey. These were:

- Carnaby's Black Cockatoo, Schedule 2, Endangered – WC Act and Endangered - EPBC Act
- Forest Red-tailed Black Cockatoo, Schedule 3, Vulnerable – WC Act, Vulnerable – EPBC Act
- Baudin's Black Cockatoo, Schedule 2, Endangered – WC Act, Vulnerable – EPBC Act
- Chuditch, Schedule 3, Vulnerable – WC Act, Vulnerable – EPBC Act
- Southern Brown bandicoot, Priority 4 – DPaW listing
- Western Brush Wallaby, Priority 4 – DPaW listing

Black Cockatoos

Three species of Black Cockatoo were recorded in the survey area and include Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*), Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*), and Baudin's Black Cockatoo (*Calyptorhynchus baudinii*) via sightings (loafing, feeding or flyover) or calls, feeding and foraging evidence adjacent to the survey area. Plate 3 shows some evidence of feeding by Forest Red-tailed Black Cockatoo on Marri and Jarrah nuts.

Carnaby's Black Cockatoo is endemic to the south-west of Western Australia with a wide-spread distribution. Carnaby's Black Cockatoo nest in hollows of live or dead eucalypts, primarily smooth-barked Salmon Gum (*Eucalyptus salmonophloia*) and Wandoo (*E. wandoo*) (Saunders 1979b, 1982) though breeding has been reported in other wheatbelt tree species and some tree species on the Coastal Plain and Jarrah forest (Saunders 1979, 1982; Storr 1991; Johnstone and Storr 1998). Success in breeding is dependent on the quality and proximity of feeding habitat within 12 km of nesting sites (Saunders 1977, 1986; Saunders and Ingram 1987). Along with the trees that provide nest hollows, the

protection, management and increase of this feeding habitat that supports the breeding of Carnaby's Black Cockatoo is a critical requirement for the conservation of the species.

Baudin's Cockatoo is endemic to a 2,000 km² area (Garnett and Crowley 2000) of the humid and sub-humid zones of south-west Western Australia (Johnstone and Storr 1998). The current distribution of Baudin's Cockatoo is from Albany extending north to Gidgegannup, east to Mount Helena, Wandering, Quindanning, Kojonup, Frankland and King River and to the eastern margin of the Swan Coastal Plain. Baudin's Cockatoo mainly feeds on the seeds of Marri (*Corymbia calophylla*), in the forested regions of south-west Western Australia (Saunders 1974a). In addition to Marri, Baudin's Cockatoo feeds on the seeds of Bull Banksia (*Banksia grandis)*, Swamp Banksia (*B. littoralis),* Holly-leaved Banksia *(B. ilicifolia,* Wavy-leaved Hakea *(Hakea undulata),* Harsh Hakea *(H. prostrata),* Two-leaf Hakea *(H. trifurcata)*, Long Storksbill (*Erodium botrys)* (Saunders 1979) and Jarrah (*E. marginata)* (Sedgwick 1964). Baudin's Cockatoo nests in mature trees such as Marri, Karri (*E. diversicolor*), Jarrah and Wandoo in the lower south-west of WA (Department of Environment and Conservation 2012).

The Forest Red-tailed Black Cockatoo is endemic to the south-west humid and sub-humid zones of Western Australia (Mawson and Johnstone 1997). It inhabits the dense Jarrah, Karri and Marri forests receiving more than 600 mm of annual average rainfall. The current distribution is north of Perth and east to Mount Helena, Christmas Tree Well, North Banister, Mt Saddleback, Rocky Gully and the upper King River (Johnstone and Storr 1998). Habitats in which the Forest Red-tailed Black Cockatoo occurs at Bungendore Park and Jarrahdale have an understorey of Bull Banksia, Snottygobble (*Persoonia longifolia)*, Sheoak (*Allocasuarina fraseriana)* and *Hakea* spp., with scattered Blackbutt (*E. patens)* and Wandoo (Johnstone and Kirkby 1999). The Forest Red-tailed Black Cockatoo roosts in Jarrah-Marri-Blackbutt habitat on roadsides, paddocks or forest blocks. While the Forest Red-tailed Black Cockatoo feeds on the seeds of other species, around 90 % of its diet is made up of the seeds from Marri and Jarrah fruits (Department of Environment and Conservation 2012).

The survey area contains approximately 10.87 ha of suitable foraging habitat, which corresponds to the *Eucalypt* woodlands. Additionally, a tree survey was conducted and the survey area contains 17 potential breeding trees (>300 mm DBH for Wandoo and >500 mm DBH for Jarrah, Marri and Flooded Gum (*E. rudis*)) for Black Cockatoos (four of the trees contain suitable hollows). Two of the potential breeding trees with hollows had signs of black cockatoo use.

Note: Most of the trees identified were from two main areas of remnant vegetation, a section along Coalfields Highway and on, and adjacent to, Centaur Road.

One location along Coalfields Highway appeared to have roosting activity (numerous droppings, branch clippings and shredded bark), however no observations of roosting were recorded. This data is further detailed below in Table 9.

Plate 3 Marri and Jarrah nuts showing evidence of Black Cockatoo feeding

Table 9 Black Cockatoo Evidence recorded within and adjacent to the survey area

Habitat type	Presence within the survey area	Evidence
Foraging habitat	Yes, Marri, Jarrah and Banksia	15 records of forest Red-tailed Black feeding evidence on Jarrah and Marri. 4 records of Carnaby's Black Cockatoo feeding evidence on Jarrah and Marri. 2 records of Baudin's Black Cockatoo feeding evidence on Marri.
Actual Breeding Habitat	No	No actual breeding events were record.
Potential breeding habitat	Yes	17 potential breeding trees >300 or 500 mm DBH of either Jarrah, Marri, Wandoo or Flooded Gum in the survey area. 4 large Jarrah with large hollows (>200 mm) suitable for breeding. Two of these had chews present however no actual breeding events were recorded.
Roosting habitat	Yes	One location along Coalfield highway had evidence of roosting.

Western Brush Wallaby (*Macropus irma*), Priority 4 – DPaW listing

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 (Van Dyke and Strahan 2008).

This species was observed twice during the field survey and was also identified via droppings. Two sets of droppings were collected from the regrowth area and were identified as Western Brush Wallaby. This species is known to be in the region and would utilise all habitats within the Survey area.

Chuditch (*Dasyurus geoffroii*), Schedule 3, Vulnerable – WC Act, Vulnerable – EPBC Act

The Chuditch inhabits eucalypt forest (especially Jarrah), 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 and Strahan 2008). The species can travel large distances, has a large home range and is sparsely populated through a large portion of its range.

The Chuditch was potentially recorded during the field assessment via scats. Three sets of scats were recorded on logs and were the same shape and size to that of the Chuditch. The Chuditch is known from the region and inhabits forest in the Collie region. The closest record of Chuditch is approximately 2.5 km away. Numerous records are present within 20 km of the survey area (DPaW 2007–). Further survey would be required to verify if the species is present.

Quenda (*Isoodon obesulus subsp. fusciventer*), Priority 5 DPaW listing

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).

The Quenda was recorded during the field survey via small diggings (Plate 4). The species is likely to utilise all habitats present within the survey area, however most diggings were recorded in the dampland areas.

Plate 4 Southern Brown Bandicoot diggings recorded in Jarrah/Marri Forest and Damplands

Likelihood of occurrence assessment

An assessment on the likelihood of conservation significant fauna species occurring in the survey area was conducted (Appendix E). This assessment was based on species biology, habitat requirements, the quality and availability of suitable habitat and records of the species in the area.

An additional six species (to those observed during the field survey) are considered likely to occur in the survey area. A summary of this assessment is presented in Table 10, with additional information provided below.

The *Eucalyptus* Woodlands are well represented in the surrounding State Forest and would be utilised by six of the seven conservation significant species known or likely to occur in the survey area. The Water Rat is the only species that realise on a specific

habitat (Collie River and Hanson Brook water bodies) to persist and would be considered specific to or solely relied upon by the conservation significant species.

Table 10 Summary of fauna likelihood of occurrence – species considered likely to occur or utilise the survey area

Species name	Common name	Status			Database search		Outcome of assessment
		WC Act	EPBC Act	DPaW	Nature Map	EPBC	
Birds							
Falco peregrinus	Peregrine Falcon	OS			X		Likely, Foraging habitat is available for this species.
Mammals							
Pseudocheirus occidentalis	Western Ringtail Possum	Cr	Vu		X	X	Likely, Habitat is present for the species and known to occur in the region.
Phascogale tapoatafa subsp. wambenger	South-western Brush-tailed Phascogale	CD			X		Likely, Habitat is present for the species and known to occur in the region.
Falsistrellus mackenziei	Western False Pipistrelle			P4	X		Likely, Habitat is present for the species and known to occur in the region.
Hydromys chrysogaster	Water Rat			P4	X		Likely, This species would be restricted to the Collie River.
Reptiles							
Ctenotus delli	Dell's Ctenotus			P4	X		Likely, Habitat is present for the species and known to occur in the region.

Peregrine Falcon (*Falco peregrinus*), Schedule 7 – WC Act

The Peregrine Falcon is seen occasionally anywhere in the south-west of Western Australia. It is found in a range of habitats from woodlands to open grasslands and coastal cliffs - though less frequently in desert regions. The species nests primarily on ledges of cliffs, in shallow tree hollows, and on ledges of building in cities. (Morcombe 2004).

This species was not recorded during the field assessment, however is likely to utilise all habitats within the survey area as a foraging resource. The *Eucalyptus* Woodland may also provide nesting refugia sites for breeding.

Western Ringtail Possum (*Pseudocheirus occidentalis*), Critically Endangered – WC Act, Vulnerable – EPBC Act

The Western Ringtail Possum occurs in and near coastal Peppermint Tree (*Agonis flexuosa*) forest and Tuart (*Eucalyptus gomphocephala*) dominated forest with a

Peppermint Tree understorey from Bunbury to Albany. It also occurs in Jarrah forest and Jarrah-Marri forest sometimes associated with Peppermint Trees (Van Dyck and Strahan 2008).

No Western Ringtail Possums or evidence of the species were recorded during the field survey, however, the species is known from the region. Searches for dreys through all habitat types were undertaken but no dreys were located within the survey area. No nocturnal surveys were undertaken for this species.

There is 10.87 ha of potential Western Ringtail Possum habitat.

Western Southern Brush-tailed Phascogale (*Phascogale tapoatafa subsp. wambenger*), Schedule 6 – WC Act

Southern Brush-tailed Phascogale prefers 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). The species is widespread in the south west, ranging from Perth and the hills to the Albany region.

Phascogales are known from the region, and within the Survey area would primarily utilise the Forest areas as habitat. The Tall Shrubland may be utilised opportunistically as a foraging/hunting resource. No nocturnal surveys were undertaken for this species.

There is 10.87 ha of potential phascogale habitat.

Western False Pipistrelle (*Falsistrellus mackenziei*), Priority 4 – DPaW

The Western False Pipistrelle is listed as Priority 4 by DPaW and is confined to the southwest of WA. The species occurs in wet sclerophyll forest dominated by Karri, and in the high rainfall zones of the Jarrah and Tuart 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, Sheoak and Peppermint trees are often co-dominant at its collection localities (Churchill 2008; McKenzie & Start 1999). This species was not recorded during the field survey, however is known to be in the region.

There is 10.87 ha of potential Western False Pipistrelle habitat.

Water rat (*Hydromys chrysogaster*), Priority 4 – DPaW

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 (Van Dyke & Strahan 2008). Within the survey area the only habitat available to this species is the Collie River and Harris River.

This species was not recorded during the field survey, however is known from the region.

There is approximately 1 ha of potential Water Rat habitat at the Collie and Harris Rivers.

Dell's Ctenotus (*Ctenotus Delli*), Priority 4 – DPaW

Dell's Ctenotus is known to occur in Jarrah-Marri woodland (Forest) 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).

Within the survey area, the forest habitat would be available to this species. This species was not recorded during the field survey, however is known from the region.

There is 10.87 ha of potential Dell's Ctenotus habitat in the survey area.

5. Conclusion

5.1 Key findings

5.1.1 Vegetation and flora

Vegetation

The majority of the intact vegetation and regrowth vegetation present within the survey area is dominated by Jarrah/Marri forest species, and is well represented in the local and regional areas. None of the vegetation types is representative of TECs or PECs or has less than 30 % of its pre-European extent remaining.

Vegetation types VT3 and VT4 support dampland and wetland species and some parts of these types are considered to be riparian vegetation. These vegetation types are considered, significant as defined by the EPA (2004a).

Of the 166.2 ha of the survey area, approximately 61.4 ha (37 %) was rated as Excellent to Very Good condition, 23.91 ha (14 %) as Good and 80.88 ha (49 %) as Degraded or Completely Degraded.

Flora

Over 228 flora species were recorded during the survey. Of these, one, *Grevillea rara*, is listed as Endangered under the EPBC Act and WC Act. Over 250 of these plants were recorded along Harris River Dam Road, under and adjacent to the existing powerline. A further record of a Critically Endangered orchid species, *Caladenia leucochila* occurs immediately adjacent to the survey area, on Centaur Road. This species would not have been visible at the time of survey.

Four other conservation significant flora species have been recorded in disturbed areas within and adjacent to the corridor. These are:

- *Leucopogon extremus* (P2) – previously recorded in a rehabilitation area east of Centaur Road
- *Synaphea hians* (P3) – over 100 plants recorded along the Coalfields Highway
- *Synaphea petiolaris* subsp. *simplex* (P3)– previously recorded in the same location as *Leucopogon extremus*.
- *Grevillea ripicola* (P4) – one plant recorded adjacent to the survey area on an old section of Griggs Road.

A further 15 conservation significant species were considered to possibly occur within the survey area, based on their habitat preferences and relative visibility at the time of survey.

5.1.2 Fauna

Six conservation significant fauna species were recorded during the field survey:

- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*), Endangered – WC Act, Endangered – EPBC Act
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*), Vulnerable – WC Act, Vulnerable – EPBC Act
- Baudin's Black Cockatoo (*Calyptorhynchus baudinii*), Endangered – WC Act, Vulnerable – EPBC Act

- Chuditch (*Dasyurus geoffroii*), Vulnerable – WC Act, Vulnerable – EPBC Act
- Western Brush Wallaby (*Macropus irma*), Priority 4 – DPaW listing
- Quenda (*Isoodon obesulus subsp. fusciventer*), Priority 4 DPaW

An additional six species are considered likely to occur in the survey area based on previous records and suitability of habitat:

- Western Ringtail Possum (*Pseudocheirus occidentalis*), Threatened – WC Act, Endangered – EPBC Act
- Southern Brush-tailed Phascogale (*Phascogale tapoatafa subsp. wambenger*), Schedule 6 – WC Act
- Peregrine Falcon (*Falco peregrinus*), Schedule 7 – WC Act
- Western False Pipistrelle (*Falsistrellus mackenziei*) Priority 4 - DPaW
- Dell's Ctenotus (*Ctenotus Delli*) Priority 4 – DPaW
- Water rat (*Hydromys chrysogaster*) Priority 4 – DPaW

Seventeen eucalypt trees which are potentially suitable for Black Cockatoo breeding were recorded within the survey area, as well as feeding at a number of trees, but no breeding events were recorded.

The Eucalyptus woodlands, which make up much of the habitat of the survey area are well represented in the surrounding State Forest and would be utilised by all the conservation significant species known or likely to occur in the area. Furthermore, (with the exclusion of the Collie River and Hanson Brook) 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. The Water Rat is the only exclusion to this statement as the water bodies of the Collie River and Hanson Brook would be core to its survival in the local area. However, the likely small, temporary impact areas for this project would be unlikely to affect the survival of the species locally or regionally.

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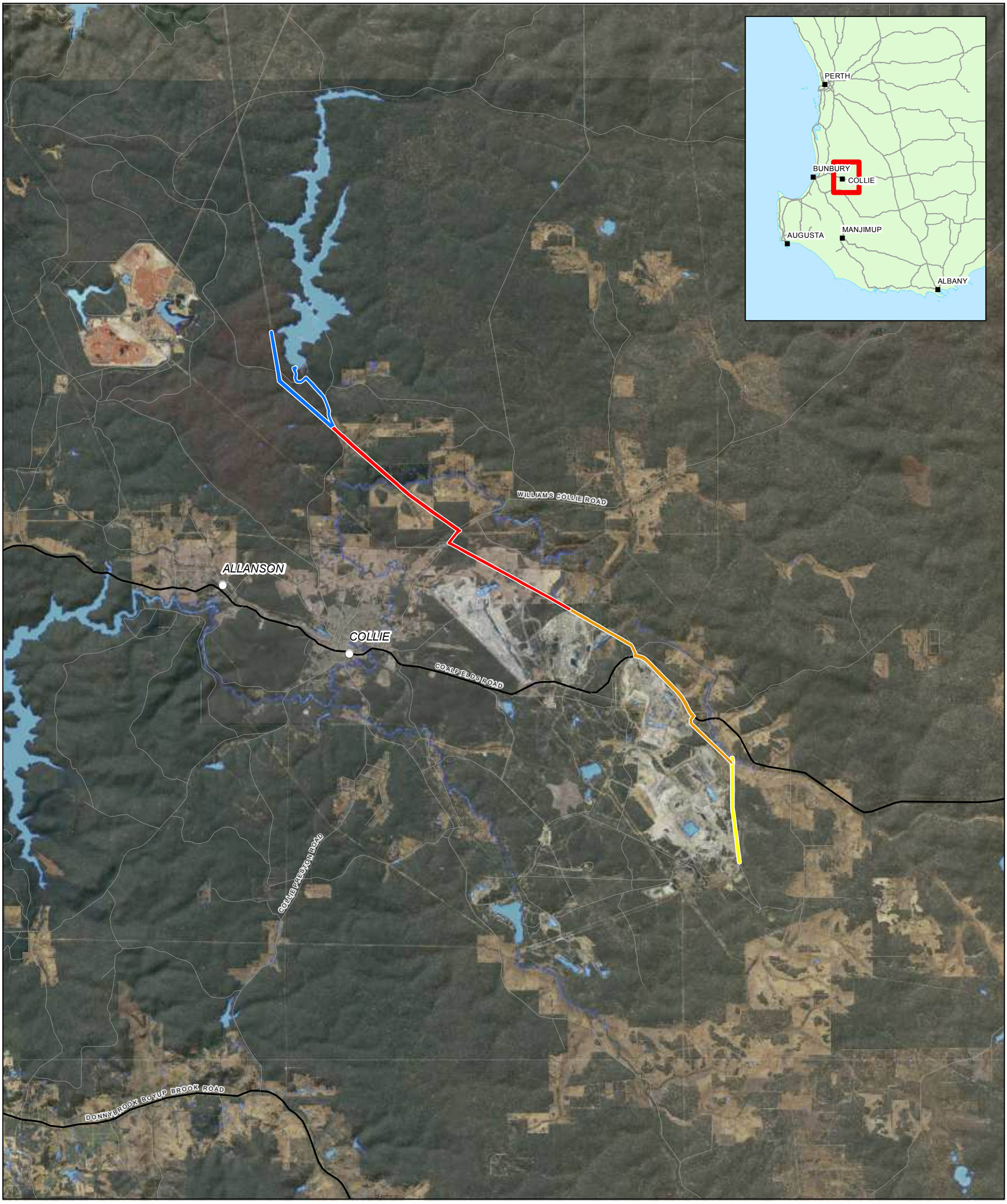
Appendices

Appendix A – Figures



LEGEND

Major Road

Minor Road

Waterbody

Survey area

Priority 1

Priority 2

Priority 3

Priority 4

Paper Size A3

0 2 4 6

Kilometres

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

N

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number 61-35152
Revision 0
Date 10 Feb 2017

Locality

Figure 1

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999 Hay Street, Perth WA 6000 Australia T 61 8 6222 8555 F 61 8 6222 8555 E permail@ghd.com.au W www.ghd.com.au

Data source: Landgate: Roads - 20161025 Imagery (Virtual Mosaic); GHD: Survey Area - 20161006; Geoscience Australia: GeoData Topo Series III. Created by:afeeney

HARRIS RIVER
ERNEST RIVER
Harris River State Forest
Lane Poole Reserve
STINKWOODS BROOK
BINGHAM RIVER
HANSON BROOK
1205/328
HAMILTON RIVER
IRONSTONE GULLY
WILLIAMS COLLIE ROAD
POLLARD BROOK
Muja State Forest
ALLANSON
SILVER WATTLE GULLY
COLLIE
COLLIE RIVER
Westralia Conservation Park
COALFIELDS ROAD
COLLIE RIVER SOUTH
Collie State Forest
COLLIE PRESTON ROAD
Mumballup State Forest
Muja Conservation Park

LEGEND

- Major Road
- Minor Road
- Watercourse
- Waterbody
- Environmentally Sensitive Area

Survey area

- Priority 1
- Priority 2
- Priority 3
- Priority 4

DPaw Managed Lands

- 5(1)(g) Reserve
- CALM Exec Body Freehold
- Conservation Park
- State Forest
- National Park

Paper Size A3

0 1 2 3 4 5

Kilometres

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

N

GHD

SLIP

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number 61-35152
Revision 0
Date 10 Feb 2017

Environmental Constraints

Figure 2

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999 Hay Street, Perth WA 6000 Australia T 61 8 6222 8555 F 61 8 6222 8555 E permail@ghd.com.au W www.ghd.com.au

Data source: Landgate: Watercourse, Waterbody, Roads - 20161025, Imagery (Virtual Mosaic); GHD: Survey Area - 201610; DPaW: Managed Lands - 201603; DER: ESA - 201603; : Site Boundary - 20161006; Geoscience Australia: GeoData Topo Series III. Created by:afeeney

Paper Size A3

0 100 200 300 400 500

Metres

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

N

LEGEND

Significant Flora - GHD Records (Labelled with approx. individuals present)

Grevillea rara- Endangered flora (GHD Survey / DPaW)

Synaphea- Priority 3 Flora (GHD Survey)

Survey Area

Priority 1

Priority 2

Priority 3

Priority 4

Vegetation Type

1, *Eucalyptus marginata/ Corymbia calophylla* forest regrowth

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
Revision	0
Date	10 Feb 2017

Vegetation Association

Figure 3

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Data source: GHD: Vegetation Association, Significant Flora - 20170130, Survey Area - 201610; Landgate: Imagery (Virtual Mosaic), Roads - 20161025. Created by:afeeney

999 Hay Street, Perth WA 6000 Australia **T** 61 8 6222 8555 **F** 61 8 6222 8555 **E** permail@ghd.com.au **W** www.ghd.com.au

418,000 419,000 420,000 421,000

6,319,000

6,318,000

Cooley Rd

Collie-Tallanalla Rd

Harris River Rd

50

> 50

> 100

15

> 30

Scar Rd

Saxa Rd

Paper Size A3

0 100 200 300 400 500

Metres

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

N

LEGEND

Significant Flora - GHD Records (Labelled with approx. individuals present)

Grevillea rara- Endangered flora (GHD Survey / DPaW)

Synaphea- Priority 3 Flora (GHD Survey)

Survey Area

Priority 1

Priority 2

Priority 3

Priority 4

Vegetation Type

1, *Eucalyptus marginata/ Corymbia calophylla* forest regrowth

HD, Highly disturbed

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Vegetation Association

Job Number	61 - 35152
Revision	0
Date	10 Feb 2017

Figure 3

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Data source: GHD: Vegetation Association, Significant Flora - 20170130, Survey Area - 201610; Landgate: Imagery (Virtual Mosaic), Roads - 20161025. Created by:afeeney

