



Water Corporation  
Dedari and Ghooli Pump Stations  
Flora, Vegetation and Fauna Assessment

October 2017

# Executive summary

The Water Corporation is proposing to remediate two heritage listed sites along the Golden Pipeline, Ghooli and Dedari Steam Pump Stations, located in the Shires of Yilgarn and Coolgardie respectively. The remediation works will involve the removal/ disturbance of approximately 5,000 cubic metres of material containing asbestos and the reburial of this material in a containment cell on each of the sites.

GHD Pty Ltd (GHD) was commissioned by the Water Corporation to undertake a biological assessment of the survey area. The purpose of the assessment was to define the environmental values within the survey area to inform planning for the remediation works. The outcomes of the assessment will be used in the environmental assessment and approvals process.

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.

## Key findings

### Flora and vegetation

The survey areas comprised six vegetation associations and two modified associations. All vegetation associations were well represented in areas adjacent to the survey area as well as in the local and broader areas. The vegetation associations are not considered representative of any Federal or State listed TECs or PECs, other significant vegetation as defined by the EPA (2016a) nor considered to be growing in association with watercourses or wetlands. The vegetation condition within the survey area was rated from Excellent to Completely Degraded.

No EPBC Act, WC Act or DBCA Priority-listed flora were recorded within the survey areas. A likelihood of occurrence assessment post-field survey concluded that no taxa are likely to occur, six taxa may possibly occur and the remaining 38 taxa are unlikely to occur within the survey areas. The six taxa that may possibly occur (*Goodenia heatheriana* (P1), *Millotia newbeyi* (P1), *Rinzia fimbriolata* (P1), *Teucrium* sp. dwarf (R. Davis 8813) (P1) and *Stylidium choreanthum* (P3) within the Ghooli survey area and *Gompholobium cinereum* (P3) within the Dedari survey area) have been recorded within the study areas, can be cryptic species and field survey was undertaken outside of the reported flowering periods for all of the species.

### Fauna

Five broad fauna habitat types were identified within the survey areas during the field survey, all of which are well represented at a local and regional scale.

No conservation significant fauna species were recorded during the survey in either Ghooli or Dedari survey areas. A likelihood of occurrence assessment post-field survey concluded two species (Rainbow Bee-eater and Peregrine Falcon) are likely to occur in Ghooli survey area and three species (Rainbow Bee-eater, Malleefowl and Chuditch) are likely to occur in Dedari survey area. The Rainbow Bee-eater and Peregrine Falcon are widespread species that are unlikely to solely rely on the habitats present within the survey areas. The mallee eucalypt woodlands and mixed shrublands provide suitable habitat for the Malleefowl and Chuditch within the Dedari survey area, with the areas of greatest value adjoining vegetation which is well connected to other patches of remnant vegetation. It is likely that these species utilise the Dedari survey area for dispersal between remnants in the region.

It should be noted that although the Carnaby's Black Cockatoo (*Calyptrorhynchus latirostris*) was considered unlikely to occur in Ghooli and Dedari, in very good years the species may

opportunistically utilise the Ghooli area, however these event would be rare and the habitat in the Ghooli survey area would not support a population of this species long term.

The survey did identify feeding evidence for the Major Mitchell's Cockatoo and Red-tailed Black Cockatoo (Wheatbelt race) within both survey areas, and breeding habitat was recorded at Ghooli. Although these species are not listed as species of conservation significance, they are considered regionally significant and wherever possible their habitat should be protected, in particular large breeding trees. Six breeding trees were identified in the Ghooli survey area to have large hollows with chews present.

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# 1. Introduction

## 1.1 Background

The Water Corporation is proposing to remediate two heritage listed sites along the Golden Pipeline, Ghooli and Dedari Steam Pump Stations, located in the Shires of Yilgarn and Coolgardie respectively. The Department of Water and Environmental Regulation (DWER) has classified these two sites as 'Contaminated – Remediation Required' based on the presence of dumped waste materials containing asbestos. Remediation works will involve the removal/ disturbance of approximately 5,000 cubic metres (m<sup>3</sup>) of material containing asbestos and the reburial of this material in a containment cell on each of the sites.

## 1.2 Purpose of this report

GHD Pty Ltd (GHD) was commissioned by the Water Corporation to undertake a biological assessment of the survey area. The purpose of the assessment was to define the environmental values within the survey area to inform planning for the remediation works. The outcomes of the assessment will be used in the environmental assessment and approvals process.