999 Hay Street, Perth WA 6000 Australia **T** 61 8 6222 8555 **F** 61 8 6222 8555 **E** permail@ghd.com.au **W** www.ghd.com.au

421,000 422,000 423,000 424,000

6,317,000

6,316,000

Harris River Rd

421,000 422,000 423,000 424,000

Paper Size A3

0 100 200 300 400 500

Metres

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

N

LEGEND

Significant Flora - GHD Records (Labelled with approx. individuals present)

Grevillea rara- *Endangered flora* (GHD Survey / DPaW)

Synaphea- Priority 3 Flora (GHD Survey)

Survey Area

Priority 1

Priority 2

Priority 3

Priority 4

Vegetation Type

1, *Eucalyptus marginata/ Corymbia calophylla* forest regrowth

3, *Eucalyptus rudis / Melaleuca* low forest / shrubland

HD, Highly disturbed

GHD

SLIP

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number 61 - 35152
Revision 0
Date 10 Feb 2017

Vegetation Association

Figure 3

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Data source: GHD: Vegetation Association, Significant Flora - 20170130, Survey Area - 201610; Landgate: Imagery (Virtual Mosaic), Roads - 20161025. Created by:afeeney

999 Hay Street, Perth WA 6000 Australia **T** 61 8 6222 8555 **F** 61 8 6222 8555 **E** permail@ghd.com.au **W** www.ghd.com.au

423,000 424,000 425,000 426,000

6,315,000

6,314,000

Roney Rd

Collie-Williams Rd

Paper Size A3

0 100 200 300 400 500

Metres

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

N

LEGEND

Significant Flora - GHD Records (Labelled with approx. individuals present)

Grevillea rara- Endangered flora (GHD Survey / DPaW)

Synaphea- Priority 3 Flora (GHD Survey)

Survey Area

Priority 1

Priority 2

Priority 3

Priority 4

Vegetation Type

1, *Eucalyptus marginata/ Corymbia calophylla* forest regrowth

3, *Eucalyptus rudis / Melaleuca* low forest / shrubland

HD, Highly disturbed

GHD

SLIP

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
Revision	0
Date	10 Feb 2017

Vegetation Association

Figure 3

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Data source: GHD: Vegetation Association, Significant Flora - 20170130, Survey Area - 201610; Landgate: Imagery (Virtual Mosaic), Roads - 20161025. Created by:afeeney

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Paper Size A3

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Metres

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

N

LEGEND

Significant Flora - GHD Records (Labelled with approx. individuals present)

Grevillea rara-Endangered flora (GHD Survey / DPaW)

Synaphea- Priority 3 Flora (GHD Survey)

Survey Area

Priority 1

Priority 2

Priority 3

Priority 4

Vegetation Type

1, *Eucalyptus marginata/ Corymbia calophylla* forest regrowth

3, *Eucalyptus rudis / Melaleuca* low forest / shrubland

6, Scattered natives

HD, Highly disturbed

GHD

SLIP

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number 61 - 35152
Revision 0
Date 10 Feb 2017

Vegetation Association

Figure 3

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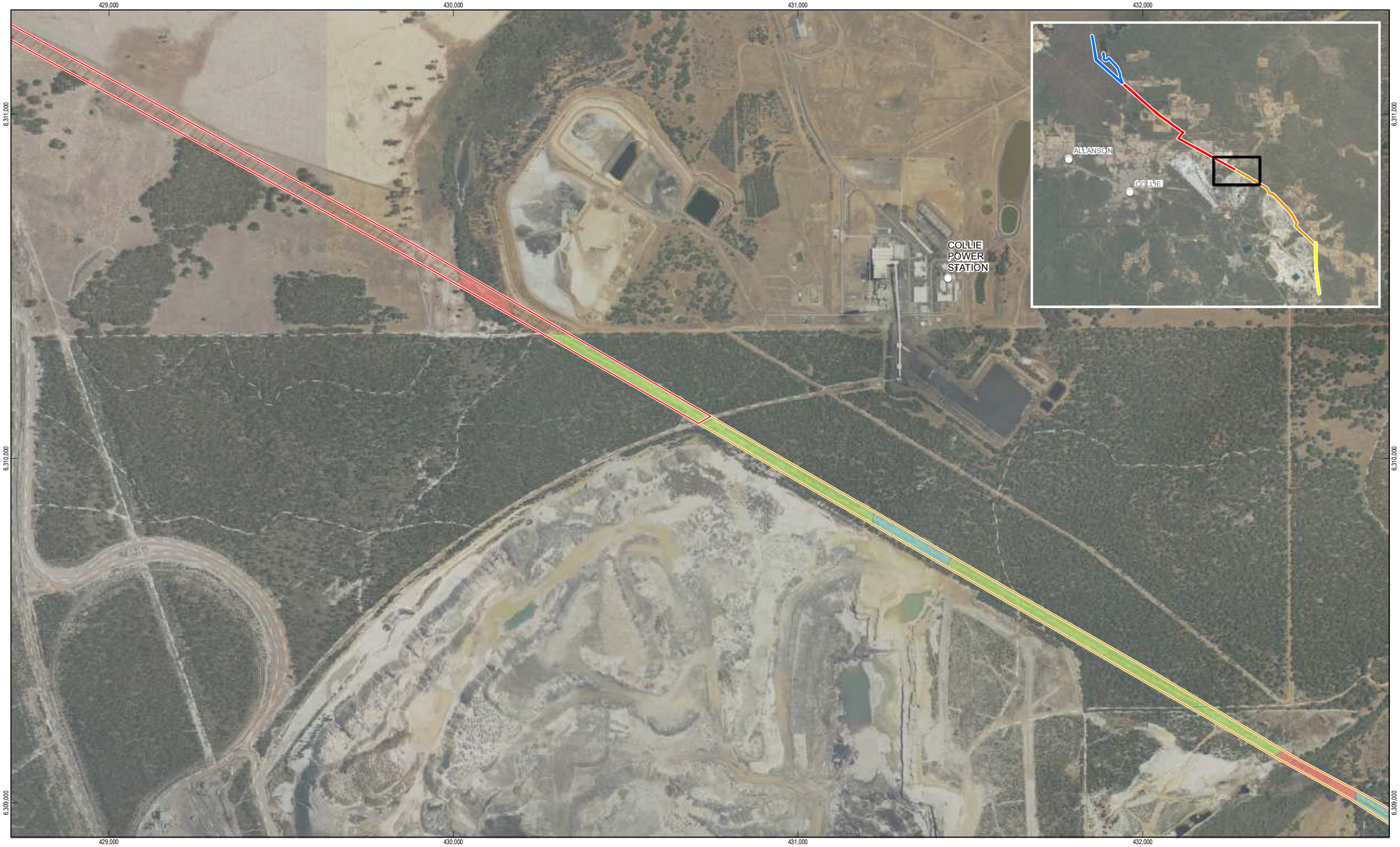

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Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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LEGEND

Significant Flora - GHD Records (Labelled with approx. individuals present)

Grevillea rara-Endangered flora (GHD Survey / DPaW)

Synaphea- Priority 3 Flora (GHD Survey)

Survey Area

Priority 1

Priority 2

Priority 3

Priority 4

Vegetation Type

1, *Eucalyptus marginata/ Corymbia calophylla* forest regrowth

3, *Eucalyptus rudis / Melaleuca* low forest / shrubland

5, *Kunzea* tall shrubland

HD, Highly disturbed

GHD

SLIP

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
Revision	0
Date	10 Feb 2017

Vegetation Association

Figure 3

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433,000 434,000 435,000 436,000

6,309,000 6,308,000 6,307,000

Shotts River Rd

Quinns Rd

Coalfields Rd

100

ALLANSON

COLLIE

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Paper Size A3

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

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LEGEND

Significant Flora - GHD Records (Labelled with approx. individuals present)

Grevillea rara- Endangered flora (GHD Survey / DPaW)

Synaphea- Priority 3 Flora (GHD Survey)

Survey Area

Priority 1

Priority 2

Priority 3

Priority 4

GHD

SLIP

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
Revision	0
Date	10 Feb 2017

Vegetation Association

Figure 3

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
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LEGEND

Significant Flora - GHD Records (Labelled with approx. individuals present)

Grevillea rara-Endangered flora (GHD Survey / DPaW)

Synaphea- Priority 3 Flora (GHD Survey)

Survey Area

Priority 1

Priority 2

Priority 3

Priority 4

Vegetation Type

2, *Eucalyptus marginata* open forest

6 / 2, *Eucalyptus marginata* open forest with scattered natives

7, Plantation

HD, Highly disturbed

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
Revision	0
Date	10 Feb 2017

Vegetation Association

Figure 3

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Map Projection: Transverse Mercator
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LEGEND

Significant Flora - GHD Records (Labelled with approx. individuals present)

Grevillea rara- *Endangered flora* (GHD Survey / DPaW)

Synaphea- Priority 3 Flora (GHD Survey)

Survey Area

Priority 1

Priority 2

Priority 3

Priority 4

Vegetation Type

6 / 2, *Eucalyptus marginata* open forest with scattered natives

6, Scattered natives

HD, Highly disturbed

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number 61 - 35152
Revision 0
Date 10 Feb 2017

Vegetation Association

Figure 3

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Centaur Rd

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ALLANSON

COLLIE

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

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LEGEND

DPaW Records (Priority labelled)
- Threatened species
- Priority 2: Poorly-known species
- Priority 3: Poorly-known species

Significant Flora - GHD Records (Labelled with approx. individuals present)
- *Grevillea rara*- *Endangered flora* (GHD Survey / DPaW)
- *Synaphea- Priority 3 Flora* (GHD Survey)

Survey Area
- Priority 1
- Priority 2
- Priority 3
- Priority 4

Vegetation Type
- 2, *Eucalyptus marginata* open forest
- 3, *Eucalyptus rudis / Melaleuca* low forest / shrubland
- 4, Mixed shrubland
- 6, Scattered natives

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number 61 - 35152
Revision 0
Date 10 Feb 2017

Vegetation Association

Figure 3

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Metres

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

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LEGEND

- Priority 2: Poorly-known species
- Priority 3: Poorly-known species

Significant Flora - GHD Records (Labelled with approx. individuals present)

- *Grevillea rara*- *Endangered flora* (GHD Survey / DPaW)
- *Synaphea- Priority 3 Flora* (GHD Survey)

Survey Area

- Priority 1
- Priority 2
- Priority 3
- Priority 4

Vegetation Type

- 3, *Eucalyptus rudis* / *Melaleuca* low forest / shrubland
- 4, Mixed shrubland

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
Revision	0
Date	10 Feb 2017

Vegetation Association

Figure 3

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0 100 200 300 400 500

Metres

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

N

LEGEND

Main Road
Minor Road
Track

Survey area

Priority 1
Priority 2
Priority 3
Priority 4

Vegetation Condition

2. Excellent
2-3. Excellent - Very Good
3. Very good
3-4. Very good - Good
4. Good
4-6. Good - Degraded
6. Degraded
6-7. Degraded - Completely degraded
7. Completely degraded

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
Revision	0
Date	10 Feb 2017

Vegetation Condition

Figure 4

G:\61\35152\GIS\Maps\MXD\Environmental\6135152_004_Rev0_Fig4VegCond.mxd

Data source: GHD: Vegetation Condition - 20170130, Survey Area; Landgate: Imagery (Virtual Mosaic), Roads - 20170201. Created by:afeeney

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418,000 419,000 420,000 421,000

6,319,000

6,318,000

Cooley Rd

Collie-Tallanalla Rd

Harris River Rd

Scar Rd

Saxa Rd

ALLANSON

COLLIE

6 4 3 6 3 6 7

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Metres

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

N

LEGEND

Main Road
Minor Road
Track

Survey area
Priority 1
Priority 2
Priority 3
Priority 4

Vegetation Condition
2. Excellent
2-3. Excellent - Very Good
3. Very good
3-4. Very good - Good
4. Good
4-6. Good - Degraded
6. Degraded
6-7. Degraded - Completely degraded
7. Completely degraded

GHD

SLIP

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number 61 - 35152
Revision 0
Date 10 Feb 2017

Vegetation Condition

Figure 4

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421,000 422,000 423,000 424,000

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ALLANSON

COLLIE

Harris River Rd

Paper Size A3

0 100 200 300 400 500

Metres

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

N

LEGEND

Main Road
Minor Road
Track

Survey area

Priority 1
Priority 2
Priority 3
Priority 4

Vegetation Condition

2. Excellent
2-3. Excellent - Very Good
3. Very good
3-4. Very good - Good
4. Good
4-6. Good - Degraded
6. Degraded
6-7. Degraded - Completely degraded
7. Completely degraded

GHD

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Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
Revision	0
Date	10 Feb 2017

Vegetation Condition

Figure 4

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Data source: GHD: Vegetation Condition - 20170130, Survey Area; Landgate: Imagery (Virtual Mosaic), Roads - 20170201. Created by:afeeney

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423,000 424,000 425,000 426,000

6,315,000

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7
4
7
Roney Rd
4
Collie-Williams Rd
6
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6
6

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Paper Size A3

0 100 200 300 400 500

Metres

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

N

LEGEND

Main Road
Minor Road
Track

Survey area
Priority 1
Priority 2
Priority 3
Priority 4

Vegetation Condition
2. Excellent
2-3. Excellent - Very Good
3. Very good
3-4. Very good - Good
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4-6. Good - Degraded
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GHD

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Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
Revision	0
Date	10 Feb 2017

Vegetation Condition

Figure 4

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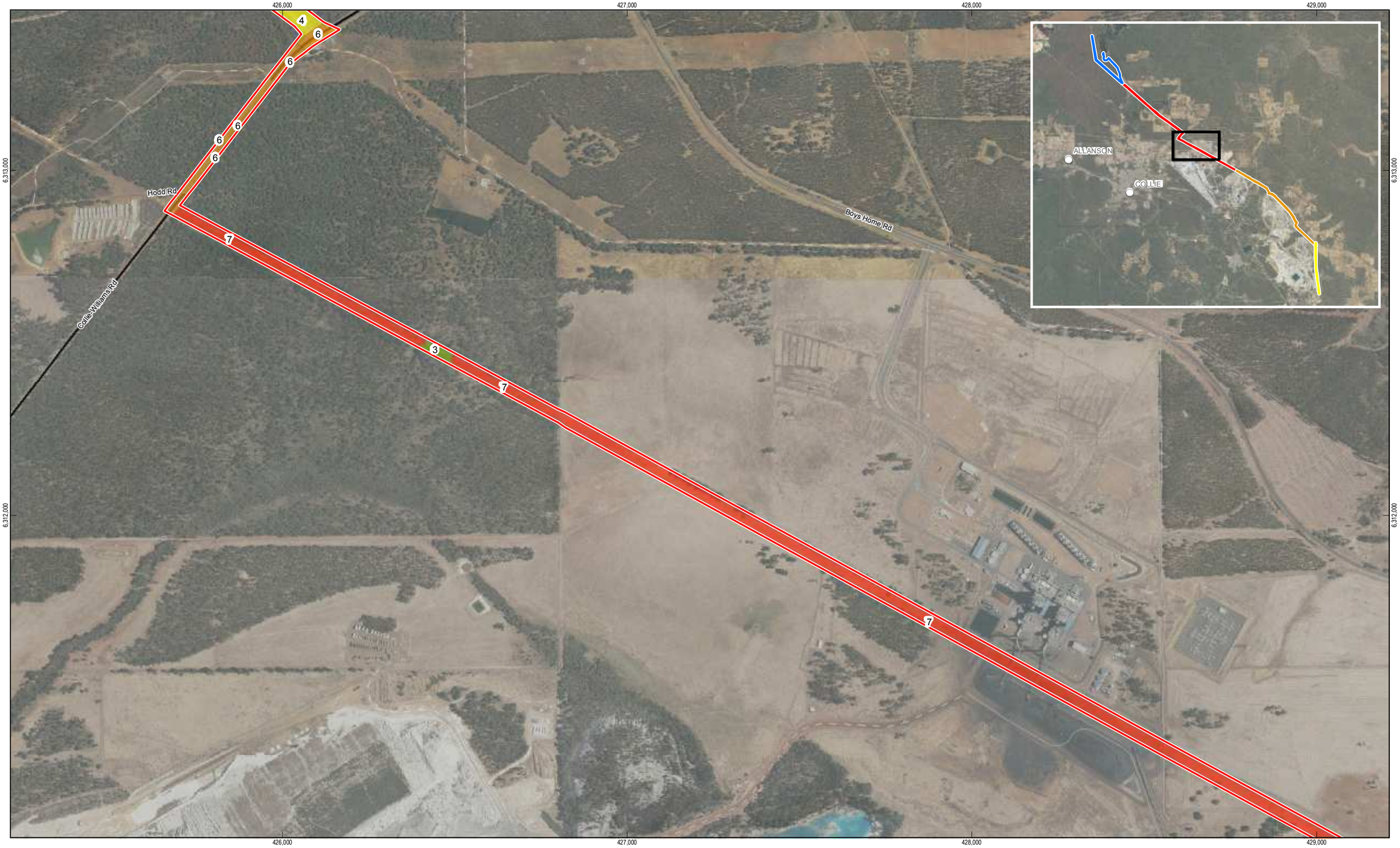

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Metres

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

N

LEGEND

Main Road
Minor Road
Track

Survey area

Priority 1
Priority 2
Priority 3
Priority 4

Vegetation Condition

2. Excellent
2-3. Excellent - Very Good
3. Very good
3-4. Very good - Good
4. Good
4-6. Good - Degraded
6. Degraded
6-7. Degraded - Completely degraded
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GHD

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Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number 61 - 35152
Revision 0
Date 10 Feb 2017

Vegetation Condition

Figure 4

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Metres

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

N

LEGEND

Main Road
Minor Road
Track

Survey area

Priority 1
Priority 2
Priority 3
Priority 4

Vegetation Condition

2. Excellent
2-3. Excellent - Very Good
3. Very good
3-4. Very good - Good
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4-6. Good - Degraded
6. Degraded
6-7. Degraded - Completely degraded
7. Completely degraded

GHD

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Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
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Date	10 Feb 2017

Vegetation Condition

Figure 4

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

N

LEGEND

Main Road
Minor Road
Track

Survey area
Priority 1
Priority 2
Priority 3
Priority 4

Vegetation Condition
2. Excellent
2-3. Excellent - Very Good
3. Very good
3-4. Very good - Good
4. Good
4-6. Good - Degraded
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7. Completely degraded

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
Revision	0
Date	10 Feb 2017

Vegetation Condition

Figure 4

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

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LEGEND

Main Road
Minor Road
Track

Survey area

Priority 1
Priority 2
Priority 3
Priority 4

Vegetation Condition

2. Excellent
2-3. Excellent - Very Good
3. Very good
3-4. Very good - Good
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4-6. Good - Degraded
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GHD

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Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number 61 - 35152
Revision 0
Date 10 Feb 2017

Vegetation Condition

Figure 4

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4-6 4-6 4-6 7 6 7 7 6 2 2

Shotts River Rd

Centaur Rd

Griggs Rd

Coalfields Rd

BUCKINGHAM

MUJA

ALLANSON

COLLIE

436,000 437,000 438,000 439,000

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

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LEGEND

Main Road
Minor Road
Track

Survey area

Priority 1
Priority 2
Priority 3
Priority 4

Vegetation Condition

2. Excellent
2-3. Excellent - Very Good
3. Very good
3-4. Very good - Good
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4-6. Good - Degraded
6. Degraded
6-7. Degraded - Completely degraded
7. Completely degraded

GHD

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Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
Revision	0
Date	10 Feb 2017

Vegetation Condition

Figure 4

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

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LEGEND

Main Road
Minor Road
Track

Survey area
Priority 1
Priority 2
Priority 3
Priority 4

Vegetation Condition
2. Excellent
2-3. Excellent - Very Good
3. Very good
3-4. Very good - Good
4. Good
4-6. Good - Degraded
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Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
Revision	0
Date	10 Feb 2017

Vegetation Condition

Figure 4

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999 Hay Street, Perth WA 6000 Australia **T** 61 8 6222 8555 **F** 61 8 6222 8555 **E** permail@ghd.com.au **W** www.ghd.com.au

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Centaur Rd

ALLANSON

COLLIE

Paper Size A3

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

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LEGEND

Main Road
Minor Road
Track

Survey area

Priority 1
Priority 2
Priority 3
Priority 4

Vegetation Condition

2. Excellent
2-3. Excellent - Very Good
3. Very good
3-4. Very good - Good
4. Good
4-6. Good - Degraded
6. Degraded
6-7. Degraded - Completely degraded
7. Completely degraded

GHD

SLIP

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
Revision	0
Date	10 Feb 2017

Vegetation Condition

Figure 4

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Metres

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

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LEGEND

Main Road
Minor Road
Track

Survey area

Priority 1
Priority 2
Priority 3
Priority 4

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
Revision	0
Date	10 Feb 2017

Fauna Observations

Figure 5

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Data source: GHD: Fauna observations - 20170201, Survey Area, Landgate: Imagery (Virtual Mosaic), Roads - 20170201. Created by:afeeney

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Cooley Rd

Collie-Tallanalla Rd

Harris River Rd

Scar Rd

Saxa Rd

ALLANSON

COLLIE

Roosting Site

- Carnaby's Black Cockatoo *(Calyptorhynchus latirostris)* roost site

Fauna Observation

- Baudin's Black Cockatoo *(Calyptorhynchus baudinii)*
- Forest Red-tailed Black Cockatoo *(Calyptorhynchus banksii naso)*
- Potential Chuditch *(Dasyurus geoffroii)* Scats
- Southern Brown Bandicoot *(Isoodon obesulus)* digs
- Western Brush Wallaby *(Macropus irma)*

Black Cockatoo feeding evidence

- Baudin's Black Cockatoo feeding evidence on Marri
- Carnaby's Black Cockatoo feeding evidence on Marri
- Forest Red-tailed Black Cockatoo feeding evidence on Jarrah
- Forest Red-tailed Black Cockatoo feeding evidence on Marri

Paper Size A3

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Metres

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

N

LEGEND

Main Road
Minor Road
Track

Survey area

Priority 1
Priority 2
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Priority 4

Collie Water
Wellington Myalup Water for Food Feasibilty Study

Job Number	61 - 35152
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Fauna Observations

Figure 5

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Data source: GHD: Fauna observations - 20170201, Survey Area, Landgate: Imagery (Virtual Mosaic), Roads - 20170201. Created by:afeeney

999 Hay Street, Perth WA 6000 Australia **T** 61 8 6222 8555 **F** 61 8 6222 8555 **E** permail@ghd.com.au **W** www.ghd.com.au

421,000 422,000 423,000 424,000

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Harris River Rd

ALLANSON

COLLIE

Roosting Site

- Carnaby's Black Cockatoo *(Calyptorhynchus latirostris)* roost site

Fauna Observation

- Baudin's Black Cockatoo *(Calyptorhynchus baudinii)*
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Map Projection: Transverse Mercator
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Survey area

Priority 1
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Collie Water
Wellington Myalup Water for Food Feasibilty Study

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Fauna Observations

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ALLANSON

COLLIE

Roney Rd

Collie-Williams Rd

Roosting Site

- Carnaby's Black Cockatoo *(Calyptorhynchus latirostris)* roost site

Fauna Observation

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Survey area

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Collie Water
Wellington Myalup Water for Food Feasibilty Study

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Collie Water
Wellington Myalup Water for Food Feasibilty Study

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Collie Water
Wellington Myalup Water for Food Feasibilty Study

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Fauna Observations

Figure 5

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Main Road
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Survey area

Priority 1
Priority 2
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Collie Water
Wellington Myalup Water for Food Feasibilty Study

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Shotts River Rd

Coalfields Rd

BUCKINGHAM

Centaur Rd

Griggs Rd

MUJA

ALLANSON

COLLIE

Roosting Site

- Carnaby's Black Cockatoo *(Calyptorhynchus latirostris)* roost site

Fauna Observation

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Horizontal Datum: GDA 1994
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Main Road
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Survey area

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Priority 4

Collie Water
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Centaur Rd

ALLANSON

COLLIE

Roosting Site

- Carnaby's Black Cockatoo *(Calyptorhynchus latirostris)* roost site

Fauna Observation

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Collie Water
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Centaur Rd

ALLANSON

COLLIE

Roosting Site

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Fauna Observation

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Collie Water
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Appendix B – Relevant legislation, conservation codes and background information

Relevant legislation

Federal *Environment Protection and Biodiversity Conservation Act 1999*

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

The biological aspects listed as MNES include:

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

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

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

State *Environmental Protection Act 1986*

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

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

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

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

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

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

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

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

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

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

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

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

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

State *Biodiversity and Conservation Act 2016*

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

Several parts of the BC Act were proclaimed by the State Governor in the Government Gazette and came into effect on 3 December 2016. However, provisions that replace those existing under the WC Act and Sandalwood Act (including threatened species listings and controls over the taking and keeping of native species) and their associated Regulations cannot be brought into effect until the necessary Biodiversity Conservation Regulations have been made. It is hoped the new Regulations will be completed and ready to commence by late 2017.

State *Wildlife Conservation Act 1950*

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

State *Biosecurity and Agriculture Management Act 2007*

The *Biosecurity and Agriculture Management Act 2007* (BAM Act) and associated regulations are administered by the Department of Agriculture and Food Western Australia (DAFWA) and replace the repealed *Agriculture and Related Resources Protection Act 1976.* The main purposes of the BAM Act and its regulations are to:

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

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

DAFWA Categories for Declared Pests under the BAM Act

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

Background information

Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are declared by the Minister for Environment under Section 51B of the EP Act. The Table below outlines the aspects of areas declared as ESA in the Environmental Protection (Environmentally Sensitive Areas) Notice 2005.

Aspects of ESAs

Aspects of Environmentally Sensitive Areas
A declared World Heritage property as defined in Section 13 of the EPBC Act.
An area that is included on the Register of the National Estate (RNE), because of its natural values, under the *Australian Heritage Commission Act 1975* 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. Defined wetlands include Ramsar wetlands, conservation category wetlands and nationally important wetlands.
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 Threatened Ecological Community.
A Bush Forever Site listed in "Bush Forever" Volumes 1 and 2 (2000), published by the Western Australia Planning Commission, except to the extent to which the site is approved to be developed by the Western Australia Planning Commission.
The areas covered by the *Environmental Protection (Gnangara Mound Crown Land) Policy 1992*.
The areas covered by the *Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002*.
The areas covered by the lakes to which the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* (EPP Lakes) applies.
Protected wetlands as defined in the *Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998*.

Reserves and conservation areas

Bush Forever

Bush Forever, which was released in December 2000 and proclaimed in 2010, is a Government initiate 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 (GoWA) 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” (DotEE 2017b). 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” (DotEE 2017b).

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 (DotEE 2017a):

- 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).

The extent of remnant native vegetation in WA has been assessed by Shepherd et al. (2002) and the GoWA (2015), based on broadscale vegetation association mapping by Beard (various publications). The GoWA produces Statewide Vegetation Statistics Reports that are used for a number of purposes including conservation planning, land use planning and when assessing development applications. The reports are updated at least every two years.

Within the Swan Coastal Plain, EPA Position Statement No. 9 (EPA 2006) identifies vegetation complexes with 30 percent or less or 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.

Vegetation condition

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

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

Condition	South West and Interzone Botanical Provinces description
Pristine	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

Condition	South West and Interzone Botanical Provinces description
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
Completely Degraded	The structure of vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Vegetation condition rating scale for the Eremaean and Northern Botanical Provinces

Condition	Eremaean and Northern Botanical Provinces description
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds..
Degraded	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

Conservation codes

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

Ecological communities

Conservation significant communities

Ecological communities are defined as naturally occurring biological assemblages that occur in a particular type of habitat (English and Blyth 1997). Federally listed Threatened Ecological Communities (TECs) are protected under the EPBC Act. The 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 TECs 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, however, may be listed as TECs under the EPBC Act.

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

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

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

Conservation categories and definitions for PECS as listed by the DPaW

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

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

Other significant vegetation

Vegetation may be significant for a range of reasons other than a statutory listing. The EPA and DPaW (2015) states that significant vegetation may include vegetation that includes the following:

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

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

Flora and fauna

Conservation significant flora and fauna

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

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

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

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

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

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

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

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

Conservation category	Definition
Extinct	There is no reasonable doubt that the last member of the species has died.
Extinct in the Wild	A) A species known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or B) A species that has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered	A species facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000).
Endangered	A) A species not critically endangered; and B) A species facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.

Conservation category	Definition
Vulnerable	A) A species not critically endangered or endangered; and B) A species facing a high risk of extinction in the wild in the medium-term, as determined in accordance with the prescribed criteria.
Conservation Dependent	A) The species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or B) The following subparagraphs are satisfied: (i) the species is a species of fish; (ii) the species is the focus of a plan of management that Section 180 provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; (iv) cessation of the plan of management would adversely affect the conservation status of the species.

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

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

Conservation codes for DPaW listed Priority flora and fauna

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

Other significant flora

Flora species, subspecies, varieties, hybrids and ecotypes may be significant for a range of reasons, other than a statutory listing. The EPA and DPaW (2015) states that significant flora may include taxa that have:

- A keystone role in a particular habitat for threatened or Priority flora or fauna species, or large populations representing a considerable proportion of the local or regional total population of a species
- Relictual status, being representation of taxonomic or physiognomic groups that no longer occur widely in the broader landscape
- Anomalous features that indicate a potential new discovery

- Being representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
- The presence of restricted subspecies, varieties, or naturally occurring hybrids
- Local endemism (a restricted distribution) or association with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems)
- Being poorly reserved

Other significant fauna

Fauna species may be significant for a range of reasons other than those protected by international agreement or treaty, Specially Protected or Priority Fauna. Significant fauna may include short-range endemic species, species that have declining populations or declining distributions, species at the extremes of their range, or isolated outlying populations, or species which may be undescribed (EPA 2016).

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.

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Appendix C – Desktop searches

EPBC Act PMST Report (20 km buffer)

NatureMap Flora Report (20 km buffer)

NatureMap Fauna Report (20 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.

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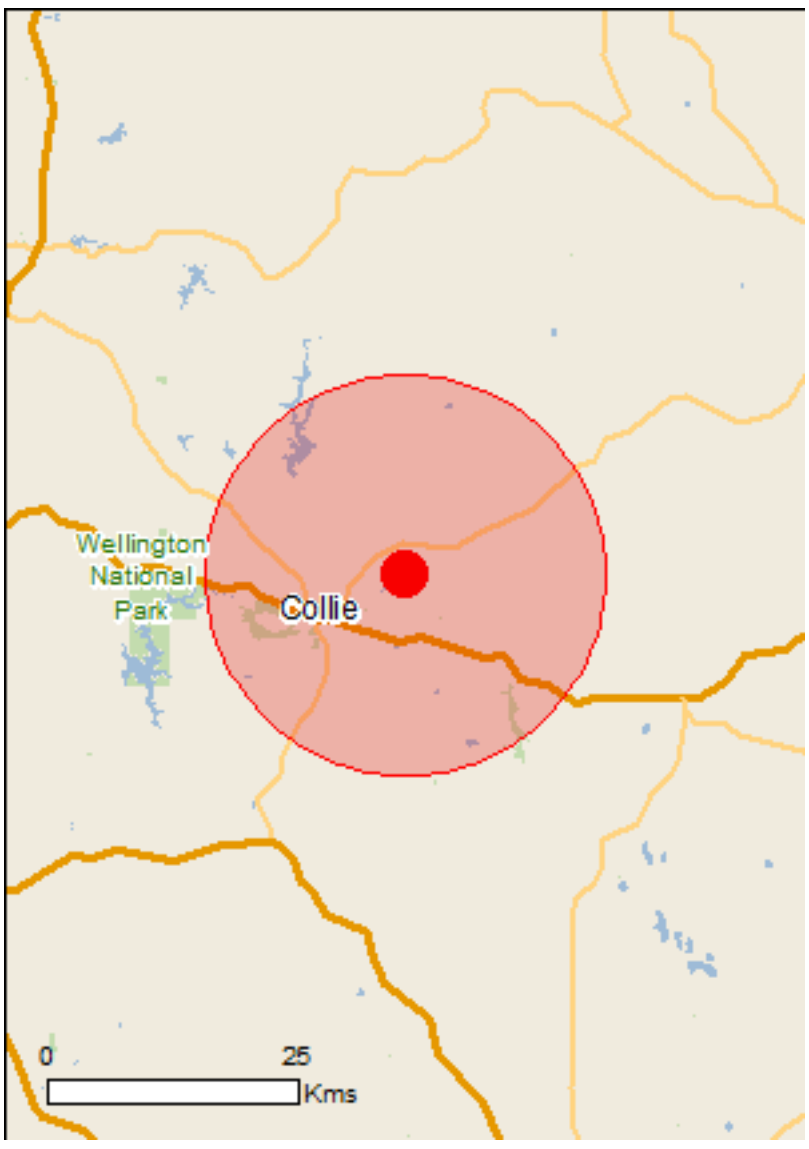
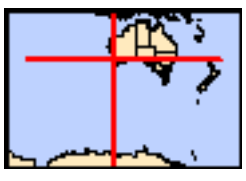


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

Buffer: 20.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	19
Listed Migratory Species:	5

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:	10
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:	6
Regional Forest Agreements:	1
Invasive Species:	19
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

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
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-Cockatoo [769]	Vulnerable	Breeding known to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Fish		
Nannatherina balstoni Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat may occur within area
Mammals		
Bettongia penicillata Brush-tailed Bettong, Woylie [213]	Endangered	Species or species habitat known to occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
Myrmecobius fasciatus Numbat [294]	Vulnerable	Translocated population known to occur within area
Phascogale calura Red-tailed Phascogale, Red-tailed Wambenger, Kenngoor [316]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
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 known to occur within area
Plants		
Caladenia lodgeana		
Lodge's Spider-orchid [68664]	Critically Endangered	Species or species habitat known to occur within area
Commersonia erythrogyna		
Trigwell's Rulingia [86397]	Endangered	Species or species habitat likely to occur within area
Diuris micrantha		
Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat known to occur within area
Grevillea rara		
Rare Grevillea [64911]	Endangered	Species or species habitat likely to occur within area
Jacksonia velveta		
Collie Jacksonia [82671]	Endangered	Species or species habitat likely to 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		
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		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]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Lane Poole Reserve	WA
Unnamed WA47688	WA
Wellington	WA
Westralia	WA
Wyvern Road	WA
Yallatup	WA

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	Western Australia

Invasive Species [Resource Information]

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

Name	Status	Type of Presence
Birds		
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
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Mammals		
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

Name	Status	Type of Presence
		habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		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

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-33.32726 116.23447

Acknowledgements

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

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

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

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

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NatureMap Species Report

Created By Guest user on 16/01/2017

Kingdom Plantae
Current Names Only Yes
Core Datasets Only Yes
Species Group Vascular Plants
Method 'By Circle'
Centre 116° 14' 14" E,33° 21' 25" S
Buffer 20km
Group By Family

Family	Species	Records
Amaranthaceae	4	5
Anarthriaceae	1	8
Apiaceae	11	34
Apocynaceae	1	1
Araliaceae	3	12
Asparagaceae	32	75
Asteraceae	42	91
Campanulaceae	9	12
Caprifoliaceae	3	4
Casuarinaceae	4	8
Celastraceae	3	7
Centrolepidaceae	4	7
Colchicaceae	2	6
Crassulaceae	2	2
Cupressaceae	1	1
Cyperaceae	23	50
Dasypogonaceae	2	2
Dennstaedtiaceae	1	3
Dilleniaceae	21	90
Droseraceae	12	25
Elaeocarpaceae	5	24
Ericaceae	25	95
Euphorbiaceae	5	10
Fabaceae	89	329
Gentianaceae	1	1
Geraniaceae	3	3
Goodeniaceae	18	59
Haemodoraceae	16	48
Haloragaceae	10	19
Hemerocallidaceae	9	19
Hydrocharitaceae	1	1
Hypericaceae	1	3
Iridaceae	8	10
Juncaceae	8	14
Juncaginaceae	2	2
Lamiaceae	7	20
Lauraceae	3	4
Lentibulariaceae	1	1
Loganiaceae	4	11
Loranthaceae	1	2
Lythraceae	1	1
Malvaceae	6	20
Marsileaceae	1	1
Menyanthaceae	2	4
Myrtaceae	61	160
Olacaceae	1	3
Onagraceae	3	3
Orchidaceae	52	122
Orobanchaceae	3	3
Oxalidaceae	1	1
Phyllanthaceae	3	12
Phytolaccaceae	1	1
Pittosporaceae	4	13
Plantaginaceae	2	3
Poaceae	25	31
Polygalaceae	4	9
Polygonaceae	3	5
Portulacaceae	1	2
Proteaceae	57	224
Pteridaceae	1	2
Ranunculaceae	1	2
Restionaceae	15	38
Rhamnaceae	5	15
Rosaceae	3	8
Rubiaceae	5	13
Rutaceae	16	43
Santalaceae	1	7
Sapindaceae	1	1
Stylidiaceae	27	58
Thymelaeaceae	5	11
Typhaceae	1	1
Violaceae	2	3
Xanthorrhoeaceae	3	10
Zamiaceae	1	7