## 1.3 Location

### 1.3.1 Survey area

The survey area includes two sites, the Ghooli Steam Pump Station, located approximately 12 km east of Southern Cross, and the Dedari Steam Pump Station, located approximately 48 km west of Coolgardie. The Ghooli survey area covers 44.28 hectares (ha) and the Dedari survey area covers 59.39 ha. The survey areas are shown in Figure 1, Appendix A.

### 1.3.2 Study area

A study area was defined for the desktop based searches for the biological assessment and includes a 20 kilometre (km) buffer of each survey area.

## 1.4 Scope of works

The scope of works, as detailed in the Water Corporation Request for Proposal was to:

- Conduct a desktop assessment of relevant literature, databases and spatial datasets to determine the environmental values of the survey areas
- Undertake a biological survey of the survey areas to provide:
  - Description, photographs and mapping of vegetation communities and condition, (using quadrats where possible)
  - Inventory of plant taxa (including weed species) by vegetation communities
  - Location and/or population mapping of any potential Threatened, Priority Flora and any other flora of local or taxonomic significance
  - Location and mapping of any Threatened Ecological Communities (TECs), Priority Ecological Communities (PECs) and any other areas of ecological importance (such as National Parks, wetlands, Environmental Sensitive Areas)
  - Description and mapping of fauna habitat

- Prepare a biological survey report (this document) that:
  - Documents the results of the desktop assessment and field survey
  - Identifies and discusses potentially occurring significant fauna species and their habitat (including identifying potential breeding or feeding habitat)
  - Provides a list of locally endemic native flora species, suitable for rehabilitation of the site post-construction

## 1.5 Relevant legislation, conservation codes and background information

In Western Australia significant communities, and 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 assessment are provided in Appendix B.

## 1.6 Report assumptions and limitations

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

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

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

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

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

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

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

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



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

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



## 2. Methodology

### 2.1 Desktop assessment

Prior to the commencement of the field survey a desktop assessment was undertaken to identify relevant environmental information pertaining to the survey area and to assist in survey design. This included a review of:

- The Department of the Environment and Energy (DEE) Protected Matters Search Tool (PMST) to identify communities and species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) potentially occurring within the study areas (DEE 2017a) (Appendix C)
- The Department of Biodiversity, Conservation and Attractions (DBCA) Threatened and Priority Ecological Communities (TEC/PEC) database to determine the potential for TECs or PECs present within the study areas
- The DBCA *NatureMap* database for flora and fauna species previously recorded within the study areas (DBCA 2007–) (Appendix C)
- The DBCA Threatened (Declared Rare) and Priority Flora (TPFL) and Western Australian (WA) Herbarium database (WAHERB) and for Threatened and Priority flora species listed under the Wildlife Conservation Act 1950 (WC Act) and listed as priority by DBCA, previously recorded within the study areas
- Existing datasets including previous vegetation mapping of the survey area (Beard 1972, 1976), aerial photography, geology/soils and hydrology information to provide background information on the variability of the environment, likely vegetation units and fauna habitats and to identify areas with the potential to contain TECs, PECs, and Threatened and Priority listed flora and fauna species

### 2.2 Field survey

#### 2.2.1 Vegetation and flora

GHD botanist Jordan Tindiglia, completed a single season detailed vegetation and flora assessment of the survey areas from 9-11 August 2017. The field survey was undertaken to verify the results of the desktop assessment, identify and describe the dominant vegetation units, assess vegetation condition, and identify and record vascular flora taxa present at the time of survey. Searches for conservation significant or other significant ecological communities and flora taxa were also undertaken during the field survey.

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

#### **Data collection**

Field survey methods involved a combination of sampling quadrats, relevés and photo points located in identified vegetation units and traversing the survey area by foot. Twelve non-permanent quadrats were described throughout the survey areas.

Quadrats (measuring an area of 400 m<sup>2</sup>) were located within each identified vegetation unit. Field data at each quadrat was recorded on a pro-forma data sheet and included the parameters detailed in Table 1. Quadrat data is provided in Appendix D.

Table 1 Data collected during the field survey

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

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

### Vegetation units

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

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

### Vegetation condition

The vegetation condition 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 2016a). 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 and nomenclature

Species well known to the survey botanist were identified in the field; all other species were collected and assigned a unique collection number to facilitate tracking. Specimens collected during the field assessment were dried and processed in accordance with the requirements of the WA Herbarium. 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 DEE (2017b).