TOTAL	**716**	**1955**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Amaranthaceae					
1.	2648	*Alternanthera denticulata (Lesser Joyweed)*			
2.	2652	*Alternanthera nodiflora (Common Joyweed)*			
3.	41506	*Ptilotus gaudichaudii subsp. gaudichaudii*			
4.	2742	*Ptilotus manglesii (Pom Poms, Mulamula)*			
Anarthriaceae					
5.	18049	*Lyginia imberbis*			
Apiaceae					
6.	6203	*Actinotus glomeratus*			
7.	12040	*Apium prostratum var. prostratum (Sea Celery)*			
8.	6218	*Daucus glochidiatus (Australian Carrot)*			
9.	41803	*Eryngium sp. Ferox (G.J. Keighery 16034)*		P3	
10.	6222	*Homalosciadium homalocarpum*			
11.	6246	*Pentapeltis silvatica (Southern Pentapeltis)*			
12.	6283	*Xanthosia atkinsoniana*			
13.	6284	*Xanthosia candida*			
14.	6285	*Xanthosia ciliata*			
15.	6289	*Xanthosia huegelii*			
16.	6293	*Xanthosia singuliflora*			
Apocynaceae					
17.	6587	*Gomphocarpus fruticosus (Narrowleaf Cottonbush)*	Y		
Araliaceae					
18.	6223	*Hydrocotyle alata*			
19.	6226	*Hydrocotyle callicarpa (Small Pennywort)*			
20.	6280	*Trachymene pilosa (Native Parsnip)*			
Asparagaceae					
21.	1280	*Chamaescilla corymbosa (Blue Squill)*			
22.	11299	*Chamaescilla corymbosa var. corymbosa*			
23.	1304	*Laxmannia minor*			
24.	11911	*Laxmannia ramosa subsp. ramosa*			
25.	1308	*Laxmannia sessiliflora (Nodding Lily)*			
26.	11464	*Laxmannia sessiliflora subsp. australis*			
27.	1309	*Laxmannia squarrosa*			
28.	1223	*Lomandra caespitosa (Tufted Mat Rush)*			
29.	1225	*Lomandra drummondii*			
30.	1229	*Lomandra integra*			
31.	1232	*Lomandra micrantha (Small-flower Mat-rush)*			
32.	14542	*Lomandra micrantha subsp. micrantha*			
33.	1234	*Lomandra nigricans*			
34.	1236	*Lomandra odora (Tiered Matrush)*			
35.	1239	*Lomandra preissii*			
36.	1240	*Lomandra purpurea (Purple Mat Rush)*			
37.	1243	*Lomandra sericea (Silky Mat Rush)*			
38.	1244	*Lomandra sonderi*			
39.		*Lomandra sp.*			
40.	1245	*Lomandra spartea*			
41.	1246	*Lomandra suaveolens*			
42.	33298	*Lomandra whicherensis*		P3	
43.	1312	*Sowerbaea laxiflora (Purple Tassels)*			
44.	1328	*Thysanotus dichotomus (Branching Fringe Lily)*			
45.	1338	*Thysanotus manglesianus (Fringed Lily)*			
46.	1339	*Thysanotus multiflorus (Many-flowered Fringe Lily)*			
47.	1343	*Thysanotus patersonii*			
48.		*Thysanotus sp.*			
49.	1351	*Thysanotus sparteus*			
50.	1354	*Thysanotus tenellus*			
51.	1357	*Thysanotus thyrsoideus*			
52.	35519	*Thysanotus unicupensis*		P3	
Asteraceae					
53.	8616	*Angianthus platycephalus*			
54.	7838	*Arctotheca calendula (Cape Weed, African Marigold)*	Y		
55.	7856	*Blennospora drummondii*			
56.	7878	*Brachyscome iberidifolia*			
57.	7918	*Centipeda cunninghamii (Common Sneezewood, Gukwonderuk, Old Man Weed)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
58.	7939	*Conyza bonariensis (Flaxleaf Fleabane)*	Y		
59.	7945	*Cotula coronopifolia (Waterbuttons)*	Y		
60.	7946	*Cotula cotuloides (Smooth Cotula)*			
61.	13354	*Craspedia variabilis*			
62.	7961	*Dittrichia graveolens (Stinkwort)*	Y		
63.	20247	*Gamochaeta calviceps*	Y		
64.	29594	*Helichrysum luteoalbum (Jersey Cudweed)*			
65.	12741	*Hyalosperma cotula*			
66.	12742	*Hyalosperma demissum*			
67.	8086	*Hypochaeris glabra (Smooth Catsear)*	Y		
68.	18585	*Lagenophora huegelii*			
69.	8099	*Leontodon saxatilis (Hairy Hawkbit)*	Y		
70.	8106	*Millotia tenuifolia (Soft Millotia)*			
71.	14344	*Millotia tenuifolia var. tenuifolia (Soft Millotia)*			
72.	8127	*Olearia axillaris (Coastal Daisybush)*			
73.	8131	*Olearia ciliata (Fringed Daisy Bush)*			
74.	8143	*Olearia paucidentata (Autumn Scrub Daisy)*			
75.	42260	*Pithocarpa ramosa*			
76.	8175	*Podolepis gracilis (Slender Podolepis)*			
77.	8182	*Podotheca angustifolia (Sticky Longheads)*			
78.	8195	*Quinetia urvillei*			
79.	13300	*Rhodanthe citrina*			
80.	13312	*Rhodanthe pyrethrum*			
81.	8203	*Senecio diaschides*			
82.	8212	*Senecio leucoglossus*		P4	
83.	20663	*Senecio multicaulis subsp. multicaulis*			
84.	8224	*Siloxerus filifolius*			
85.	8225	*Siloxerus humifusus (Procumbent Siloxerus)*			
86.	10920	*Soliva sessilis (Jo-jo, Onehunga Weed)*	Y		
87.	8230	*Sonchus asper (Rough Sowthistle)*	Y		
88.	8231	*Sonchus oleraceus (Common Sowthistle)*	Y		
89.	8248	*Tolpis barbata (Yellow Hawkweed)*	Y		
90.	8251	*Trichocline spathulata (Native Gerbera)*			
91.	38388	*Ursinia anthemoides subsp. anthemoides*	Y		
92.	8257	*Vellereophyton dealbatum (White Cudweed)*	Y		
93.	13333	*Waitzia suaveolens var. suaveolens*			
94.	44861	*Xerochrysum macranthum*			
Campanulaceae					
95.	37500	*Grammatotheca bergiana var. bergiana*	Y		
96.	7396	*Isotoma hypocrateriformis (Woodbridge Poison)*			
97.	9289	*Lobelia anceps (Angled Lobelia)*			
98.	7402	*Lobelia gibbosa (Tall Lobelia)*			
99.	7406	*Lobelia rhombifolia (Tufted Lobelia)*			
100.	37440	*Monopsis debilis var. depressa*	Y		
101.	7388	*Wahlenbergia multicaulis*			
102.	7389	*Wahlenbergia preissii*			
103.		*Wahlenbergia sp.*			
Caprifoliaceae					
104.	7366	*Centranthus macrosiphon*	Y		
105.	35322	*Centranthus ruber subsp. ruber*	Y		
106.	7365	*Lonicera japonica (Japanese Honeysuckle)*	Y		
Casuarinaceae					
107.	1728	*Allocasuarina fraseriana (Sheoak, Kondil)*			
108.	1732	*Allocasuarina humilis (Dwarf Sheoak)*			
109.	1739	*Allocasuarina thuyoides (Horned Sheoak)*			
110.	19842	*Casuarina equisetifolia*	Y		
Celastraceae					
111.	9069	*Stackhousia huegelii*			
112.	9070	*Stackhousia pubescens (Downy Stackhousia)*			
113.	4737	*Tripterococcus brunonis (Winged Stackhousia)*			
Centrolepidaceae					
114.	1117	*Aphelia cyperoides*			
115.	43548	*Aphelia sp. Albany (B.G. Briggs 596)*			
116.	1121	*Centrolepis aristata (Pointed Centrolepis)*			
117.	1133	*Centrolepis pilosa*			
Colchicaceae					
118.	12770	*Burchardia congesta*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
119.	1402	*Wurmbea sinora*			
Crassulaceae					
120.	3138	*Crassula decumbens (Rufous Stonecrop)*			
121.	3142	*Crassula natans*	Y		
Cupressaceae					
122.	41142	*Hesperocyparis lusitanica*	Y		
Cyperaceae					
123.	753	*Carex appressa (Tall Sedge)*			
124.	768	*Cyathochaeta avenacea*			
125.	771	*Cyperus alterniflorus*			
126.	783	*Cyperus congestus (Dense Flat-sedge)*	Y		
127.	900	*Gahnia aristata*			
128.	902	*Gahnia decomposita*			
129.	20200	*Isolepis cernua var. setiformis*			
130.	912	*Isolepis cyperoides*			
131.	14540	*Isolepis hystrix*	Y		
132.	917	*Isolepis marginata (Coarse Club-rush)*			
133.	936	*Lepidosperma leptostachyum*			
134.	938	*Lepidosperma persecans*			
135.		*Lepidosperma sp.*			
136.	29150	*Lepidosperma sp. Margaret River (B.J. Lepschi 1841)*			
137.	945	*Lepidosperma squamatum*			
138.	948	*Lepidosperma tetraquetrum*			
139.	953	*Mesomelaena graciliceps*			
140.	957	*Mesomelaena tetragona (Semaphore Sedge)*			
141.	984	*Schoenus curvifolius*			
142.	1003	*Schoenus natans (Floating Bog-rush)*		P4	
143.	1017	*Schoenus subbulbosus*			
144.	1036	*Tetraria octandra*			
145.	35579	*Tetraria sp. Jarrah Forest (R. Davis 7391)*			
Dasypogonaceae					
146.	45758	*Calectasia demarzii (Demarz's Tinsel Lily)*			
147.	1218	*Dasypogon bromeliifolius (Pineapple Bush)*			
Dennstaedtiaceae					
148.	41651	*Pteridium esculentum subsp. esculentum*			
Dilleniaceae					
149.	5109	*Hibbertia amplexicaulis*			
150.	5114	*Hibbertia commutata*			
151.	5118	*Hibbertia cunninghamii*			
152.	20051	*Hibbertia diamesogenos*			
153.	5125	*Hibbertia ferruginea*			
154.	19777	*Hibbertia glomerata subsp. glomerata*			
155.	20059	*Hibbertia hemignosta*			
156.	45534	*Hibbertia hypericoides subsp. hypericoides*			
157.	5139	*Hibbertia lasiopus (Large Hibbertia)*			
158.	5143	*Hibbertia lineata*			
159.	5150	*Hibbertia nymphaea*			
160.	5154	*Hibbertia perfoliata*			
161.	20032	*Hibbertia pulchra var. pulchra*			
162.	5161	*Hibbertia quadricolor*			
163.	5162	*Hibbertia racemosa (Stalked Guinea Flower)*			
164.	5170	*Hibbertia silvestris*			
165.		*Hibbertia sp.*			
166.	18429	*Hibbertia sp. Kojonup (C.M. Lewis 288)*			
167.	5172	*Hibbertia stellaris (Orange Stars)*			
168.	5173	*Hibbertia subvaginata*			
169.	5176	*Hibbertia vaginata*			
Droseraceae					
170.	13211	*Drosera erythrorhiza subsp. collina*			
171.	15453	*Drosera gigantea subsp. gigantea*			
172.	3098	*Drosera glanduligera (Pimpernel Sundew)*			
173.	3102	*Drosera huegelii (Bold Sundew)*			
174.	3106	*Drosera macrantha (Bridal Rainbow)*			
175.	13209	*Drosera marchantii subsp. marchantii*			
176.	3109	*Drosera menziesii (Pink Rainbow)*			
177.	11853	*Drosera menziesii subsp. menziesii*			
178.	3114	*Drosera nitidula (Shining Sundew)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
179.	3118	*Drosera pallida (Pale Rainbow)*			
180.	3124	*Drosera pulchella (Pretty Sundew)*			
181.	8911	*Drosera rosulata*			
Elaeocarpaceae					
182.	4524	*Platytheca galioides*			
183.	4535	*Tetratheca hirsuta (Black Eyed Susan)*			
184.	4538	*Tetratheca parvifolia*		P3	
185.	4546	*Tetratheca virgata*			
186.	4548	*Tremandra stelligera*			
Ericaceae					
187.	6306	*Andersonia caerulea (Foxtails)*			
188.	6312	*Andersonia involucrata*			
189.	6323	*Astroloma ciliatum (Candle Cranberry)*			
190.	6325	*Astroloma drummondii*			
191.	6334	*Astroloma pallidum (Kick Bush)*			
192.	6347	*Conostephium minus (Pink-tipped Pearl flower)*			
193.	6348	*Conostephium pendulum (Pearl Flower)*			
194.	6360	*Leucopogon australis (Spiked Beard-heath)*			
195.	6367	*Leucopogon capitellatus*			
196.	6374	*Leucopogon conostephioides*			
197.	41160	*Leucopogon extremus*		P2	
198.	6396	*Leucopogon glabellus*			
199.	6416	*Leucopogon nutans (Drooping Leucopogon)*			
200.	6425	*Leucopogon oxycedrus*			
201.	6428	*Leucopogon pendulus*			
202.	6436	*Leucopogon propinquus*			
203.	6439	*Leucopogon pulchellus (Beard-heath)*			
204.	6441	*Leucopogon reflexus (Heart-leaf Beard-heath)*			
205.	6444	*Leucopogon sprengelioides*			
206.	6447	*Leucopogon strictus*			
207.	6454	*Leucopogon verticillatus (Tassel Flower)*			
208.	34736	*Lysinema pentapetalum*			
209.	31931	*Sphenotoma capitata*			
210.	31952	*Sphenotoma gracilis (Swamp Paper-heath)*			
211.	6476	*Styphelia tenuiflora (Common Pinheath)*			
Euphorbiaceae					
212.	13101	*Amperea simulans*			
213.	16493	*Calycopeplus oligandrus*			
214.	4624	*Euphorbia dendroides*	Y		
215.	4666	*Monotaxis occidentalis*			
216.	4716	*Stachystemon vermicularis*			
Fabaceae					
217.	15466	*Acacia applanata*			
218.	11449	*Acacia browniana var. endlicheri*			
219.	3254	*Acacia celastrifolia (Glowing Wattle)*			
220.	3307	*Acacia divergens*			
221.	11303	*Acacia drummondii subsp. candolleana*			
222.	18287	*Acacia elata*	Y		
223.	3331	*Acacia extensa (Wiry Wattle)*			
224.	3374	*Acacia huegelii*			
225.	3383	*Acacia incurva*			
226.	16165	*Acacia insolita subsp. insolita*			
227.	3410	*Acacia lateriticola*			
228.	3428	*Acacia luteola*			
229.	3454	*Acacia nervosa (Rib Wattle)*			
230.	3464	*Acacia obovata*			
231.	17860	*Acacia podalyriifolia*	Y		
232.	3496	*Acacia preissiana*			
233.	3502	*Acacia pulchella (Prickly Moses)*			
234.	15481	*Acacia pulchella var. glaberrima*			
235.	15483	*Acacia pulchella var. pulchella*			
236.	3527	*Acacia saligna (Orange Wattle, Kudjong)*			
237.	30034	*Acacia saligna subsp. pruinescens*			
238.	3537	*Acacia semitrullata*		P4	
239.	3554	*Acacia squamata*			
240.	3557	*Acacia stenoptera (Narrow Winged Wattle)*			
241.	3576	*Acacia tetragonocarpa*			
242.	3591	*Acacia urophylla*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
243.	3593	*Acacia varia*			
244.	3602	*Acacia willdenowiana (Grass Wattle)*			
245.	3686	*Aotus cordifolia*			
246.	3688	*Aotus gracillima*			
247.	41824	*Aotus sp. Diffusa (W.E. Blackall & C.A. Gardner 1739)*			
248.	14396	*Bossiaea aquifolium subsp. aquifolium*			
249.	3710	*Bossiaea eriocarpa (Common Brown Pea)*			
250.	3713	*Bossiaea linophylla*			
251.	3714	*Bossiaea ornata (Broad Leaved Brown Pea)*			
252.	14291	*Bossiaea praetermissa*			
253.	3718	*Bossiaea rufa*			
254.	18156	*Chamaecytisus palmensis (Tagasaste)*	Y		
255.	13111	*Chorizema aciculare subsp. laxum*			
256.	8971	*Chorizema cordatum*			
257.	3753	*Chorizema dicksonii (Yellow-eyed Flame Pea)*			
258.	3761	*Chorizema rhombeum*			
259.	3799	*Daviesia cordata (Bookleaf)*			
260.	3800	*Daviesia costata*			
261.	3805	*Daviesia decurrens (Prickly Bitter-pea)*			
262.	41921	*Daviesia decurrens subsp. Hamata (M.D. Crisp 6610)*			
263.	3815	*Daviesia horrida (Prickly Bitter-pea)*			
264.	3816	*Daviesia incrassata*			
265.	15505	*Daviesia incrassata subsp. incrassata*			
266.	3819	*Daviesia longifolia*			
267.	3835	*Daviesia preissii*			
268.	3872	*Euchilopsis linearis (Swamp Pea)*			
269.	3880	*Eutaxia virgata*			
270.	20475	*Gastrolobium capitatum*			
271.	20473	*Gastrolobium ebracteolatum*			
272.	3947	*Gompholobium burtonioides*			
273.	3948	*Gompholobium capitatum*			
274.	3950	*Gompholobium knightianum*			
275.	3951	*Gompholobium marginatum*			
276.	3953	*Gompholobium ovatum*			
277.	3954	*Gompholobium polymorphum*			
278.	3955	*Gompholobium preissii*			
279.	11083	*Gompholobium scabrum*			
280.	3957	*Gompholobium tomentosum (Hairy Yellow Pea)*			
281.	3964	*Hovea chorizemifolia (Holly-leaved Hovea)*			
282.	3968	*Hovea trisperma (Common Hovea)*			
283.	19700	*Isotropis cuneifolia subsp. cuneifolia*			
284.	4002	*Jacksonia capitata*			
285.	4005	*Jacksonia condensata*			
286.	4012	*Jacksonia furcellata (Grey Stinkwood)*			
287.	4017	*Jacksonia horrida*			
288.	19373	*Jacksonia velveta*		T	
289.	4036	*Kennedia carinata*			
290.	4037	*Kennedia coccinea (Coral Vine)*			
291.	4044	*Kennedia prostrata (Scarlet Runner)*			
292.	3669	*Labichea punctata (Lance-leaved Cassia)*			
293.	4059	*Lotus angustissimus (Narrowleaf Trefoil)*	Y		
294.	8564	*Lotus subbiflorus*	Y		
295.	4090	*Mirbelia dilatata (Holly-leaved Mirbelia)*			
296.	4141	*Phyllota gracilis*			
297.	4177	*Pultenaea ochreata*			
298.	4183	*Pultenaea skinneri (Skinner's Pea)*		P4	
299.	4187	*Pultenaea verruculosa*			
300.	19337	*Sphaerolobium benetectum*		P2	
301.	17551	*Sphaerolobium drummondii*			
302.	4207	*Sphaerolobium medium*			
303.	4295	*Trifolium dubium (Suckling Clover)*	Y		
304.	4312	*Trifolium striatum (Knotted Clover)*	Y		
305.	4313	*Trifolium subterraneum (Subterranean Clover)*	Y		
Gentianaceae					
306.	6539	*Centaurium erythraea (Common Centaury)*	Y		
Geraniaceae					
307.	4332	*Erodium botrys (Long Storksbill)*	Y		
308.	4340	*Geranium retrorsum*			
309.	4346	*Pelargonium littorale*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Goodeniaceae					
310.	7420	*Dampiera alata (Winged-stem Dampiera)*			
311.	7444	*Dampiera hederacea (Karri Dampiera)*			
312.	7454	*Dampiera linearis (Common Dampiera)*			
313.	7462	*Dampiera pedunculata*			
314.	7484	*Dampiera trigona (Angled-stem Dampiera)*			
315.	29362	*Goodenia coerulea*			
316.	7505	*Goodenia eatoniana*			
317.	7538	*Goodenia pulchella*			
318.	19286	*Goodenia pulchella subsp. Coastal Plain A (M. Hislop 634)*			
319.	13165	*Goodenia pusilla*			
320.	7568	*Lechenaultia biloba (Blue Leschenaultia)*			
321.	7572	*Lechenaultia expansa*			
322.	7574	*Lechenaultia floribunda (Free-flowering Leschenaultia)*			
323.	7602	*Scaevola calliptera*			
324.	7613	*Scaevola glandulifera (Viscid Hand-flower)*			
325.	7619	*Scaevola lanceolata (Long-leaved Scaevola)*			
326.	7646	*Scaevola striata (Royal Robe)*			
327.	7665	*Velleia trinervis*			
Haemodoraceae					
328.	1406	*Anigozanthos bicolor (Little Kangaroo Paw)*			
329.	11931	*Anigozanthos bicolor subsp. decrescens*			
330.	1407	*Anigozanthos flavidus (Tall Kangaroo Paw)*			
331.	11261	*Anigozanthos manglesii subsp. manglesii*			
332.	1418	*Conostylis aculeata (Prickly Conostylis)*			
333.	11826	*Conostylis aculeata subsp. aculeata*			
334.	1438	*Conostylis laxiflora*			
335.	1447	*Conostylis pusilla*			
336.	1453	*Conostylis serrulata*			
337.	11597	*Conostylis setigera subsp. setigera*			
338.	1468	*Haemodorum laxum*			
339.	1472	*Haemodorum simplex*			
340.	1475	*Haemodorum spicatum (Mardja)*			
341.	1478	*Phlebocarya ciliata*			
342.	1483	*Tribonanthes longipetala*			
343.	1485	*Tribonanthes violacea*			
Haloragaceae					
344.	33620	*Glischrocaryon angustifolium*			
345.	6143	*Glischrocaryon aureum (Common Popflower)*			
346.	6149	*Gonocarpus cordiger*			
347.	6150	*Gonocarpus diffusus*			
348.	33638	*Meionectes tenuifolia*		P3	
349.	6189	*Myriophyllum crispatum*			
350.	6195	*Myriophyllum limnophilum*			
351.	6199	*Myriophyllum tillaeoides*			
352.	34964	*Trihaloragis hexandra subsp. hexandra*			
353.	35016	*Trihaloragis hexandra subsp. integrifolia*			
Hemerocallidaceae					
354.	23474	*Agrostocrinum hirsutum*			
355.	1276	*Caesia micrantha (Pale Grass Lily)*			
356.	1277	*Caesia occidentalis*			
357.	1259	*Dianella revoluta (Blueberry Lily)*			
358.	11636	*Dianella revoluta var. divaricata*			
359.	1295	*Johnsonia acaulis*			
360.	1297	*Johnsonia lupulina (Hooded Lily)*			
361.	1361	*Tricoryne elatior (Yellow Autumn Lily)*			
362.	1362	*Tricoryne humilis*			
Hydrocharitaceae					
363.	168	*Ottelia ovalifolia (Swamp Lily)*			
Hypericaceae					
364.	5182	*Hypericum perforatum (St John's Wort)*	Y		
Iridaceae					
365.	1534	*Ixia polystachya (Variable Ixia)*	Y		
366.	1542	*Patersonia babianoides*			
367.	1549	*Patersonia maxwellii*			
368.	1550	*Patersonia occidentalis (Purple Flag, Koma)*			
369.	30472	*Patersonia occidentalis var. occidentalis*			

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370.	1551	*Patersonia pygmaea (Pygmy Patersonia)*			
371.	1553	*Patersonia umbrosa (Yellow Flags)*			
372.	11550	*Patersonia umbrosa var. xanthina (Yellow Flags)*			
Juncaceae					
373.	1178	*Juncus bufonius (Toad Rush)*	Y		
374.	1180	*Juncus capitatus (Capitate Rush)*	Y		
375.	14631	*Juncus meianthus*		P2	
376.	1186	*Juncus microcephalus*	Y		
377.	1188	*Juncus pallidus (Pale Rush)*			
378.	1190	*Juncus planifolius (Broadleaf Rush)*			
379.	1196	*Juncus usitatus (Common Rush)*	Y		
380.	1198	*Luzula meridionalis (Field Woodrush)*			
Juncaginaceae					
381.	40661	*Cycnogeton lineare*			
382.	147	*Triglochin mucronata*			
Lamiaceae					
383.	6839	*Hemiandra pungens (Snakebush)*			
384.	6856	*Hemigenia incana (Silky Hemigenia)*			
385.	6866	*Hemigenia pritzelii*			
386.	6868	*Hemigenia rigida*		P1	
387.	6777	*Lachnostachys albicans*			
388.	17209	*Lachnostachys verbascifolia var. verbascifolia*			
389.	6883	*Mentha pulegium (Pennyroyal)*	Y		
Lauraceae					
390.	2952	*Cassytha glabella (Tangled Dodder Laurel)*			
391.	2957	*Cassytha racemosa (Dodder Laurel)*			
392.	11799	*Cassytha racemosa forma racemosa*			
Lentibulariaceae					
393.	7138	*Utricularia inaequalis*			
Loganiaceae					
394.	38000	*Logania sylvicola*		P2	
395.	46316	*Orianthera serpyllifolia subsp. angustifolia*			
396.	46315	*Orianthera serpyllifolia subsp. serpyllifolia*			
397.	16177	*Phyllangium paradoxum*			
Loranthaceae					
398.	2401	*Nuytsia floribunda (Christmas Tree, Mudja)*			
Lythraceae					
399.	5281	*Lythrum hyssopifolia (Lesser Loosestrife)*	Y		
Malvaceae					
400.	5026	*Lasiopetalum cardiophyllum*		P4	
401.	5084	*Thomasia grandiflora (Large Flowered Thomasia)*			
402.	5086	*Thomasia macrocalyx*			
403.	5092	*Thomasia pauciflora (Few Flowered Thomasia)*			
404.	5097	*Thomasia rhynchocarpa*			
405.	17391	*Thomasia sp. Big Brook (M. Koch 2373)*			
Marsileaceae					
406.	77	*Marsilea mutica*			
Menyanthaceae					
407.	36160	*Liparophyllum capitatum*			
408.	36177	*Ornduffia albiflora*			
Myrtaceae					
409.	20283	*Astartea scoparia*			
410.	36441	*Babingtonia camphorosmae (Camphor Myrtle)*			
411.	5394	*Callistemon glaucus*			
412.	5395	*Callistemon phoeniceus (Lesser Bottlebrush, Dubarda)*			
413.	11333	*Calothamnus graniticus subsp. leptophyllus*		P4	
414.	5415	*Calothamnus lateralis*			
415.	5416	*Calothamnus lehmannii*			
416.	35163	*Calothamnus planifolius var. pallidifolius*			
417.	5428	*Calothamnus rupestris (Mouse Ears)*			
418.	5458	*Calytrix flavescens (Summer Starflower)*			
419.	5465	*Calytrix leschenaultii*			
420.	5474	*Calytrix pulchella*		P3	
421.	19890	*Calytrix sp. Wheatbelt (R. Davis 4544)*			

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422.	5482	*Calytrix tenuiramea*			
423.	5483	*Calytrix tetragona (Common Fringe-myrtle)*			
424.	17104	*Corymbia calophylla (Marri)*			
425.	5508	*Darwinia citriodora (Lemon-scented Darwinia)*			
426.	5519	*Darwinia oederoides*			
427.	14104	*Eremaea pauciflora var. pauciflora*			
428.	45243	*Ericomyrtus parviflora*			
429.	13534	*Eucalyptus aspersa*			
430.	5628	*Eucalyptus drummondii (Drummond's Gum)*			
431.	13547	*Eucalyptus marginata subsp. marginata (Jarrah)*			
432.	5709	*Eucalyptus megacarpa (Bullich, Pulidj)*			
433.	5739	*Eucalyptus patens (Swan River Blackbutt, Dwuda)*			
434.	5763	*Eucalyptus rudis (Flooded Gum, Kulurda)*			
435.	13512	*Eucalyptus rudis subsp. cratyantha*		P4	
436.	13511	*Eucalyptus rudis subsp. rudis*			
437.	5816	*Homalospermum firmum*			
438.	5817	*Hypocalymma angustifolium (White Myrtle, Kudjid)*			
439.	5818	*Hypocalymma cordifolium*			
440.	5832	*Kunzea ericifolia (Spearwood, Pondil)*			
441.	15498	*Kunzea glabrescens (Spearwood)*			
442.	5835	*Kunzea micrantha*			
443.	5841	*Kunzea recurva*			
444.	5847	*Leptospermum erubescens (Roadside Teatree)*			
445.	37580	*Melaleuca acutifolia*			
446.	5900	*Melaleuca cuticularis (Saltwater Paperbark)*			
447.	5921	*Melaleuca incana (Grey Honeymyrtle)*			
448.	13273	*Melaleuca incana subsp. incana*			
449.	5926	*Melaleuca lateritia (Robin Redbreast Bush)*			
450.	5946	*Melaleuca pauciflora*			
451.	5952	*Melaleuca preissiana (Moonah)*			
452.	5959	*Melaleuca rhaphiophylla (Swamp Paperbark)*			
453.	5968	*Melaleuca spathulata*			
454.	5975	*Melaleuca subtrigona*			
455.	5983	*Melaleuca trichophylla*			
456.	5987	*Melaleuca viminea (Mohan)*			
457.	13280	*Melaleuca viminea subsp. viminea*			
458.	16477	*Pericalymma ellipticum var. ellipticum*			
459.	16478	*Pericalymma ellipticum var. floridum*			
460.	15501	*Pericalymma spongiocaule*			
461.	6022	*Rinzia fumana*			
462.	20135	*Taxandria linearifolia*			
463.	29720	*Tetrapora glomerata*			
464.	12392	*Verticordia attenuata*		P3	
465.	12411	*Verticordia densiflora var. cespitosa*			
466.	15432	*Verticordia densiflora var. densiflora*			
467.	12439	*Verticordia lindleyi subsp. purpurea*			
468.	14717	*Verticordia multiflora subsp. multiflora*			
469.	12449	*Verticordia plumosa var. brachyphylla*			
Olacaceae					
470.	2365	*Olax benthamiana*			
Onagraceae					
471.	11756	*Epilobium billardiereanum subsp. cinereum (Variable Willow Herb)*			
472.	6133	*Epilobium hirtigerum (Hairy Willow Herb)*			
473.	14292	*Oenothera stricta subsp. stricta*	Y		
Orchidaceae					
474.	15332	*Caladenia attingens subsp. attingens*			
475.	15336	*Caladenia bryceana subsp. bryceana*		T	
476.	1580	*Caladenia cairnsiana (Zebra Orchid)*			
477.	1586	*Caladenia discoidea (Dancing Orchid)*			
478.	15348	*Caladenia flava subsp. flava*			
479.	15350	*Caladenia flava subsp. sylvestris*			
480.	44903	*Caladenia leucochila*		T	
481.	1603	*Caladenia longiclavata (Clubbed Spider Orchid)*			
482.	1604	*Caladenia macrostylis (Leaping Spider Orchid)*			
483.	1605	*Caladenia marginata (White Fairy Orchid)*			
484.	15371	*Caladenia nana subsp. nana*			
485.	1609	*Caladenia pectinata (King Spider Orchid)*			
486.	1613	*Caladenia reptans (Little Pink Fairy Orchid)*			
487.	15377	*Caladenia reptans subsp. reptans*			

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488.		*Caladenia sp.*			
489.	15380	*Caladenia splendens*			
490.	44899	*Caladenia straminichila*			
491.	15404	*Cyanicula sericea*			
492.	10916	*Cyrtostylis huegelii*			
493.	10964	*Cyrtostylis robusta*			
494.	19649	*Disa bracteata*	Y		
495.	12943	*Diuris brumalis*			
496.	10791	*Diuris carinata (Bee Orchid)*			
497.	1635	*Diuris longifolia (Common Donkey Orchid)*			
498.	1640	*Drakaea glyptodon (King-in-his-carriage)*			
499.	11156	*Drakaea livida*			
500.	1643	*Elythranthera brunonis (Purple Enamel Orchid)*			
501.	1644	*Elythranthera emarginata (Pink Enamel Orchid)*			
502.	15412	*Eriochilus dilatatus subsp. multiflorus*			
503.	15413	*Eriochilus dilatatus subsp. undulatus*			
504.	1647	*Eriochilus scaber (Pink Bunny Orchid)*			
505.	15415	*Eriochilus scaber subsp. scaber*			
506.	1653	*Leporella fimbriata (Hare Orchid)*			
507.	15418	*Leptoceras menziesii*			
508.	1656	*Lyperanthus serratus (Rattle Beak Orchid)*			
509.	34158	*Microtis alboviridis*			
510.	15419	*Microtis media subsp. media*			
511.	1667	*Paracaleana nigrita (Flying Duck Orchid)*			
512.	15424	*Praecoxanthus aphyllus*			
513.	10875	*Pterostylis concava*			
514.	1693	*Pterostylis recurva (Jug Orchid)*			
515.	19709	*Pterostylis sp. Helena River (G. Brockman GBB 340)*			
516.	18655	*Pterostylis sp. crinkled leaf (G.J. Keighery 13426)*			
517.	10998	*Pterostylis turfosa (Bird Orchid)*			
518.	1698	*Pterostylis vittata (Banded Greenhood)*			
519.	16367	*Pyrorchis nigricans (Red beaks, Elephants ears)*			
520.	1701	*Thelymitra antennifera (Vanilla Orchid)*			
521.	1705	*Thelymitra crinita (Blue Lady Orchid)*			
522.	1708	*Thelymitra fuscolutea (Chestnut Sun Orchid)*			
523.	11143	*Thelymitra graminea*			
524.	1718	*Thelymitra villosa (Custard Orchid)*			
525.	20731	*Thelymitra vulgaris*			
Orobanchaceae					
526.	7122	*Orobanche minor (Lesser Broomrape)*	Y		
527.	7089	*Parentucellia latifolia (Common Bartsia)*	Y		
528.	7090	*Parentucellia viscosa (Sticky Bartsia)*	Y		
Oxalidaceae					
529.	30375	*Oxalis exilis*			
Phyllanthaceae					
530.	4675	*Phyllanthus calycinus (False Boronia)*			
531.	4690	*Poranthera huegelii*			
532.	4691	*Poranthera microphylla (Small Poranthera)*			
Phytolaccaceae					
533.	2793	*Phytolacca octandra (Red Ink Plant)*	Y		
Pittosporaceae					
534.	3157	*Billardiera floribunda (White-flowered Billardiera)*			
535.	25788	*Billardiera fraseri (Elegant Pronaya)*			
536.	25798	*Billardiera fusiformis (Australian Bluebell)*			
537.	3165	*Billardiera variifolia*			
Plantaginaceae					
538.	14282	*Gratiola pubescens*			
539.	7109	*Veronica calycina (Cup Speedwell)*			
Poaceae					
540.	185	*Aira cupaniana (Silvery Hairgrass)*	Y		
541.	13380	*Amphibromus nervosus*			
542.	198	*Amphipogon laguroides*			
543.	20184	*Amphipogon laguroides subsp. laguroides*			
544.	17245	*Austrostipa mollis*			
545.	244	*Briza maxima (Blowfly Grass)*	Y		
546.	245	*Briza minor (Shivery Grass)*	Y		
547.	250	*Bromus hordeaceus (Soft Brome)*			

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			Y		
548.	277	*Cortaderia selloana (Pampas Grass)*	Y		
549.	444	*Holcus lanatus (Yorkshire Fog)*	Y		
550.	449	*Hordeum leporinum (Barley Grass)*	Y		
551.	20019	*Lachnagrostis filiformis*			
552.	476	*Lolium perenne (Perennial Ryegrass)*	Y		
553.	478	*Lolium rigidum (Wimmera Ryegrass)*	Y		
554.	492	*Neurachne alopecuroidea (Foxtail Mulga Grass)*			
555.	40424	*Pentameris airoides subsp. airoides*	Y		
556.	551	*Phalaris minor (Lesser Canary Grass)*	Y		
557.	582	*Polypogon monspeliensis (Annual Beardgrass)*	Y		
558.	10970	*Rostraria cristata*	Y		
559.	40431	*Rytidosperma acerosum*			
560.	40427	*Rytidosperma setaceum*			
561.	667	*Tetrarrhena laevis (Forrest Ricegrass)*			
562.	11018	*Vulpia muralis*	Y		
563.	12052	*Vulpia myuros forma megalura*	Y		
564.	33101	*Vulpia myuros forma myuros*	Y		
Polygalaceae					
565.	4550	*Comesperma calymega (Blue-spike Milkwort)*			
566.	4551	*Comesperma ciliatum*			
567.	4564	*Comesperma virgatum (Milkwort)*			
568.	4566	*Comesperma volubile (Love Creeper)*			
Polygonaceae					
569.	11052	*Persicaria prostrata*			
570.	2430	*Rumex brownii (Swamp Dock)*	Y		
571.	2433	*Rumex crispus (Curled Dock)*	Y		
Portulacaceae					
572.	16365	*Calandrinia sp. Kenwick (G.J. Keighery 10905)*			
Proteaceae					
573.	11336	*Adenanthos cygnorum subsp. chamaephyton*		P3	
574.	1791	*Adenanthos obovatus (Basket Flower)*			
575.	1800	*Banksia attenuata (Slender Banksia, Piara)*			
576.	32678	*Banksia bipinnatifida subsp. bipinnatifida*			
577.	32616	*Banksia dallanneyi subsp. sylvestris*			
578.	32577	*Banksia dallanneyi var. mellicula*			
579.	1819	*Banksia grandis (Bull Banksia, Pulgarla)*			
580.	1822	*Banksia ilicifolia (Holly-leaved Banksia)*			
581.	1830	*Banksia littoralis (Swamp Banksia, Pungura)*			
582.	17108	*Banksia meisneri subsp. meisneri*			
583.	1848	*Banksia seminuda (River Banksia)*			
584.	32080	*Banksia sessilis var. sessilis*			
585.	12111	*Banksia sphaerocarpa var. sphaerocarpa (Fox Banksia)*			
586.	32045	*Banksia squarrosa subsp. squarrosa*			
587.	16878	*Conospermum caeruleum subsp. spathulatum*			
588.	16854	*Conospermum capitatum subsp. capitatum*			
589.	16853	*Conospermum capitatum subsp. glabratum*			
590.	16850	*Conospermum flexuosum subsp. laevigatum*			
591.	19628	*Grevillea bipinnatifida subsp. bipinnatifida*			
592.	13085	*Grevillea centristigma*			
593.	2029	*Grevillea leptobotrys*			
594.	13427	*Grevillea manglesioides subsp. manglesioides*			
595.	14417	*Grevillea prominens*		P3	
596.	2080	*Grevillea quercifolia (Oak-leaf Grevillea)*			
597.	14418	*Grevillea rara*		T	Y
598.	2082	*Grevillea ripicola (Collie Grevillea)*		P4	
599.	12824	*Grevillea vestita subsp. vestita*			
600.	2137	*Hakea ceratophylla (Horned Leaf Hakea)*			
601.	2175	*Hakea lissocarpha (Honey Bush)*			
602.	2179	*Hakea marginata*			
603.	2203	*Hakea ruscifolia (Candle Hakea)*			
604.	2212	*Hakea sulcata (Furrowed Hakea)*			
605.	2214	*Hakea trifurcata (Two-leaf Hakea)*			
606.	2215	*Hakea undulata (Wavy-leaved Hakea)*			
607.	2216	*Hakea varia (Variable-leaved Hakea)*			
608.	8844	*Isopogon crithmifolius*			
609.	45553	*Isopogon spathulatus*			
610.	14439	*Isopogon teretifolius subsp. teretifolius (Nodding Coneflower)*			

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611.	2262	*Persoonia elliptica (Spreading Snottygobble)*			
612.	2267	*Persoonia longifolia (Snottygobble)*			
613.	2299	*Petrophile linearis (Pixie Mops)*			
614.	2309	*Petrophile serruriae*			
615.	2312	*Petrophile striata*			
616.	2316	*Stirlingia latifolia (Blueboy)*			
617.	12910	*Stirlingia seselifolia*			
618.	2317	*Stirlingia simplex*			
619.	16869	*Synaphea cuneata*			
620.	16883	*Synaphea damopsis*			
621.	12914	*Synaphea decorticans*			
622.	16937	*Synaphea decumbens*		P3	
623.	15529	*Synaphea floribunda*			
624.	2323	*Synaphea gracillima*			
625.	16769	*Synaphea hians*		P3	
626.	12911	*Synaphea obtusata*			
627.	2324	*Synaphea petiolaris (Synaphea)*			
628.	16862	*Synaphea petiolaris subsp. simplex*		P3	
629.	2331	*Xylomelum occidentale (Woody Pear, Djandin)*			
Pteridaceae					
630.	25	*Adiantum aethiopicum (Common Maidenhair)*			
Ranunculaceae					
631.	2929	*Clematis pubescens (Common Clematis)*			
Restionaceae					
632.	17845	*Apodasmia ceramophila*			
633.	17685	*Chaetanthus aristatus*			
634.	17692	*Cytogonidium leptocarpoides*			
635.	17691	*Desmocladus fasciculatus*			
636.	16595	*Desmocladus flexuosus*			
637.	1070	*Hypolaena exsulca*			
638.	17622	*Hypolaena robusta*		P4	
639.	19833	*Leptocarpus laxus*			
640.	46382	*Leptocarpus roycei*			
641.	46379	*Leptocarpus thysananthus*			
642.	1088	*Lepyrodia macra (Large Scale Rush)*			
643.	1090	*Lepyrodia muirii*			
644.	15562	*Lepyrodia riparia*			
645.	17684	*Tremulina tremula*			
646.	17680	*Tyrbastes glaucescens*			
Rhamnaceae					
647.	13470	*Cryptandra arbutiflora var. arbutiflora*			
648.	13484	*Cryptandra arbutiflora var. tubulosa*			
649.	4842	*Trymalium ledifolium*			
650.	13479	*Trymalium ledifolium var. rosmarinifolium*			
651.	33438	*Trymalium odoratissimum subsp. trifidum*			
Rosaceae					
652.	3184	*Acaena echinata (Sheep's Burr)*			
653.	3187	*Rosa rubiginosa (Sweet Briar)*	Y		
654.	20506	*Rubus anglocandicans*	Y		
Rubiaceae					
655.	18254	*Opercularia apiciflora*			
656.	7346	*Opercularia echinocephala (Bristly Headed Stink Weed)*			
657.	7348	*Opercularia hispidula (Hispid Stinkweed)*			
658.	18255	*Opercularia vaginata (Dog Weed)*			
659.	7362	*Sherardia arvensis (Field Madder)*	Y		
Rutaceae					
660.	4413	*Boronia crenulata (Aniseed Boronia)*			
661.	17653	*Boronia crenulata subsp. pubescens*			
662.	11503	*Boronia crenulata var. crenulata*			
663.	4417	*Boronia dichotoma*			
664.	4420	*Boronia fastigiata (Bushy Boronia)*			
665.	4428	*Boronia megastigma (Scented Boronia)*			
666.	4429	*Boronia molloyae (Tall Boronia)*			
667.	4430	*Boronia nematophylla*			
668.	11381	*Boronia ramosa subsp. anethifolia*			
669.	4441	*Boronia spathulata (Boronia)*			
670.	4454	*Diplolaena dampieri (Southern Diplolaena)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
671.	9027	*Diplolaena drummondii*			
672.	15268	*Diplolaena graniticola*			
673.	4457	*Diplolaena microcephala (Lesser Diplolaena)*			
674.	18532	*Philotheca nodiflora subsp. lasiocalyx*			
675.	18529	*Philotheca spicata (Pepper and Salt)*			
Santalaceae					
676.	2342	*Leptomeria cunninghamii*			
Sapindaceae					
677.	4775	*Dodonaea pinifolia*			
Stylidiaceae					
678.	7670	*Levenhookia dubia (Hairy Stylewort)*			
679.	7676	*Levenhookia pusilla (Midget Stylewort)*			
680.	7677	*Levenhookia stipitata (Common Stylewort)*			
681.	40480	*Stylidium acuminatum subsp. acuminatum*		P2	
682.	7681	*Stylidium affine (Queen Triggerplant)*			
683.	7684	*Stylidium amoenum (Lovely Triggerplant)*			
684.	17666	*Stylidium amoenum var. amoenum*			
685.	30278	*Stylidium androsaceum*			
686.	25831	*Stylidium araeophyllum (Stilt Walker)*			
687.	7693	*Stylidium brunonianum (Pink Fountain Triggerplant)*			
688.	7702	*Stylidium ciliatum (Golden Triggerplant)*			
689.	7713	*Stylidium dichotomum (Pins-and-needles)*			
690.	7734	*Stylidium guttatum (Dotted Triggerplant)*			
691.	7745	*Stylidium junceum (Reed Triggerplant)*			
692.	7747	*Stylidium lepidum (Redcaps)*		P3	
693.	7774	*Stylidium piliferum (Common Butterfly Triggerplant)*			
694.	7776	*Stylidium plantagineum (Plantagenet Triggerplant)*			
695.	7782	*Stylidium pulchellum (Thumbelina Triggerplant)*			
696.	7785	*Stylidium repens (Matted Triggerplant)*			
697.	7786	*Stylidium rhipidium (Fan Triggerplant)*		P3	
698.	7787	*Stylidium rhynchocarpum (Black-beaked Triggerplant)*			
699.	7798	*Stylidium schoenoides (Cow Kicks)*			
700.		*Stylidium sp.*			
701.	7799	*Stylidium spathulatum (Creamy Triggerplant)*			
702.	45593	*Stylidium tenue subsp. tenue (Little Fountain Triggerplant)*			
703.	45393	*Stylidium uniflorum subsp. uniflorum (Pincushion Triggerplant)*			
704.	7808	*Stylidium violaceum (Violet Triggerplant)*			
Thymelaeaceae					
705.	5231	*Pimelea angustifolia (Narrow-leaved Pimelea)*			
706.	11928	*Pimelea ciliata subsp. ciliata*			
707.	5251	*Pimelea imbricata*			
708.	11402	*Pimelea imbricata var. piligera*			
709.	11182	*Pimelea lehmanniana subsp. nervosa*			
Typhaceae					
710.	99	*Typha orientalis (Bulrush, Cumbungi)*			
Violaceae					
711.	5218	*Hybanthus debilissimus*			
712.	12007	*Hybanthus floribundus subsp. floribundus*			
Xanthorrhoeaceae					
713.	1253	*Xanthorrhoea gracilis (Graceful Grass Tree, Mimidi)*			
714.	1254	*Xanthorrhoea nana (Dwarf Grasstree)*			
715.	1256	*Xanthorrhoea preissii (Grass tree, Palga)*			
Zamiaceae					
716.	85	*Macrozamia riedlei (Zamia, Djiridji)*			

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

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

NatureMap Fauna Species Report

Created By Guest user on 23/01/2017

Kingdom	Animalia
Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Circle'
Centre	116° 12' 25" E,33° 20' 13" S
Buffer	20km
Group By	Species Group