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, TPFL, *NatureMap* and the WAHERB databases search results) were reviewed to determine conservation significant flora taxa potentially present within the study site 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.

#### **2.2.2 Fauna**

GHD zoologist (Glen Gaikhorst) conducted a single season fauna assessment of the survey areas from 9-11 August 2017, concurrently with the vegetation and flora assessment. The purpose of the field survey was to identify fauna habitat types, identify and record fauna taxa present at the time of survey, assess habitat value and connectivity, and undertake targeted searches for conservation significant fauna taxa and their habitats.

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

### **Habitat assessment**

The survey areas were assessed for habitat type, structural complexity, type and extent of resource availability and value for fauna. Specifically, the assessment included:

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

### **Camera traps**

Four Reconyx Hyper-fire Motion sensor cameras were deployed within the Dedari survey area for one night. The cameras were deployed in habitat types considered likely to support threatened fauna and to spatially complement other survey efforts and collected information on all species that were active in the range of the camera. The cameras were set with a lure (such as sardines) to increase the rate of encounter.

No cameras were deployed within the Ghooli survey area due to survey duration constraints and limited suitable habitat in Good or better condition.

### **Opportunistic observations**

Whilst conducting activities in the survey areas, opportunistic observations were made of any other vertebrates (or signs of their presence). Fauna taxa observed or heard were noted, and indirect evidence (such as scats, tracks, diggings, nests, feathers, bones, pellets) indicating the current or recent presence of a species also noted. Active searches across all habitat types within the survey areas were conducted, with searches involving turning over logs or rocks, and examining hollow logs.

Observed fauna were recorded and where conservation significant fauna were identified, photographs, GPS points and habitat data were recorded.

### **Targeted assessments for Carnaby Black Cockatoo**

A Carnaby Black Cockatoo habitat assessment was undertaken for the Ghooli survey area to assess the presence, quality and extent of habitat. The Ghooli survey area occurs just outside of the known (modelled) range of one species of Black Cockatoo, the Carnaby's Black Cockatoo (*Calyptrorhynchus latirostris*). Note the Dedari survey area is well outside of the modelled distribution for the species (DSEWPac 2012). The assessment involved visual and aural assessment of the study sites identifying breeding habitat (presence/absence of actual and potential breeding trees), foraging habitat, roosting areas, current activity and any other signs of use by Carnaby's Black Cockatoos. For the purpose of this assessment, the DSEWPac (2012) Black Cockatoo referral guidelines were used to define breeding, foraging and night roosting habitat.

Information collected during the field survey included:

- Foraging habitat – the location and extent of suitable Black Cockatoo species foraging habitat was identified and mapped for the Study sites, based on the vegetation associations and presence/absence of known foraging species. During the field surveys any direct or indirect evidence of foraging by Black Cockatoos was recorded via GPS.
- Breeding habitat - suitable breeding habitat for Black Cockatoos is defined by (DSEWPac 2012) as trees of species known to support breeding within the range of the species which either have a suitable nest hollow or are of a suitable diameter at breast height (DBH) to develop a nest hollow. For most tree species, suitable DBH is 500 mm. For Salmon Gum and Wandoo, suitable DBH is 300 mm (DSEWPac 2012). Breeding habitat was identified and mapped according to the presence of suitable breeding trees. For each breeding tree, details of the tree species, size and number of hollows observed, evidence of use and any other significant observations were recorded. On average, Carnaby's Black Cockatoos are known to nest in hollows with an entrance diameter greater than 20 - 30 cm (Johnstone and Storr 1998; Groom 2011). Therefore, during the field survey a suitable nesting hollow currently able to support breeding was defined as a tree hollow with an entrance diameter greater than 20 cm. All trees with hollows with an entrance diameter less than 20 cm were also recorded.
- Night roosting habitat - suitable roosting habitat is defined by (DSEWPac 2012). Suitable roosting habitat was identified based on the presence of suitable tall trees, proximity of known roosting sites and the presence of suitable foraging habitat.
- Opportunistic observations (both visual and aural) for the presence of Black Cockatoos within the Study sites and surrounding areas were also noted during the survey.

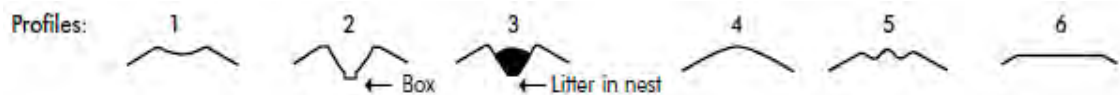
This information was used to map and calculate the amount of foraging habitat, potential breeding habitat and night roosting sites within the study sites. Any area containing known foraging species or potential nesting trees was considered as habitat for Black Cockatoos.