Species Group	Species	Records
Amphibian	10	98
Bird	113	1408
Fish	5	46
Invertebrate	418	1302
Mammal	37	328
Reptile	30	171
TOTAL	**613**	**3353**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Amphibian					
1.	25398	*Crinia georgiana (Quacking Frog)*			
2.	25399	*Crinia glauerti (Clicking Frog)*			
3.	25401	*Crinia pseudinsignifera (Bleating Froglet)*			
4.	25404	*Geocrinia leai (Ticking Frog)*			
5.	25410	*Heleioporus eyrei (Moaning Frog)*			
6.	25411	*Heleioporus inornatus (Whooping Frog)*			
7.	25415	*Limnodynastes dorsalis (Western Banjo Frog)*			
8.	25378	*Litoria adelaidensis (Slender Tree Frog)*			
9.	25388	*Litoria moorei (Motorbike Frog)*			
10.	25426	*Neobatrachus pelobatoides (Humming Frog)*			
Bird					
11.	24559	*Acanthagenys rufogularis (Spiny-cheeked Honeyeater)*			
12.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
13.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
14.	24262	*Acanthiza inornata (Western Thornbill)*			
15.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
16.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
17.	24312	*Anas gracilis (Grey Teal)*			
18.	24316	*Anas superciliosa (Pacific Black Duck)*			
19.		*Anhinga novaehollandiae*			
20.	24561	*Anthochaera carunculata (Red Wattlebird)*			
21.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
22.	25670	*Anthus australis (Australian Pipit)*			
23.	24285	*Aquila audax (Wedge-tailed Eagle)*			
24.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
25.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
26.		*Barnardius zonarius*			
27.	24319	*Biziura lobata (Musk Duck)*			
28.	24359	*Burhinus grallarius (Bush Stone-curlew)*			
29.	25715	*Cacatua roseicapilla (Galah)*			
30.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
31.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
32.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
33.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black-Cockatoo)*		T	
34.	24733	*Calyptorhynchus baudinii (Baudin's Cockatoo (long-billed black-cockatoo), Baudin's Cockatoo)*		T	
35.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo (short-billed black-cockatoo), Carnaby's Cockatoo)*		T	
36.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
37.	25601	*Chrysococcyx lucidus (Shining Bronze Cuckoo)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
38.	24432	*Chrysococcyx lucidus subsp. plagosus (Shining Bronze Cuckoo)*			
39.	24834	*Cincloramphus mathewsi (Rufous Songlark)*			
40.	24396	*Climacteris rufa (Rufous Treecreeper)*			
41.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
42.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
43.	25592	*Corvus coronoides (Australian Raven)*			
44.	25595	*Cracticus tibicen (Australian Magpie)*			
45.	25596	*Cracticus torquatus (Grey Butcherbird)*			
46.	24322	*Cygnus atratus (Black Swan)*			
47.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
48.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
49.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
50.	24470	*Dromaius novaehollandiae (Emu)*			
51.		*Egretta novaehollandiae*			
52.		*Elanus axillaris*			
53.	24290	*Elanus caeruleus subsp. axillaris (Australian Black-shouldered Kite)*			
54.		*Elseyornis melanops*			
55.		*Eolophus roseicapillus*			
56.	25692	*Eopsaltria australis (Yellow Robin)*			
57.	24651	*Eopsaltria australis subsp. griseogularis (Western Yellow Robin)*			
58.	24652	*Eopsaltria georgiana (White-breasted Robin)*			
59.	25621	*Falco berigora (Brown Falcon)*			
60.	25622	*Falco cenchroides (Australian Kestrel)*			
61.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
62.	25727	*Fulica atra (Eurasian Coot)*			
63.	25729	*Gallinula tenebrosa (Dusky Moorhen)*			
64.	25530	*Gerygone fusca (Western Gerygone)*			
65.	24735	*Glossopsitta porphyrocephala (Purple-crowned Lorikeet)*			
66.	24443	*Grallina cyanoleuca (Magpie-lark)*			
67.	24295	*Haliastur sphenurus (Whistling Kite)*			
68.	24491	*Hirundo neoxena (Welcome Swallow)*			
69.	25629	*Hirundo nigricans (Tree Martin)*			
70.	24347	*Ixobrychus flavicollis subsp. australis (Australian Black Bittern)*		P1	
71.	24367	*Lalage tricolor (White-winged Triller)*			
72.	25661	*Lichmera indistincta (Brown Honeyeater)*			
73.	25650	*Malurus elegans (Red-winged Fairy-wren)*			
74.	25654	*Malurus splendens (Splendid Fairy-wren)*			
75.	25663	*Melithreptus brevirostris (Brown-headed Honeyeater)*			
76.	24587	*Melithreptus chloropsis (Western White-naped Honeyeater)*			
77.	24598	*Merops ornatus (Rainbow Bee-eater)*		IA	
78.		*Microcarbo melanoleucos*			
79.	25610	*Myiagra inquieta (Restless Flycatcher)*			
80.	24738	*Neophema elegans (Elegant Parrot)*			
81.	24820	*Ninox novaeseelandiae subsp. boobook (Boobook Owl)*			
82.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
83.	25679	*Pachycephala pectoralis (Golden Whistler)*			
84.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
85.	24692	*Pachyptila belcheri (Slender-billed Prion)*			
86.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
87.	24626	*Pardalotus punctatus subsp. xanthopyge (Yellow-rumped Pardalote)*			
88.	25682	*Pardalotus striatus (Striated Pardalote)*			
89.	24659	*Petroica goodenovii (Red-capped Robin)*			
90.	25695	*Petroica multicolor (Scarlet Robin)*			
91.	25697	*Phalacrocorax carbo (Great Cormorant)*			
92.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
93.	24409	*Phaps chalcoptera (Common Bronzewing)*			
94.	25587	*Phaps elegans (Brush Bronzewing)*			
95.	24594	*Phylidonyris melanops (Tawny-crowned Honeyeater)*			
96.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
97.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
98.	25720	*Platycercus icterotis (Western Rosella)*			
99.	24745	*Platycercus icterotis subsp. icterotis (Western Rosella)*			
100.	24747	*Platycercus spurius (Red-capped Parrot)*			
101.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
102.	25703	*Podargus strigoides (Tawny Frogmouth)*			
103.	25704	*Podiceps cristatus (Great Crested Grebe)*			
104.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
105.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
106.		*Purpureicephalus spurius*			
107.	25613	*Rhipidura fuliginosa (Grey Fantail)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
108.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
109.	25616	*Rhipidura rufiventris (Northern Fantail)*			
110.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
111.	30948	*Smicrornis brevirostris (Weebill)*			
112.	24645	*Stagonopleura oculata (Red-eared Firetail)*			
113.	25597	*Strepera versicolor (Grey Currawong)*			
114.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
115.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
116.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
117.	24844	*Threskiornis molucca (Australian White Ibis)*			
118.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
119.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
120.		*Tribonyx ventralis*			
121.	25761	*Turnix varia (Painted Button-quail)*			
122.	24849	*Turnix varia subsp. varia (Painted Button-quail)*			
123.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			
Fish					
124.		*Edelia vittata*			
125.	34028	*Galaxias occidentalis (Western Minnow)*			
126.	34030	*Geotria australis (Pouched Lamprey)*		P1	
127.		*Leiopotherapon unicolor*			
128.		*Nannoperca vittata*			
Invertebrate					
129.		*Abantiades hydrographis*			
130.		*Abantiades ocellatus*			
131.		*Acantholophus sp. fc496*			
132.		*Acantholophus sp. fc869*			
133.		*Acariformes sp.*			
134.		*Adreppus sp. fc1323*			
135.		*Adreppus sp. fc868*			
136.		*Aeshnidae sp.*			
137.		*Agrotis munda*			
138.		*Amblyomma fimbriatum*			
139.		*Amorbus bispinus*			
140.		*Amphisopodidae sp.*			
141.		*Aname mainae*			
142.		*Aname tepperi*			
143.		*Ancylidae sp.*			
144.		*Anthela canescens*			
145.		*Anthela ferruginosa*			
146.		*Antichiropus variabilis*			
147.		*Apis mellifera*			
148.		*Apterogryllus sp. fc811*			
149.		*Arcina fulgorigera*			
150.		*Arhodia sp. fc2*			
151.		*Arhodia sp. fc320*			
152.		*Artoriopsis expolita*			
153.	33972	*Austromerope poultoni (scorpionfly)*		P2	
154.		*Baetidae sp.*			
155.		*Baiami tegenarioides*			
156.		*Baiami volucripes*			
157.		*Caenidae sp.*			
158.		*Calliphora sp. fc53*			
159.		*Calolampra sp. fc147*			
160.		*Camponotus sp. fc423*			
161.		*Carabidae sp.*			
162.		*Carthaea saturnioides*			
163.		*Cedarinia sp. fc3014*			Y
164.		*Cedarinia sp. fc576*			
165.		*Cedarinia sp. fc722*			Y
166.		*Ceinidae sp.*			
167.		*Cenogmus sp. fc264*			
168.		*Ceratopogonidae sp.*			
169.		*Cercophonius sulcatus*			
170.		*Chenistonia sp. fc721*			
171.	33939	*Cherax cainii (Marron)*			
172.		*Cherax destructor*			
173.		*Cherax plebejus*			
174.		*Cherax preissii*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
175.		*Cherax quinquecarinatus*			
176.		*Chironominae sp.*			
177.		*Chlorocoma dicloraria*			
178.		*Chlorocoma sp. fc22*			
179.		*Chrysopa sp. fc822*			
180.		*Coenagrionidae sp.*			
181.		*Colpochila sp. fc1866*			
182.		*Conchostraca (unident.)*			
183.		*Conoderus sp. fc1109*			
184.		*Conoderus sp. fc135*			
185.		*Conoderus sp. fc1816*			
186.		*Conoderus sp. fc909*			
187.		*Corduliidae sp.*			
188.		*Corixidae sp.*			
189.		*Cormocephalus aurantiipes*			
190.		*Coryphistes sp. fc231*			
191.		*Crypsiphona ocultaria*			
192.		*Culicidae sp.*			
193.		*Curculionidae sp.*			
194.		*Destolmia sp. fc4*			
195.		*Dichromodes personalis*			
196.		*Dingosa serrata*			
197.		*Discophlebia lucasii*			
198.		*Doratifera sp. fc1625*			
199.		*Dugesiidae sp.*			
200.		*Dytiscidae sp.*			
201.		*Ecnomidae sp.*			
202.		*Ectropis sp. fc23*			
203.		*Eleale sp. fc695*			
204.		*Empididae sp.*			
205.		*Entometa fervens*			
206.		*Entometa sp. fc426*			
207.		*Epicoma melanostica*			
208.		*Eriophora biapicata*			
209.		*Ethmostigmus sp. fc223*			
210.		*Eucyclodes buprestaria*			
211.		*Gasteracantha minax*			
212.		*Genus fc1022 sp. fc1022*			
213.		*Genus fc1029 sp. fc1029*			
214.		*Genus fc1031 sp. fc1031*			
215.		*Genus fc1051 sp. fc1051*			
216.		*Genus fc106 sp. fc106*			
217.		*Genus fc1098 sp. fc1098*			
218.		*Genus fc1118 sp. fc1118*			
219.		*Genus fc1134 sp. fc1134*			
220.		*Genus fc1169 sp. fc1169*			
221.		*Genus fc12 sp. fc12*			
222.		*Genus fc132 sp. fc132*			
223.		*Genus fc14 sp. fc14*			
224.		*Genus fc140 sp. fc140*			
225.		*Genus fc1401 sp. fc1401*			
226.		*Genus fc1421 sp. fc1421*			
227.		*Genus fc144 sp. fc144*			
228.		*Genus fc145 sp. fc145*			
229.		*Genus fc146 sp. fc146*			
230.		*Genus fc1491 sp. fc1491*			
231.		*Genus fc1497 sp. fc1497*			
232.		*Genus fc1557 sp. fc1557*			
233.		*Genus fc156 sp. fc156*			
234.		*Genus fc1580 sp. fc1580*			
235.		*Genus fc16 sp. fc16*			
236.		*Genus fc1626 sp. fc1626*			
237.		*Genus fc163 sp. fc163*			
238.		*Genus fc1631 sp. fc1631*			
239.		*Genus fc174 sp. fc174*			
240.		*Genus fc1751 sp. fc1751*			
241.		*Genus fc176 sp. fc176*			
242.		*Genus fc180 sp. fc180*			
243.		*Genus fc1832 sp. fc1832*			
244.		*Genus fc1833 sp. fc1833*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
245.		*Genus fc1840 sp. fc1840*			
246.		*Genus fc1847 sp. fc1847*			
247.		*Genus fc1882 sp. fc1882*			
248.		*Genus fc1906 sp. fc1906*			
249.		*Genus fc1938 sp. fc1938*			
250.		*Genus fc1964 sp. fc1964*			
251.		*Genus fc1966 sp. fc1966*			
252.		*Genus fc203 sp. fc203*			
253.		*Genus fc2041 sp. fc2041*			
254.		*Genus fc2054 sp. fc2054*			
255.		*Genus fc2059 sp. fc2059*			Y
256.		*Genus fc206 sp. fc206*			
257.		*Genus fc2089 sp. fc2089*			
258.		*Genus fc217 sp. fc217*			
259.		*Genus fc225 sp. fc225*			
260.		*Genus fc226 sp. fc226*			
261.		*Genus fc227 sp. fc227*			
262.		*Genus fc228 sp. fc228*			
263.		*Genus fc24 sp. fc24*			
264.		*Genus fc25 sp. fc25*			
265.		*Genus fc251 sp. fc251*			
266.		*Genus fc257 sp. fc257*			
267.		*Genus fc258 sp. fc258*			
268.		*Genus fc259 sp. fc259*			
269.		*Genus fc267 sp. fc267*			
270.		*Genus fc2734 sp. fc2734*			Y
271.		*Genus fc2885 sp. fc2885*			
272.		*Genus fc2888 sp. fc2888*			
273.		*Genus fc2890 sp. fc2890*			
274.		*Genus fc2901 sp. fc2901*			
275.		*Genus fc2902 sp. fc2902*			Y
276.		*Genus fc2903 sp. fc2903*			
277.		*Genus fc2904 sp. fc2904*			
278.		*Genus fc2907 sp. fc2907*			
279.		*Genus fc2909 sp. fc2909*			
280.		*Genus fc2910 sp. fc2910*			
281.		*Genus fc2911 sp. fc2911*			Y
282.		*Genus fc3012 sp. fc3012*			
283.		*Genus fc3013 sp. fc3013*			Y
284.		*Genus fc3015 sp. fc3015*			
285.		*Genus fc3016 sp. fc3016*			
286.		*Genus fc3018 sp. fc3018*			
287.		*Genus fc3027 sp. fc3027*			Y
288.		*Genus fc3028 sp. fc3028*			
289.		*Genus fc3113 sp. fc3113*			
290.		*Genus fc3117 sp. fc3117*			
291.		*Genus fc3118 sp. fc3118*			
292.		*Genus fc3119 sp. fc3119*			Y
293.		*Genus fc312 sp. fc312*			
294.		*Genus fc3126 sp. fc3126*			
295.		*Genus fc3127 sp. fc3127*			Y
296.		*Genus fc3128 sp. fc3128*			
297.		*Genus fc3129 sp. fc3129*			Y
298.		*Genus fc313 sp. fc313*			
299.		*Genus fc3130 sp. fc3130*			Y
300.		*Genus fc3131 sp. fc3131*			Y
301.		*Genus fc3132 sp. fc3132*			Y
302.		*Genus fc3154 sp. fc3154*			
303.		*Genus fc316 sp. fc316*			
304.		*Genus fc3166 sp. fc3166*			Y
305.		*Genus fc3167 sp. fc3167*			Y
306.		*Genus fc317 sp. fc317*			
307.		*Genus fc318 sp. fc318*			
308.		*Genus fc323 sp. fc323*			
309.		*Genus fc324 sp. fc324*			
310.		*Genus fc326 sp. fc326*			
311.		*Genus fc333 sp. fc333*			
312.		*Genus fc342 sp. fc342*			
313.		*Genus fc345 sp. fc345*			
314.		*Genus fc360 sp. fc360*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
315.		*Genus fc374 sp. fc374*			
316.		*Genus fc375 sp. fc375*			
317.		*Genus fc376 sp. fc376*			
318.		*Genus fc38 sp. fc38*			
319.		*Genus fc383 sp. fc383*			
320.		*Genus fc391 sp. fc391*			
321.		*Genus fc399 sp. fc399*			
322.		*Genus fc400 sp. fc400*			
323.		*Genus fc407 sp. fc407*			
324.		*Genus fc411 sp. fc411*			
325.		*Genus fc417 sp. fc417*			
326.		*Genus fc421 sp. fc421*			
327.		*Genus fc422 sp. fc422*			
328.		*Genus fc424 sp. fc424*			
329.		*Genus fc425 sp. fc425*			
330.		*Genus fc430 sp. fc430*			
331.		*Genus fc436 sp. fc436*			
332.		*Genus fc439 sp. fc439*			
333.		*Genus fc441 sp. fc441*			
334.		*Genus fc449 sp. fc449*			
335.		*Genus fc460 sp. fc460*			
336.		*Genus fc469 sp. fc469*			
337.		*Genus fc473 sp. fc473*			
338.		*Genus fc48 sp. fc48*			
339.		*Genus fc484 sp. fc484*			
340.		*Genus fc489 sp. fc489*			
341.		*Genus fc498 sp. fc498*			
342.		*Genus fc521 sp. fc521*			
343.		*Genus fc523 sp. fc523*			
344.		*Genus fc544 sp. fc544*			
345.		*Genus fc554 sp. fc554*			
346.		*Genus fc564 sp. fc564*			
347.		*Genus fc568 sp. fc568*			
348.		*Genus fc573 sp. fc573*			Y
349.		*Genus fc577 sp. fc577*			
350.		*Genus fc579 sp. fc579*			
351.		*Genus fc585 sp. fc585*			
352.		*Genus fc6 sp. fc6*			
353.		*Genus fc603 sp. fc603*			
354.		*Genus fc608 sp. fc608*			
355.		*Genus fc611 sp. fc611*			
356.		*Genus fc612 sp. fc612*			
357.		*Genus fc618 sp. fc618*			
358.		*Genus fc62 sp. fc62*			
359.		*Genus fc63 sp. fc63*			
360.		*Genus fc641 sp. fc641*			
361.		*Genus fc642 sp. fc642*			
362.		*Genus fc646 sp. fc646*			
363.		*Genus fc649 sp. fc649*			
364.		*Genus fc652 sp. fc652*			
365.		*Genus fc657 sp. fc657*			
366.		*Genus fc658 sp. fc658*			
367.		*Genus fc66 sp. fc66*			
368.		*Genus fc661 sp. fc661*			
369.		*Genus fc662 sp. fc662*			
370.		*Genus fc67 sp. fc67*			
371.		*Genus fc692 sp. fc692*			
372.		*Genus fc693 sp. fc693*			
373.		*Genus fc696 sp. fc696*			
374.		*Genus fc697 sp. fc697*			
375.		*Genus fc698 sp. fc698*			Y
376.		*Genus fc699 sp. fc699*			
377.		*Genus fc703 sp. fc703*			
378.		*Genus fc719 sp. fc719*			
379.		*Genus fc72 sp. fc72*			
380.		*Genus fc720 sp. fc720*			Y
381.		*Genus fc723 sp. fc723*			
382.		*Genus fc724 sp. fc724*			Y
383.		*Genus fc73 sp. fc73*			
384.		*Genus fc753 sp. fc753*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
385.		*Genus fc755 sp. fc755*			
386.		*Genus fc757 sp. fc757*			
387.		*Genus fc758 sp. fc758*			
388.		*Genus fc76 sp. fc76*			
389.		*Genus fc760 sp. fc760*			
390.		*Genus fc765 sp. fc765*			
391.		*Genus fc766 sp. fc766*			
392.		*Genus fc768 sp. fc768*			Y
393.		*Genus fc769 sp. fc769*			Y
394.		*Genus fc77 sp. fc77*			
395.		*Genus fc770 sp. fc770*			
396.		*Genus fc771 sp. fc771*			
397.		*Genus fc772 sp. fc772*			
398.		*Genus fc782 sp. fc782*			
399.		*Genus fc784 sp. fc784*			
400.		*Genus fc788 sp. fc788*			Y
401.		*Genus fc789 sp. fc789*			Y
402.		*Genus fc790 sp. fc790*			Y
403.		*Genus fc791 sp. fc791*			
404.		*Genus fc792 sp. fc792*			
405.		*Genus fc793 sp. fc793*			Y
406.		*Genus fc794 sp. fc794*			
407.		*Genus fc80 sp. fc80*			
408.		*Genus fc801 sp. fc801*			
409.		*Genus fc818 sp. fc818*			
410.		*Genus fc83 sp. fc83*			
411.		*Genus fc837 sp. fc837*			
412.		*Genus fc840 sp. fc840*			
413.		*Genus fc855 sp. fc855*			
414.		*Genus fc859 sp. fc859*			
415.		*Genus fc86 sp. fc86*			
416.		*Genus fc873 sp. fc873*			
417.		*Genus fc90 sp. fc90*			
418.		*Genus fc916 sp. fc916*			
419.		*Genus fc921 sp. fc921*			
420.		*Genus fc928 sp. fc928*			
421.		*Genus fc95 sp. fc95*			
422.		*Genus fc986 sp. fc986*			
423.		*Gomphidae sp.*			
424.		*Goniaea sp. fc1470*			
425.		*Goniaea sp. fc233*			
426.		*Goniaea sp. fc235*			
427.		*Goniaea sp. fc272*			
428.		*Goniaea sp. fc3017*			Y
429.		*Goniaea sp. fc871*			
430.		*Goniaea sp. fc872*			
431.		*Goniaea vocans*			
432.		*Goniaoidea sp. fc1261*			
433.		*Gripopterygidae sp.*			
434.		*Gyrinidae sp.*			
435.		*Haliplidae sp.*			
436.		*Harpobittacus phaeoscius*			
437.		*Harpobittacus similis*			
438.		*Hebridae sp.*			
439.		*Heliomystis sp. fc663*			
440.		*Hemicorduliidae sp.*			
441.		*Heteronyx sp. fc347*			
442.		*Heteronyx sp. fc363*			
443.		*Heurodes turritus*			
444.		*Hierodula sp. fc767*			
445.		*Hydraenidae sp.*			
446.		*Hydrometridae sp.*			
447.		*Hydrophilidae sp.*			
448.		*Hydroptilidae sp.*			
449.		*Hyocephalus auprugnus*			
450.		*Hyriidae sp.*			
451.		*Isopeda leishmanni*			
452.		*Lampona brevipes*			
453.		*Lancetes lanceolatus*			
454.		*Laxta sp. fc27*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
455.		*Leptoceridae sp.*			
456.		*Leptophlebiidae sp.*			
457.		*Lestidae sp.*			
458.		*Libellulidae sp.*			
459.		*Longepi woodman*			
460.		*Lyncestis melanoschista*			
461.		*Megapodagrionidae sp.*			
462.		*Melobasis sp. fc701*			
463.		*Mesoveliidae sp.*			
464.		*Metriorrhynchus sp. fc99*			
465.		*Missulena hoggi*			
466.		*Mituliodon tarantulinus*			
467.		*Moerarchis clathrella*			
468.		*Myrmecia analis*			
469.		*Myrmecia sp. fc252*			
470.		*Myrmecia sp. fc408*			
471.		*Myrmecia vindex*			
472.		*Neohyborrhynchus sp. fc814*			Y
473.		*Nerthra sp. fc1567*			
474.		*Notonectidae sp.*			
475.		*Ochrogaster sp. fc10*			
476.		*Ochrogaster sp. fc2655*			
477.		*Ochrogaster sp. fc7*			
478.		*Oenochroma cerasiplaga*			
479.		*Oenochroma sp. fc31*			
480.		*Oenosandra boisduvalii*			
481.		*Oligochaeta sp.*			
482.		*Olios diana*			
483.		*Olios sp. fc939*			
484.		*Onosandrus sp. fc526*			
485.		*Onychohydrus scutellaris*			
486.		*Ophion sp. fc87*			
487.		*Opodiphthera helena*			
488.		*Orthocladiinae sp.*			
489.		*Oxyops fasciata*			
490.		*Oxyops pictipennis*			
491.	33988	*Pachysaga munggai (cricket)*		P3	
492.		*Palaemonidae sp.*			
493.		*Pantydia sp. fc329*			
494.		*Pantydia sp. fc388*			
495.		*Pantydia sp. fc5*			
496.		*Parastacidae sp.*			
497.		*Paropsis sp. fc667*			
498.		*Paropsisterna sp. fc175*			
499.		*Persectania ewingii*			
500.		*Perthiidae sp.*			
501.		*Phallaria ophiusaria*			
502.		*Phaulacridium sp. fc293*			
503.		*Philopotamidae sp.*			
504.		*Pholodes sp. fc384*			
505.		*Phoracantha semipuncta*			Y
506.		*Phyllotocus ustulatus*			Y
507.		*Planorbidae sp.*			
508.		*Platyzosteria sp. fc219*			
509.		*Platyzosteria sp. fc507*			
510.		*Platyzosteria sp. fc899*			
511.		*Podykipus leptoiuloides*			
512.		*Poecilasthena sp. fc2630*			
513.		*Pollanisus cupreus*			
514.		*Pollanisus sp. fc78*			
515.		*Polyphrades aesalon*			
516.		*Polyzosteria sp. fc592*			
517.		*Prasinocyma sp. fc393*			
518.		*Proteuxoa pissonephra*			
519.		*Proteuxoa sp. fc2752*			
520.		*Ptomaphila lacrymosa*			
521.		*Rhantus suturalis*			
522.		*Richardsonianidae sp.*			
523.		*Sandava scitisigna*			
524.		*Scirtidae sp.*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
525.		*Semanopterus sp. fc1021*			
526.		*Simuliidae sp.*			
527.		*Sorama bicolor*			
528.		*Sphaeriidae sp.*			
529.		*Spilosoma sp. fc445*			
530.		*Tabanidae sp.*			
531.		*Tanypodinae sp.*			
532.		*Tasmanicosa leuckartii*			
533.		*Telephlebiidae sp.*			
534.		*Thalamarchella alveola*			
535.		*Theridion mortuale*			Y
536.		*Thiaridae sp.*			
537.		*Tipulidae sp.*			
538.		*Uresiphita ornithopteralis*			
539.		*Urodacus novaehollandiae*			
540.		*Veliidae sp.*			
541.		*Venator immansueta*			
542.		*Venatrix pullastra*			
543.		*Xanthorhoe sp. fc42*			
544.		*Xanthorhoe sp. fc455*			
545.		*the dart sp. fc322*			
546.		*unidentifiable unidentifiable*			
Mammal					
547.	25449	*Antechinus flavipes (Yellow-footed Antechinus)*			
548.	24088	*Antechinus flavipes subsp. leucogaster (Yellow-footed Antechinus, Mardo)*			
549.	24162	*Bettongia penicillata subsp. ogilbyi (Woylie, Brush-tailed Bettong)*		T	
550.	30883	*Canis lupus subsp. familiaris (Dog)*	Y		
551.	24086	*Cercartetus concinnus (Western Pygmy-possum, Mundarda)*			
552.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
553.	24187	*Chalinolobus morio (Chocolate Wattled Bat)*			
554.	24092	*Dasyurus geoffroii (Chuditch, Western Quoll)*		T	
555.	24189	*Falsistrellus mackenziei (Western False Pipistrelle)*		P4	
556.	24041	*Felis catus (Cat)*	Y		
557.	24215	*Hydromys chrysogaster (Water-rat)*		P4	
558.	24153	*Isoodon obesulus subsp. fusciventer (Quenda, Southern Brown Bandicoot)*		P5	
559.	24131	*Macropus eugenii subsp. derbianus (Tammar Wallaby (WA subsp))*		P5	
560.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
561.	24133	*Macropus irma (Western Brush Wallaby)*		P4	
562.	24168	*Macrotis lagotis (Bilby, Dalgyte)*		T	
563.	24184	*Mormopterus planiceps (Southern Freetail-bat)*			
564.	24223	*Mus musculus (House Mouse)*	Y		
565.	24042	*Mustela putorius (European Polecat, Ferret)*	Y		
566.	24146	*Myrmecobius fasciatus (Numbat, Walpurti)*		T	
567.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
568.	24195	*Nyctophilus gouldi (Gould's Long-eared Bat)*			
569.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
570.	34016	*Ovis aries (Sheep)*			
571.	25508	*Phascogale tapoatafa (Brush-tailed Phascogale)*			
572.	24099	*Phascogale tapoatafa subsp. tapoatafa (Southern Brush-tailed Phascogale, Wambenger)*		T	
573.	24166	*Pseudocheirus occidentalis (Western Ringtail Possum)*		T	
574.	24245	*Rattus rattus (Black Rat)*	Y		
575.	24145	*Setonix brachyurus (Quokka)*		T	
576.	24111	*Sminthopsis gilberti (Gilbert's Dunnart)*			
577.	25515	*Sminthopsis griseoventer (Grey-bellied Dunnart)*			
578.	24259	*Sus scrofa (Pig)*	Y		
579.	24207	*Tachyglossus aculeatus (Short-beaked Echidna)*			
580.	24185	*Tadarida australis (White-striped Freetail-bat)*			
581.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			
582.	24206	*Vespadelus regulus (Southern Forest Bat)*			
583.	24040	*Vulpes vulpes (Red Fox)*	Y		
Reptile					
584.	42368	*Acritoscincus trilineatus (Western Three-lined Skink)*			
585.	24990	*Aprasia pulchella (Granite Worm-lizard)*			
586.	24991	*Aprasia repens (Sand-plain Worm-lizard)*			
587.	24980	*Christinus marmoratus (Marbled Gecko)*			
588.	30893	*Cryptoblepharus buchananii*			
589.	25035	*Ctenotus delli (Dell's Ctenotus, Darling Range Heath Ctenotus)*		P4	
590.	25047	*Ctenotus impar*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
591.	25049	*Ctenotus labillardieri*			
592.	41403	*Diplodactylus calcicolus (South Coast Gecko)*			
593.	44654	*Diplodactylus lateroides (Speckled Stone Gecko)*			
594.	24939	*Diplodactylus polyophthalmus*			
595.	25100	*Egernia napoleonis*			
596.	30919	*Hemiergis gracilipes*			
597.	25115	*Hemiergis initialis subsp. initialis*			
598.	25118	*Hemiergis peronii subsp. tridactyla*			
599.	25131	*Lerista distinguenda*			
600.	25154	*Lerista microtis subsp. microtis*			
601.	25184	*Menetia greyii*			
602.	25240	*Morelia spilota subsp. imbricata (Carpet Python)*		S	
603.	25192	*Morethia obscura*			
604.	25252	*Notechis scutatus (Tiger Snake)*			
605.	25253	*Parasuta gouldii*			
606.	25255	*Parasuta nigriceps*			
607.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
608.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
609.	25266	*Simoselaps bertholdi (Jan's Banded Snake)*			
610.	25519	*Tiliqua rugosa*			
611.	25207	*Tiliqua rugosa subsp. rugosa*			
612.	25218	*Varanus gouldii (Bungarra or Sand Monitor)*			
613.	25225	*Varanus rosenbergi (Heath Monitor)*			

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

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

Appendix D – Flora data

Flora species list

Likelihood of occurrence assessment

Flora species recorded during the field survey

Family	Genus	Species	Status
Amaranthaceae	*Ptilotus*	*drummondii* subsp. *drummondii*	
Amaranthaceae	*Ptilotus*	*manglesii*	
Apiaceae	*Xanthosia*	*atkinsoniana*	
Apiaceae	*Xanthosia*	*huegelii*	
Asparagaceae	*Chamaescilla*	*corymbsa*	
Asparagaceae	*Laxmannia*	*squarrosa*	
Asparagaceae	*Lomandra*	*?preissii*	
Asparagaceae	*Lomandra*	*caespitosa*	
Asparagaceae	*Thysanotus*	*dichotomus*	
Asparagaceae	*Thysanotus*	*multiflorus*	
Asparagaceae	*Thysanotus*	*patersonii*	
Asteraceae	*Brachyscome*	*iberidifolia*	
Asteraceae	*Cotula*	*turbinata*	*
Asteraceae	*Craspedia*	*variabilis*	
Asteraceae	*Helichrysum*	*luteoalbum*	
Asteraceae	*Hyalosperma*	*cotula*	
Asteraceae	*Hypochaeris*	*glabra*	*
Asteraceae	*Lagenophora*	*huegelii*	
Asteraceae	*Podolepis*	*gracilis*	
Asteraceae	*Ursinia*	*anthemoides*	*
Asteraceae	*Xerochrysum*	*bracteatum*	
Campanulaceae	*Isotoma*	*hypocrateriformis*	
Campanulaceae	*Wahlenbergia*	*sp.*	
Casuarinaceae	*Allocasuarina*	*fraseriana*	
Casuarinaceae	*Allocasuarina*	*humilis*	
Centrolepidaceae	*Centrolepis*	*aristata*	
Cupressaceae	*Callitris*	*pyramidalis*	
Cyperaceae	*Cyanthochaeta*	*avenacea*	
Cyperaceae	*Lepidosperma*	*leptostachyum*	
Cyperaceae	*Lepidosperma*	*pubisquameum*	
Cyperaceae	*Lepidosperma*	*sp.*	

Family	Genus	Species	Status
Cyperaceae	*Mesomelaena*	*tetragona*	
Cyperaceae	*Tetraria*	*octandra*	
Cyperaceae	*Tetraria*	*sp.* Jarrah forest	
Dasypogonaceae	*Dasypogon*	*bromeliifolius*	
Dennstaedtiaceae	*Pteridium*	*esculentum*	
Dilleniaceae	*Hibbertia*	*?spicata*	
Dilleniaceae	*Hibbertia*	*amplexicaulis*	
Dilleniaceae	*Hibbertia*	*commutata*	
Dilleniaceae	*Hibbertia*	*diamesogenos*	
Dilleniaceae	*Hibbertia*	*hypericoides* subsp. *hypericoides*	
Dilleniaceae	*Hibbertia*	*perfoliata*	
Dilleniaceae	*Hibbertia*	*pilosa*	
Dilleniaceae	*Hibbertia*	*racemosa*	
Dilleniaceae	*Hibbertia*	*silvestris*	
Dilleniaceae	*Hibbertia*	*vaginata*	
Elaeocarpaceae	*Tetratheca*	*sp.*	
Ericaceae	*Astroloma*	*ciliatum*	
Ericaceae	*Astroloma*	*pallidum*	
Ericaceae	*Conostephium*	*peundulum*	
Ericaceae	*Leucopogon*	*propinquus*	
Ericaceae	*Leucopogon*	*verticillatus*	
Ericaceae	*Styphelia*	*tenuiflora*	
Euphorbiaceae	*Monotaxis*	*grandiflora*	
Fabaceae	*Acacia*	*applanata*	
Fabaceae	*Acacia*	*browniana* var *endlicheri*	
Fabaceae	*Acacia*	*browniana* var *obscura*	
Fabaceae	*Acacia*	*celastrifolia*	
Fabaceae	*Acacia*	*drummondii* subsp. *candolleana*	
Fabaceae	*Acacia*	*drummondii* subsp. *drummondii*	
Fabaceae	*Acacia*	*extensa*	

Family	Genus	Species	Status
Fabaceae	*Acacia*	*insolita* subsp. *insolita*	
Fabaceae	*Acacia*	*latericola*	
Fabaceae	*Acacia*	*podalyrifolia*	*
Fabaceae	*Acacia*	*preissiana*	
Fabaceae	*Acacia*	*pulchella* var. *pulchella*	
Fabaceae	*Acacia*	*saligna*	
Fabaceae	*Acacia*	*sp.*	
Fabaceae	*Acacia*	*stenoptera*	
Fabaceae	*Acacia*	*pycnantha*	*
Fabaceae	*Bossiaea*	*aquifolium*	
Fabaceae	*Bossiaea*	*eriocarpa*	
Fabaceae	*Bossiaea*	*linophylla*	
Fabaceae	*Bossiaea*	*ornata*	
Fabaceae	*Callistachys*	*lanceolata*	
Fabaceae	*Chamaecytisus*	*palmensis*	*
Fabaceae	*Daviesia*	*costata*	
Fabaceae	*Daviesia*	*incrassata* subsp. *incrassata*	
Fabaceae	*Daviesia*	*longifolia*	
Fabaceae	*Daviesia*	*preissii*	
Fabaceae	*Gastrolobium*	*?bilobum*	
Fabaceae	*Gastrolobium*	*ebracteolatum*	
Fabaceae	*Gompholobium*	*capitatum*	
Fabaceae	*Gompholobium*	*knightianum*	
Fabaceae	*Gompholobium*	*marginatum*	
Fabaceae	*Gompholobium*	*ovatum*	
Fabaceae	*Gompholobium*	*polymorphum*	
Fabaceae	*Gompholobium*	*tomentosum*	
Fabaceae	*Hovea*	*chorizemifolia*	
Fabaceae	*Jacksonia*	*alata*	
Fabaceae	*Jacksonia*	*furcellata*	
Fabaceae	*Kennedia*	*coccinea*	
Fabaceae	*Kennedia*	*prostrata*	

Family	Genus	Species	Status
Fabaceae	*Labichea*	*punctata*	
Fabaceae	*Lotus*	*angustissimus*	*
Fabaceae	*Mirbelia*	*dilatata*	
Fabaceae	*Sphaeolobium*	*medium*	
Fabaceae	*Viminea*	*juncea*	
Genianaceae	*Centaurium*	*tenuiflorum*	
Gonocarpaceae	*Gonocarpus*	*cordiger*	
Goodeniaceae	*Dampiera*	*alata*	
Goodeniaceae	*Dampiera*	*linearis*	
Goodeniaceae	*Goodenia*	*sp.*	
Goodeniaceae	*Lechenaultia*	*biloba*	
Goodeniaceae	*Scaevola*	*calliptera*	
Haemodoraceae	*Anigozanthos*	*bicolor*	
Haemodoraceae	*Anigozanthos*	*manglesii*	
Haemodoraceae	*Conostylis*	*aculeata*	
Haemodoraceae	*Conostylis*	*pusilla*	
Haemodoraceae	*Conostylis*	*setigera*	
Haemodoraceae	*Haemodorum*	*laxum*	
Haemodoraceae	*Haemodorum*	*sp.*	
Haemodoraceae	*Haemodorum*	*spicatum*	
Haemodoraceae	*Phlebocarya*	*ciliata*	
Haemodoraceae	*Ptilotus*	*polystachyus*	
Haloragaceae	*Glischrocaryon*	*aureum*	
Hemerocallidaceae	*Agrostocrinum*	*hirsutum*	
Hemerocallidaceae	*Dianella*	*revoluta*	
Iridaceae	*Patersonia*	*babianoides*	
Iridaceae	*Patersonia*	*occidentalis* var. *occidentalis*	
Iridaceae	*Patersonia*	*pygmaea*	
Iridaceae	*Watsonia*	*sp.*	*
Juncaceae	*Juncus*	*pallidus*	
Lamiaceae	*Hemiandra*	*pungens*	
Lamiaceae	*Lachnostachys*	*albicans*	

Family	Genus	Species	Status
Lamiaceae	*Lavender*	*stoechas*	*
Lauraceae	*Cassytha*	*sp.*	
Loranthaceae	*Nuytsia*	*floribunda*	
Myrtaceae	*Astartea*	*scoparia*	
Myrtaceae	*Babingtonia*	*camphorosmae*	
Myrtaceae	*Callistemon*	*phoenicius*	Planted/naturalised
Myrtaceae	*Calothamnus*	*quadrifidus*	
Myrtaceae	*Calothamnus*	*rupestris*	Planted/naturalised
Myrtaceae	*Corymbia*	*callophylla*	
Myrtaceae	*Darwinia*	*oederoides*	
Myrtaceae	*Eucalyptus*	*marginata*	
Myrtaceae	*Eucalyptus*	*rudis* subsp. *rudis*	
Myrtaceae	*Eucalyptus*	*wandoo*	
Myrtaceae	*Hypocalymma*	*angustifolia*	
Myrtaceae	*Kunzea*	*ericifolia*	
Myrtaceae	*Kunzea*	*micrantha*	
Myrtaceae	*Kunzea*	*recurva*	
Myrtaceae	*Leptospermum*	*erubescens*	
Myrtaceae	*Leptospermum*	*laevigatum*	*
Myrtaceae	*Melaleuca*	*?trichophylla*	
Myrtaceae	*Melaleuca*	*incana*	
Myrtaceae	*Melaleuca*	*pauciflora*	
Myrtaceae	*Melaleuca*	*preissiana*	
Myrtaceae	*Melaleuca*	*rhapiophylla*	
Myrtaceae	*Melaleuca*	*viminea*	
Myrtaceae	*Pericalymma*	*elliptica*	
Myrtaceae	*Rinzia*	*sp.*	
Myrtaceae	*Taxandria*	*linearifolia*	
Orchidaceae	*Caladenia*	*sp.*	
Orchidaceae	*Disa*	*bracteata*	*
Orchidaceae	*Thelymitra*	*crinita*	
Orobanchaceae	*Bartsia*	*trixago*	*

Family	Genus	Species	Status
Pittosporaceae	*Billardiera*	*fraseri*	
Pittosporaceae	*Billardiera*	*fusiformis*	
Poaceae	*Aira*	*cupaniana*	*
Poaceae	*Amphipogon*	*laguroides*	
Poaceae	*Austrostipa*	*mollis*	
Poaceae	*Avena*	*barbata*	*
Poaceae	*Briza*	*maxima*	*
Poaceae	*Briza*	*minor*	*
Poaceae	*Eragrostis*	*?brownii*	
Poaceae	*Eragrostis*	*curvula*	*
Poaceae	*Neurachne*	*alopecuroidea*	
Poaceae	*Rytidosperma*	*sp.*	
Poaceae	*Tetrarrhena*	*laevis*	
Polygalaceae	*Comesperma*	*calymega*	
Polygalaceae	*Comesperma*	*virgatum*	
Porantheraceae	*Poranthera*	*huegelii*	
Primulaceae	*Lysimachia*	*arvensis*	*
Primulaceae	*Oenothera*	*sp.*	
Proteaceae	*Adenanthos*	*obovatus*	
Proteaceae	*Banksia*	*attenuata*	
Proteaceae	*Banksia*	*dallanneyi* subsp. *sylvestris*	
Proteaceae	*Banksia*	*grandis*	
Proteaceae	*Banksia*	*littoralis*	
Proteaceae	*Banksia*	*sessilis*	
Proteaceae	*Banksia*	*sphaerocarpa* var. *sphaerocarpa*	
Proteaceae	*Grevillea*	*bipinnatifida*	
Proteaceae	*Grevillea*	*quercifolia*	
Proteaceae	*Grevillea*	*ripicola*	
Proteaceae	*Hakea*	*amplexicaulis*	
Proteaceae	*Hakea*	*ceratophylla*	
Proteaceae	*Hakea*	*lissocarpha*	

Family	Genus	Species	Status
Proteaceae	*Hakea*	*marginata*	
Proteaceae	*Hakea*	*prostrata*	
Proteaceae	*Hakea*	*ruscifolia*	
Proteaceae	*Hakea*	*sulcata*	
Proteaceae	*Hakea*	*undulata*	
Proteaceae	*Hakea*	*varia*	
Proteaceae	*Persoonia*	*longifolia*	
Proteaceae	*Petrophile*	*linearis*	
Proteaceae	*Stirlingia*	*simplex*	
Proteaceae	*Synaphea*	*?gracillima*	
Proteaceae	*Synaphea*	*floribunda*	
Proteaceae	*Synaphea*	*hians*	
Proteaceae	*Synaphea*	*petiolaris* ?subsp. *petiolaris*	
Proteaceae	*Xylomelum*	*occidentale*	
Ranunculaceae	*Clematis*	*pubescens*	
Restionaceae	*Desmocladus*	*fasciculatus*	
Restionaceae	*Hypolaena*	*exsulca*	
Restionaceae	*Leptocarpus*	*?laxus*	
Restionaceae	*Lyginia*	*imberbis*	
Restionaceae	*Tremulina*	*tremula*	
Rhamnaceae	*Cryptandra*	*sp.*	
Rhamnaceae	*Trymalium*	*odoratissimum*	
Rubiaceae	*Opercularia*	*apiciflora*	
Rutaceae	*Boronia*	*crenulata* subsp. *crenulata*	
Rutaceae	*Phyllanthus*	*calycinus*	
Stackhousiaceae	*Stackhousia*	*huegelii*	
Stackhousiaceae	*Tripterococcus*	*brunonis*	
Sterculiaceae	*Thomasia*	*grandiflora*	
Stylidiaceae	*Stylidium*	*amoenum*	
Stylidiaceae	*Stylidium*	*brunonianum*	
Stylidiaceae	*Stylidium*	*calcaratum*	
Stylidiaceae	*Stylidium*	*piliferum*	

Family	Genus	Species	Status
Thymeleaceae	*Pimelea*	*ciliata* subsp. *ciliata*	
Thymeleaceae	*Pimelea*	*imbricata* var *piligera*	
Thymeleaceae	*Pimelea*	*rosea*	
Xanthorrhoaceae	*Xanthorrhoea*	*gracilis*	
Xanthorrhoaceae	*Xanthorrhoea*	*preissii*	
Zamiaceae	*Macrozamia*	*reidlei*	

* Denotes introduced or naturalised species

Flora Likelihood of Occurrence assessment guidelines

Likelihood of Occurrence	Guideline
Known	Species recorded within survey area from field survey results.
Likely	Species previously recorded within 5 km and large areas of suitable habitat occur in the 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 study area and/or the 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

Source information - desktop searches

PMST – DotE Protected Matters Search Tool (PMST) to identify flora listed under the EPBC Act potentially occurring within the study area (accessed November 2016)

DPaW – DPaW (2016) records of threatened flora, database search within the study area (accessed October 2016)

NM – DPaW NatureMap (accessed November 2016)

Survey – recorded within the survey area during the 2016 assessment

Flora Likelihood of Occurrence Assessment

Family	Taxon	EPBC Act	WC Act /DPaW	Description	Habitat	Likelihood of Occurrence	Source
Orchidaceae	*Caladenia leucochila*	Cr	Cr	Tuberous perennial herb. Flowers September.	Mid slopes with damp lowlands. Sand over laterite.	Likely – Species previously recorded immediately adjacent to survey area and suitable habitat present.	NM, DPaW
Orchidaceae	*Caladenia lodgeana*	Cr	Cr	Tuberous perennial herb. White flowers, October.	Black loam.	Highly Unlikely – Previous records have this species occurring between Cape Leeuwin and Cape Naturaliste.	PMST
Orchidaceae	*Caladenia bryceana* subsp. *bryceana*	En	En	Tuberous perennial herb, 0.05-0.1 m high. Green-yellow flowers, August to October.	Sand, loam. Adjacent to watercourses, winter-wet sites.	Unlikely – Species not previously recorded within 5 km of survey area and limited suitable habitat present.	PMST, NM
Malvaceae	*Commersonia erythrogyna*	En	En	A small shrub/under shrub to 1.5 m height and up to 1 m width. Leaves entire. Terminal inflorescence of cymes. Flowers usually white. Flowers September.	Outcropping laterite.	Unlikely - Limited suitable habitat and not recorded during survey.	PMST
Proteaceae	*Grevillea rara*	En	En	Dense, prickly shrub to 2 m high. White-pink/white flowers, October.	Lateritic loam. Creeklines.	Known – Species recorded within survey area.	PMST, NM
Fabaceae	*Jacksonia velveta*	En	En	Open, upright, sometimes sprawling shrub to 1.9 m high. Yellow-orange flowers, December.	Brown gravelly loam, dry grey sand, ironstone. Slight hill slopes, ridges.	Possible – Species previously recorded within 5 km of survey area and suitable habitat present.	PMST, NM
Orchidaceae	*Diuris drummondii*	Vu	Vu	Tuberous perennial herb, 0.5-1.05 m high. Yellow flowers, November to December or January.	Low-lying depressions, swamps.	Unlikely – Species not recorded within 40 km of survey area.	PMST

Family	Taxon	EPBC Act	WC Act /DPaW	Description	Habitat	Likelihood of Occurrence	Source
Orchidaceae	*Diuris micrantha*	Vu	Vu	Tuberous perennial herb, 0.3-0.6 m high. Yellow and brown flowers, September to October.	Brown loamy clay. Winter-wet swamps in shallow water.	Unlikely - suitable habitat not present.	PMST, NM
Lamiaceae	*Hemigenia rigida*		P1	Upright or spreading shrub, 0.1-0.6(-1) m high. Fl. blue-purple/violet, Aug to Dec or Jan.	Sandy soils, lateritic gravelly soils. Hillslopes, granite outcrops, flats, ironstone ridges.	Possible – Suitable habitat present and species is similar to common *Hemigenia* species.	NM
Ericaceae	*Leucopogon extremus*		P2	Low shrub to 0.5 m high. Flowers greenish white. September to October.	Wet sandy clay to sandy loam.	Known - species previously recorded from survey area and suitable habitat present.	NM
Elaeocarpaceae	*Tetratheca parvifolia*		P2	Small shrub, 0.2-0.3 m high. Flowers mauve pink. October	Dry, brown, gravelly loam over laterite	Possible – Suitable habitat present and plant is small.	NM
Fabaceae	*Sphaerolobium benetectum*		P2	Slender, caespitose shrub, 0.2-1 m high, to 0.45 m wide. Fl. pink & red & yellow, Oct to Nov.	White gravelly sandy clay, sandy loam, granite, laterite. Ridges, swamps, undulating rises.	Possible - suitable habitat present and plant is not distinctive when not in flower.	NM
Juncaceae	*Juncus meianthus*		P2	Tufted perennial herb, 0.05-0.2 m high. Brown flowers, November to January.	Black sand, sandy clay. Creeks, seepage areas.	Possible - suitable habitat present and plant is not distinctive when not in flower.	NM
Loganiaceae	*Logania sylvicola*		P2	Erect, compact shrub 30 cm high x 20 cm wide. Fl. White. Aug to Sept.	Sandy, gravelly, loamy. Dry or winter wet.	Possible - suitable habitat present and plant is not distinctive when not in flower.	NM
Stylidiaceae	*Stylidium acuminatum*		P2	Basally tufted perennial herb to 10-35 cm high. Flowers	Sand, gravelly clay loam. Lateritic ridges.	Possible – Suitable habitat present and plant is small.	NM

Family	Taxon	EPBC Act	WC Act /DPaW	Description	Habitat	Likelihood of Occurrence	Source
	subsp. acuminatum			pale yellow. October to November.			
Proteaceae	*Adenanthos cygnorum* subsp. *chamaephyton*		P3	Prostrate, mat-forming, non-lignotuberous shrub to 0.3 m high. White-cream-pink-green flowers, July or September or December to January.	Grey sand, lateritic gravel.	Unlikely – Suitable habitat present but not recorded during survey.	NM
Myrtaceae	*Calytrix pulchella*		P3	Shrub, 0.3-0.7 m high. Pink flowers from August to November.	Grey or white sand over laterite. Ridges, flats.	Unlikely - suitable habitat present but not seen during survey.	NM
Apiaceae	*Eringium sp. ferox (G. J. Keighery 16034)*		P3	Tuberous perennial herb. Herb, 30 cm high, 7 cm wide. Long jointed leaves. Perennial, erect, open. Blue flowers. Summer.	Winter wet flats with depressions. Grey clay. Moist brown clay. Granite derived soil over limestone.	Unlikely - suitable habitat not present.	NM
Proteaceae	*Grevillea prominens*		P3	Spreading shrub, 0.5-1.7 m high, 0.3-1 m wide. Cream-white flowers, September to October.	Gravelly loam. Along creeklines.	Unlikely – Suitable habitat present but not recorded during survey.	NM
Asparagaceae	*Lomandra whicherensis*		P3	Tufted rhizomatous herb. 20 to 40 cm high x 30 cm wide. Flowers cream/purple/yellow. November to December.	High broad ridge of Darling Plateau. Gravelly brown sandy loam. Laterite.	Possible - suitable habitat present and plant is not distinctive when not in flower.	NM
Haloragaceae	*Meionectes tenuiflora*		P3	Perennial, prostrate erect, annaual herb. Height: 10-20 cm and width: 10-20 cm. Red stems.	Brown/black clayey sand. Winter wet areas,	Unlikely - suitable habitat not present.	NM

Family	Taxon	EPBC Act	WC Act /DPaW	Description	Habitat	Likelihood of Occurrence	Source
				Cream/green/orange flowers. Oct to Dec.	depressions. Granites		
Stylidiaceae	*Stylidium lepidum*		P3	Spreading, rosette perennial herb to 0.05 m high, forming densely packed colonies. Pink-orange flowers, October to November.	Gravelly sand or loam, clay. Winter-wet depressions.	Possible – Species previously recorded within 5 km of survey area and is very small.	NM
Proteaceae	*Synaphea decumbens*		P3	Decumbent shrub. Yellow flowers, September to October.	Sand over laterite.	Unlikely - not recorded during survey and Synaphea species targeted and collected.	NM
Proteaceae	*Synaphea hians*		P3	Prostrate or Decumbent shrub, 0.15-0.6 m high, to 1 m wide. Yellow flowers, July or September to November.	Sandy soils. Rises.	Known – Species previously recorded within survey area.	Ngh 2011b
Proteaceae	*Synaphea petiolaris subsp. simplex*		P3	Tufted shrub, 0.1-0.6 m high. Fl. yellow, Sep to Oct.	Sandy soils. Flats, winter-wet areas.	Known – Species previously recorded within survey area and very similar to other Synaphea species.	NM
Asparagaceae	*Thysanotus unicupensis*		P3	Erect herb, 24 cm high. Flower: inflorescence compact. Leaves circular. Purple flowers, October to December.	Grey sandy loam over laterite; gravel; clayey sand	Possible – Suitable habitat is present and species is small.	NM
Myrtaceae	*Verticordia attenuata*		P3	Shrub, 0.4-1 m high. Fl. pink, Dec or Jan to May.	White or grey sand. Winter-wet depressions.	Possible – Species previously recorded within 5 km of survey area	NM
Stylidiaceae	*Stylidium rhipidium*		P3	Slender annual, herb, ca 0.05 m high. Fl. white, Oct to Nov.	Sandy soils. Wet creek flats, swamps, granite outcrops.	Unlikley – Species not previously recorded within 5 km of survey area and limited suitable habitat present.	NM

Family	Taxon	EPBC Act	WC Act /DPaW	Description	Habitat	Likelihood of Occurrence	Source
Fabaceae	*Acacia semitrullata*		P4	Slender, erect, pungent shrub, 0.2 -0.7 m high. Cream-white flowers, May to October.	White/grey sand, sometimes over laterite, clay. Sandplains, swampy areas.	Likely – Species previously recorded within 5 km of survey area and some habitat present.	NM, DPaW
Myrtaceae	*Calothamnus graniticus subsp. leptophyllus*		P4	Erect, multi-stemmed shrub, 1-2 m high. Fl. red, Jun to Aug.	Clay over granite, lateritic soils. Hillsides	Unlikely - suitable habitat present but not seen during survey.	NM
Myrtaceae	*Eucalyptus rudis subsp. cratyantha*		P4	Tree, 5-20 m high, bark rough, box-type. Cream-white flowers, July to Sept.	Loam. Flats, hillsides	Possible – Species not previously recorded within 5 km of survey area but suitable habitat present.	NM
Proteaceae	*Grevillea ripicola*		P4	Spreading, much-branched, non-lignotuberous shrub, 0.6-2(-3) m high, to 4 m wide. Fl. red/red-orange, Jan or Mar to Apr or Nov to Dec.	Sandy clay, clay or gravelly loam. Swampy flats, granite outcrops, along watercourses.	Known – Species recorded immediately adjacent to the survey area during survey.	NM
Restionaceae	*Hypolaena robusta*		P4	Dioecious rhizomatous, perennial, herb, ca 0.5 m high. Brown flowers, Sep to Oct.	White sand. Sandplains.	Possible – Species previously recorded within 5 km of survey area and some suitable habitat present.	NM
Malvaceae	*Lasiopetalum cardiophyllum*		P4	Erect, multi-stemmed shrub, 0.2-0.5 m high. Fl. pink, Aug to Dec or Jan.	Lateritic gravelly soils, sandy clay. Flats, hillslopes	Possible – Species previously recorded within 20 km of survey area and suitable habitat present.	NM
Fabaceae	*Pultenaea skinneri*		P4	Slender shrub, 1-2 m high. Yellow/orange and red flowers, July to September.	Sandy or clayey soils. Winter-wet depressions.	Unlikely – Some suitable habitat present but not recorded during survey.	NM
Cyperaceae	*Schoenus natans*		P4	Aquatic annual, grass-like or herb (sedge), 0.3 m high. Flowers brown, Oct.	Winter wet depressions.	Unlikely – Species not previously recorded within 5 km of survey area and limited habitat present.	NM

Appendix E – Fauna data

Fauna species recorded during the field survey

Family	Scientific Name	Common Name	Species listing	Numbers
Birds				
Acanthizidae	*Gerygone fusca*	Western Gerygone		1
Acanthizidae	*Smicrornis brevirostris*	Weebill		4
Acanthizidae	*Sericornis frontalis*	White-browed Scrubwren		1
Accipitridae	*Accipiter fasciatus*	Brown Goshawk		1
Accipitridae	*Aquila audax*	Wedge-tailed Eagle		1
Artamidae	*Artamus cinereus*	Black-faced Woodswallow		2
Artamidae	*Cracticus tibicen*	Australian Magpie		1
Artamidae	*Strepera versicolor*	Grey Currawong		1
Climacteridae	*Climacteris rufa*	Rufous Treecreeper		1
Cacatuidae	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo	Vu, Vu, S3	3
Cacatuidae	*Calyptorhynchus baudinii*	Baudin's Black Cockatoo	Vu, En, S3	2
Cacatuidae	*Calyptorhynchus latirostris*	Carnaby's Black Cockatoo	En, En, S2	6
Cacatuidae	*Eolophus roseicapillus*	Galah		2
Casuariidae	*Dromaius novaehollandiae*	Emu		1
Corvidae	*Corvus coronoides*	Australian Raven		6
Columbidae	*Phaps chalcoptera*	Common Bronzewing		1
Cuculidae	*Chalcites basalis*	Horsfield's Bronze-Cuckoo		1
Halcyonidae	*Dacelo novaeguineae*	Laughing Kookaburra		1

Family	Scientific Name	Common Name	Species listing	Numbers
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		4
Maluridae	*Malurus splendens*	Splendid Fairy-wren		2
Megaluridae	*Cincloramphus mathewsi*	Rufous Songlark		2
Meliphagidae	*Acanthorhynchus superciliosus*	Western Spinebill		1
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird		2
Meliphagidae	*Anthochaera chrysoptera*	Little Wattlebird		1
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater		1
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater		2
Meliphagidae	*Phylidonyris niger*	White-cheeked Honeyeater		2
Meliphagidae	*Phylidonyris novaehollandiae*	New Holland Honeyeater		1
Meropidae	*Merops ornatus*	Rainbow Bee-eater		1
Monarchidae	*Grallina cyanoleuca*	Mudlark		2
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit		2
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush		1
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler		1
Pardalotidae	*Pardalotus striatus*	Striated Pardalote		2
Petroicidae	*Petroica boodang*	Scarlet Robin		1
Petroicidae	*Microeca fascinans*	Jacky Winter		2
Phasianidae	*Coturnix ypsilophora*	Brown Quail		1
Psittacidae	*Barnardius zonarius*	Australian Ringneck		4

Family	Scientific Name	Common Name	Species listing	Numbers
Psittacidae	*Platycercus icterotis*	Western Rosella		1
Psittacidae	*Purpureicephalus spurius*	Red-capped Parrot		2
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail		1
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail		1
Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis		4
Zosteropidae	*Zosterops lateralis*	Silvereye		4
Reptiles				
Elapidae	*Notechis scutatus*	Tiger Snake		1
Elapidae	*Pseudonaja affinis*	Dugite		1
Scincidae	*Acritoscincus trilineatus*	Western Three-lined Skink		1
Scincidae	*Cryptoblepharus buchananii*	Buchanan's Snake-eyed Skink		1
Scincidae	*Egernia napoleonis*	South-western Crevice-skink		1
Scincidae	*Menetia greyii*	Common Dwarf Skink		1
Scincidae	*Morethia obscura*	Shrubland Morethia Skink		1
Scincidae	*Tiliqua rugosa*	Bobtail		1
Varanidae	*Varanus gouldii*	Sand Goanna		1
Varanidae	*Varanus rosenbergi*	Heath Monitor		1
Amphibia				
Myobatrachidae	*Crinia glauerti*	Clicking Frog		1
Mammals				

Family	Scientific Name	Common Name	Species listing	Numbers
Canidae	*Vulpes vulpes*	Fox	int	1
Dasyuridae	*Dasyurus geoffroii*	Chuditch	Vu, Vu, S3	possible scats
Leporidae	*Oryctolagus cuniculus*	Rabbit	int	1
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo		2
Macropodidae	*Macropus irma*	Western Brush Wallaby	P4	2
Suidae	*Sus scrofa*	Pig	int	1
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna		1
Phalangeridae	*Trichosurus vulpecula*	Common Brushtail Possum		scats
Peramelidae	*Isoodon obesulus*	Southern Brown Bandicoot	P4	Digs

- **Parameters of fauna likelihood of occurrence assessment**

Assessment outcome	Description
Present	Species recorded during the field survey or from recent, reliable records from within or close proximity to the survey area.
Likely	Species are **likely** to occur in the survey area where there is suitable habitat within the survey area and there are recent records of occurrence of the species in close proximity to the survey area. OR Species known distribution overlaps with the survey area and there is suitable habitat within the survey area.
Unlikely	Species assessed as **unlikely** include those species previously recorded within 5 km of the survey area however: • There is limited (i.e. the type, quality and quantity of the habitat is generally poor or restricted) habitat in the survey area. • The suitable habitat within the survey area is isolated from other areas of suitable habitat and the species has no capacity to migrate into the survey area. OR Those species that have a known distribution overlapping with the survey area however: • There is limited habitat in the survey area (i.e. the type, quality and quantity of the habitat is generally poor or restricted). • The suitable habitat within the survey area is isolated from other areas of suitable habitat and the species has no capacity to migrate into the survey area.
Highly unlikely	Species that are considered **highly unlikely** to occur in the survey area include: • Those species that have no suitable habitat within the survey area. • Those species that have become locally extinct, or are not known to have ever been present in the region of the survey area.

Definitions:

Survey area = a 5 km buffer around the survey area

Source information - desktop searches

PMST – DotE Protected Matters Search Tool (PMST) to identify fauna listed under the EPBC Act potentially occurring within the survey area

DPaW – DPaW (2007 -) records of threatened fauna, database search within the survey area (accessed April 2016)

NM – DPaW NatureMap (accessed April 2016)

Add – DPaW 2015. WA Government, Department of Parks and Wildlife Threatened and Priority fauna rankings (current as of 20 November 2015) - *Wildlife Conservation Act 1950*

Fauna likelihood of occurrence assessment

Common name (species name)	Status (WC Act/DPAW, EPBC Act)		Source			Description & habitat requirements	Habitat with survey areas / Records (NatureMap)	Likelihood of Occurrence
	WC Act	EPBC Act	NM	EPBC PMST	South west			
Birds								
Calyptorhynchus latirostris (Carnaby's Black Cockatoo)	EN	EN	X	X	X	Carnaby's Black Cockatoo mainly occurs in uncleared or remnant native eucalypt woodlands and in shrubland or kwongan heathland dominated by Hakea, Banksia and Grevillea species. The species also occurs in forests containing Marri (*Corymbia calophylla*), Jarrah (*Eucalyptus marginata*) or Karri (*E. diversicolor*). Breeding usually occurs in the Wheatbelt region of WA in large Wandoo (*E. wandoo*), 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 *Allocasuarina, Banksia, Eucalyptus, Grevillea* and Hakea, and some introduced plants (DSEWPaC 2012).	Habitat Feeding and potential Breeding Habitat present Records Numerous records in the region	Known
Calyptorhynchus banksii naso (Forest Red-tailed Black Cockatoo)	VU	VU	X	X	X	Forest Red-tailed Black Cockatoo typically occurs in dense Jarrah (*Eucalyptus marginata*), Karri (*E. diversicolor*) and Marri (*Corymbia calophylla*) forests, however the species also occurs in a range of other forest and woodland types, including Blackbutt (*E. patens*), Wandoo (*E. wandoo*), Tuart (*E. gomphocephala*), Albany Blackbutt, Yate (*E. cornuta*), and Flooded Gum (*E. rudis*) (DSEWPaC, 2012). Habitats also tend to have an understorey of *Banksia spp*., *Persoonia spp*., *Allocasuarina spp*. 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).	Habitat Feeding and potential Breeding Habitat present Records Numerous records in the region	Known

Common name (species name)	Status (WC Act/DPAW, EPBC Act)		Source			Description & habitat requirements	Habitat with survey areas / Records (NatureMap)	Likelihood of Occurrence
	WC Act	EPBC Act	NM	EPBC PMST	South west			
Calyptorhynchus baudinii (Baudin's Cockatoo)	EN	VU	X	X	X	Baudin's Black Cockatoo occurs in high-rainfall areas, usually at sites that are heavily forested and dominated by Marri (*Corymbia calophylla*) and Eucalyptus species, especially Karri (*E. diversicolor*) and Jarrah (*E. marginata*). The species also occurs in woodlands of Wandoo (*E. wandoo*), Blackbutt (*E. patens*), Flooded Gum (*E. rudis*), and Yate (*E. cornuta*), 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).	<u>Habitat</u> Feeding and potential Breeding Habitat present <u>Records</u> Numerous records in the region	Known

Common name (species name)	Status (WC Act/DPAW, EPBC Act)		Source			Description & habitat requirements	Habitat with survey areas / Records (NatureMap)	Likelihood of Occurrence
	WC Act	EPBC Act	NM	EPBC PMST	South west			
Botaurus poiciloptilus (Australasian Bittern)	EN	EN		X	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*, canegrass *Eragrostis* or other dense vegetation (Marchant & Higgins 1990). It occasionally ventures into areas of open water or onto banks.	Habitat No habitat present Records No records in the survey area	Unlikely
Calidris ferruginea (Curlew Sandpiper)	VU	CR		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).	Habitat No habitat present Records No records in the survey area	Unlikely

Common name (species name)	Status (WC Act/DPAW, EPBC Act)		Source			Description & habitat requirements	Habitat with survey areas / Records (NatureMap)	Likelihood of Occurrence
	WC Act	EPBC Act	NM	EPBC PMST	South west			
Charadrius rubricollis (Hooded Plover)	P4	M		X	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 move inland during the wet season (Morcombe, 2004).	Habitat No habitat present Records No records in the survey area	Unlikely
Falco peregrinus (Peregrine Falcon)	OS		X		X	The Peregrine Falcon is seen occasionally anywhere in the south-west of WA. It is found everywhere from woodlands to open grasslands and coastal cliffs - though less frequently in desert regions. The species is known to have a very large home range and nests primarily on ledges of cliffs, shallow tree hollows, and ledges of building in cities (Morcombe 2004).	Habitat Forest habitat is present in the area Records Records are present in the region and have been recorded within 5 km of the survey area.	Likely

Common name (species name)	Status (WC Act/DPAW, EPBC Act)		Source			Description & habitat requirements	Habitat with survey areas / Records (NatureMap)	Likelihood of Occurrence
	WC Act	EPBC Act	NM	EPBC PMST	South west			
Apus pacificus (Fork-tailed Swift)	S5	Ma, Mi		X	X	There are widespread records of the Fork-tailed Swift from Wyndham through north and east Kimberley to the south-west Pilbara, but they are scarce in the south west. They are common in coastal and sub coastal areas between Carnarvon and Augusta including near and offshore islands. There are scattered records along south coast from Denmark east to Cocklebiddy on the Great Australian Bight, and sparsely scattered records inland. They are found across a range of habitats, from inland open plains to wooded areas. They are most often observed over inland plains in Australia, but sometimes recorded over coastal cliffs and beaches as well as urban areas. They have been recorded well out to sea as well as from offshore islands especially when on passage from Indonesia. This species is almost exclusively aerial (DotE 2015).	Habitat No habitat present Records This species is solely areal and no records are present in the survey area	Unlikely
Leipoa ocellata (Malleefowl)	VU	VU	X	X	X	The Malleefowl generally occurs in semi-arid areas of Western Australia, from Carnarvon to south east of the Eyre Bird Observatory (south-east WA). It occupies shrublands and low woodlands that are dominated by mallee vegetation, as well as native pine Callitris woodlands, Acacia shrublands, Broombush (*Melaleuca uncinata*) vegetation or coastal heathlands. The nest is a large mound of sand or soil and organic matter (Jones and Goth 2008; Morcombe 2004).	Habitat Some habitat is present for this species however it is considered extinct in the region Records No records in the survey area	Unlikely

Common name (species name)	Status (WC Act/DPAW, EPBC Act)		Source			Description & habitat requirements	Habitat with survey areas / Records (NatureMap)	Likelihood of Occurrence
	WC Act	EPBC Act	NM	EPBC PMST	South west			
Numenius madagascariensis (Eastern Curlew)	VU	CR		X		The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (Marchant & Higgins 1993).	Habitat No habitat present Records No records in the survey area	Unlikely
Ixobrychus flavicollis subsp. australis (Australian Black Bittern)	P1		X		X	The Black Bittern tends to be found on smaller bodies of water, particularly along creek lines with shadowy, leafy waterside trees (callistemon, casuarina, paperbark, eucalypt, mangrove, and willows), in sheltered mudflats, and oyster-slats. In the south west they are found on the quieter river systems, often where there are large paperbarks. They can be found in the coastal south west from Perth, through Margaret River, to Northcliffe (Nevill 2013; Pizzey and Knight 2012).	Habitat No habitat present Records No records in the survey area	Unlikely
Tyto novaehollandiae novaehollandiae (Masked Owl)	P3				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).	Habitat Habitat is present for this species. Records No records are present in the region	Unlikely

Common name (species name)	Status (WC Act/DPAW, EPBC Act)		Source			Description & habitat requirements	Habitat with survey areas / Records (NatureMap)	Likelihood of Occurrence
	WC Act	EPBC Act	NM	EPBC PMST	South west			
Grey Wagtail (*Motacilla cinerea*)		IA		X		A migratory species that regularly visits northern Australia particularly the area from Broome to Darwin (Morcombe 2004). The species prefers coastal habitat near to water where it prefers to forage. However the species has been recorded further inland feeding on plains (Morcombe 2004).	Habitat No habitat present Records No records in the survey area	Unlikely
Reptiles								
Ctenotus delli (Dell's Ctenotus)	P4		X		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).	Habitat Habitat is present in the survey area Records Records are present in the region and have been recorded within 5 km of the survey area.	Likely
Fishes								
Geotria australis (Pouched Lamprey)	P1		X		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.	Habitat Habitat is present in the Collie River and several small seasonal creeks. Records Two historical records are known from the Collie area in the Collie River dated 1912 and 1915.	Unlikely no recent records in the region.

Common name (species name)	Status (WC Act/DPAW, EPBC Act)		Source			Description & habitat requirements	Habitat with survey areas / Records (NatureMap)	Likelihood of Occurrence
	WC Act	EPBC Act	NM	EPBC PMST	South west			
Nannatherina balstoni (Balston's Pygmy Perch)	VU	VU		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).	Habitat Habitat is present in the Collie River and several small seasonal creeks. Records No records in the survey area or region species is present along the south coast.	Unlikely
Mammals								
Bettongia penicillata (Woylie or Brush-tailed Bettong)	CR	EN	X	X	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 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 Gastrolobium (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).	Habitat Habitat is present for this species. Records Historical records are present in the region however the species is now confined to areas that are under extensive management for feral pests.	Unlikely

Common name (species name)	Status (WC Act/DPAW, EPBC Act)		Source			Description & habitat requirements	Habitat with survey areas / Records (NatureMap)	Likelihood of Occurrence
	WC Act	EPBC Act	NM	EPBC PMST	South west			
Dasyurus geoffroii (Chuditch or Western Quoll)	VU	VU	X	X	X	The Chuditch inhabits eucalypt forest (especially Jarrah, *Eucalyptus marginata*), 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 and Strahan 2008). The species can travel large distances, has a large home range and is sparsely populated through a large portion of its range.	Habitat Habitat is present for this species Records Records are present in the area (within 2.5 km) and surrounding the survey area	Likely, some droppings were found likely to be this species
Falsistrellus mackenziei (Western False Pipistrelle)	P4		X		X	The Western False Pipistrelle occurs in wet sclerophyll forest dominated by Karri (*Eucalyptus diversicolor*), and in the high rainfall zones of the Jarrah (*E. marginata*) and Tuart (*E. gomphocephala*) 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 (*E. calophylla*), Sheoak (*Casuarina heugeliana*) and Peppermint (*Agonis flexuosa*) trees are often co-dominant at its collection localities (Churchill 2008; McKenzie & Start 1999).	Habitat Habitat is present for this species Records Recent records (2007 and 2010) are present in the area and surrounding the survey area	Likely, several records are present in the survey area.
Hydromys chrysogaster (Water Rat)	P4		X		X	The Water Rat lives in the vicinity of permanent bodies of fresh or brackish water, from sub-alpine streams to lakes and farm dams, and on sheltered coastal beaches, mangroves and offshore islands. It can travel considerable distance overland and is an occasional vagrant to temporary waters. Water Rat's dens are made at the end of tunnels in banks and occasionally in logs (Van Dyck and Strahan 2008).	Habitat Habitat is present along the Collie river Records Several records are present in the region and appear to be along the Collie river.	Likely, This species is likely to be present in the Collie River only.

Common name (species name)	Status (WC Act/DPAW, EPBC Act)		Source			Description & habitat requirements	Habitat with survey areas / Records (NatureMap)	Likelihood of Occurrence
	WC Act	EPBC Act	NM	EPBC PMST	South west			
Myrmecobius fasciatus (Numbat)	T	VU	X	X	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 (*Eucalyptus astringens*) plantations. Habitats usually have an abundance of termites in the soil, hollow logs and branches for shelter (DPaW 2015). 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).	Habitat Habitat is present for this species. Records Historical records are present in the region however the species is now confined to areas that are under extensive management for feral pests	Unlikely
Phascogale calura (Red-tailed Phascogale)	CD	EN		X		The Red-tailed Phascogale inhabits Wandoo (*Eucalyptus wandoo*) and dense Sheoak (*Allocasuarina huegeliana*) woodland associations, with populations being most dense in the latter vegetation type. The species prefers vegetation that is unburnt for a long time, which provides continuous canopy cover to assist their arboreal habits. Trees need to be of a sufficient age to provide hollows for nesting in limbs or logs, and grass trees need to have ample skirts to provide cover. Small, scattered populations still occur in remnant vegetation in the Wheatbelt (Van Dyke and Strahan 2008).	Habitat Very little Wandoo habitat is present in the survey area. Records No records are present in the region	Unlikely

Common name (species name)	Status (WC Act/DPAW, EPBC Act)		Source			Description & habitat requirements	Habitat with survey areas / Records (NatureMap)	Likelihood of Occurrence
	WC Act	EPBC Act	NM	EPBC PMST	South west			
Pseudocheirus occidentalis (Western Ringtail Possum)	CR	Vu	X	X	X	The Western Ringtail Possum core habitat occurs in and near coastal Peppermint Tree (*Agonis flexuosa*) forest and Tuart (*Eucalyptus gomphocephala*) dominated forest with a Peppermint Tree understorey from Bunbury to Albany. The species also occurs in Jarrah (*Eucalyptus marginata*) forest and Jarrah-Marri (*Corymbia calophylla*) forest associated with Peppermint Tree (Van Dyck and Strahan, 2008).	Habitat Habitat is present for this species Records Records are present in the area and surrounding the survey area	Likely
Macrotis lagotis (Bilby)	Vu	Vu	X			The Greater Bilby now occupies sand plains, sandy dune systems or along drainage or salt lake systems (DEC 2012). They occur in three major vegetation types; open tussock grassland on uplands and hills, mulga woodland/shrubland growing on ridges and rises and hummock grassland in plains and alluvial areas. In the south of its range, the Greater Bilby lives on rises and ridges among sparse grasses, especially mitchell grass and short shrubs. In WA there are disjunct populations in the Gibson Desert, south-western Kimberley, inland areas of the Pilbara and northern Great Sandy Desert (Van Dyke & Strahan, 2008). There are no naturally occurring populations remaining in the south west of Western Australia.	Habitat Habitat is present for this species. Records Historical records are present in the region however the species is now locally exinct.	Highly Unlikely

Common name (species name)	Status (WC Act/DPAW, EPBC Act)		Source			Description & habitat requirements	Habitat with survey areas / Records (NatureMap)	Likelihood of Occurrence
	WC Act	EPBC Act	NM	EPBC PMST	South west			
Setonix brachyurus (Quokka)	VU	VU	X	X	X	Dense forests and thickets, streamside vegetation, heaths and shrublands *Agonis linearifolia*-dominated swamps in the Jarrah (*Eucalyptus marginata*) 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).	Habitat Habitat is present along Centaur Road in dampland areas. Records The quokka is known from the region in disjunct populations in damplands and along riparian areas. The closest population is 5-10 km away.	Unlikely, based on current records the species is not known to be present in the survey area.
South-western Brush-tailed Phascogale *(Phascogale tapoatafa wambenger*)	VU		X		X	The South-western Brush-tailed Phascogale prefer 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). The species is found throughout south Western Australia where habitat remains available.	Habitat Habitat is present for this species Records Records are present in the area and surrounding the survey area with one record within 5 km of the survey area.	Likely
(*Isoodon obesulus fusciventer)* Quenda or 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).	Habitat Habitat is present for this species Records Records are present in the area and surrounding the survey area	Known from digs in the dampland along Centaur Road

Common name (species name)	Status (WC Act/DPAW, EPBC Act)		Source			Description & habitat requirements	Habitat with survey areas / Records (NatureMap)	Likelihood of Occurrence
	WC Act	EPBC Act	NM	EPBC PMST	South west			
Macropus eugenii derbianus (Tammar Wallaby)	P4		X		X	The Tammar 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 tammar wallaby is currently known to inhabit three islands in the Houtman Abrolhos group, Garden Island near 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).	Habitat Habitat is present for this species Records Historical records are present in the area however the species would be locally extinct	Unlikely
(*Macropus Irma*) Western Brush Wallaby	P4	-	X		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 WA but has undergone a reduction in range and a significant decline in abundance in its current habitat. (Van Dyke and Strahan 2008).	Habitat Habitat is present for this species Records Numerous records are present in the region and survey area.	Known the species was observed and scats recorded.

Definitions:

NM = Naturemap

EPBC PMST= Environment Protection and Biodiversity Conservation Act (1999) Protected Matters Search Tool

WC Act = Wildlife Conservation Act (1950)

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