### **Targeted assessments for Malleefowl**

The aim of the Malleefowl assessment was to assess the presence, quality and extent of habitat for Malleefowl within the Survey Area. Malleefowl in the region are known to utilise dense shrublands and woodlands. A selection of the survey areas were ground truthed to look for evidence of use or mounds. The assessment involved visual assessment of the habitat identifying breeding evidence (presence/absence of Malleefowl mounds), foraging evidence (scratchings), droppings, current activity (via presence of prints) and any other signs of Malleefowl. For the purpose of this assessment, the NHT (2007) National manual for the Malleefowl monitoring system standards were used to define mound size, use and age. Where evidence of Malleefowl was observed, it was recorded via GPS.

Information collected during the field survey included:

- Foraging Activity (Scratchings) – Identified by the disturbance of Malleefowl in litter while foraging. Often the disturbance is extensive and close to an existing mound.
- Droppings – During the transect walks, visual inspection for Malleefowl droppings were conducted. These were assessed for age and images recorded.
- Prints – During the transect walks, visual inspection for Malleefowl prints were conducted. These were assessed for age and images recorded.
- Mounds – Malleefowl utilise a mound to incubate their eggs. The mounds are a good indication of habitat usage, reproductive output, distribution and occurrence. Mounds were assessed according to their current activity status or profile ranking according to NHT (2007). These profiles are shown and described below.



### **Profile descriptions**

Profile 1 – Typical crater with raised rims. This is a typical shape of an inactive mound. However the mound may also be active and open. (GHD regards Profile 1 mounds as being inactive).

Profile 2 – Mound fully dugout and active. The characteristic of this profile is that the crater slopes down steeply and at the base the sides drop vertically to form a box-like structure with sides usually 20 to 30 cm deep. Often litter will have been raked into windrows and may have started to enter the mound.

Profile 3 – Mound with litter and active. This is the next stage after Profile 2. Litter will have been raked into the mound by Malleefowl and thick layers of litter are evident on the surface. There may or may not be sand mixed with the litter at this stage.

Profile 4 – Active mound mounded up with debris but no crater. This is the typical profile of an active and worked mound but unopened Malleefowl mound.

Profile 5 – Mound forms a sandy crater with peak in centre. This is a typical profile of an active mound which is in the process of being closed by Malleefowl or being thermoregulated by the birds.

Profile 6 – Mound low and flat without peak or crater. These mounds are long unused and often abandoned. Often have vegetation growing with the rim or crater (if anything is left).

Mounds observed are measured for their size including total diameter, rim width, rim height (to outside ground level) and crater depth (to rim height). Photographic evidence is taken of each mound and location recorded by GPS.

### ***Fauna nomenclature***

Nomenclature used in this report follows that used by the WA Museum as reported on *NatureMap*. This nomenclature is deemed the most up-to-date species information for Western Australia fauna, with the exception of Aves nomenclature, which follows Christidis and Boles (2008).

## **2.3 Limitations**

### **2.3.1 Desktop limitations**

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

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 DBCA 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.

### **2.3.2 Field survey limitations**

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

Table 2 Field survey limitations

Aspect	Constraint	Comment
Sources of information and availability of contextual information.	Nil	Adequate information is available for the survey area, this includes: <ul style="list-style-type: none"> <li>Broad scale (1:250,000) mapping by Beard (1972, 1976) and digitised by Shepherd <i>et al.</i> (2002)</li> <li>Regional biogeography (Cowan et al. 2001)</li> </ul>
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	<p>The detailed single season vegetation and flora survey was completed in August 2017. The flora recorded from the field survey is detailed in Section 4.1.4 and a full flora species list is provided in Appendix D. The portion of flora collected and identified was considered high, however it is likely the survey under-recorded some grass species (Poaceae) and herbs due to survey timing.</p> <p>The fauna reconnaissance survey was completed at the same time as the vegetation and flora survey – August 2017. The fauna assessment sampled those species that can be easily seen, heard or have distinctive signs, such as tracks, scats, diggings, etc. Many cryptic species would not have been identified during a reconnaissance survey and seasonal variation within species often requires targeted surveys at a particular time of the year. Of the fauna species recorded during the survey, all species were identified to species level.</p> <p>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.</p>
Flora determination	Minor	<p>Flora determination was undertaken by the GHD botanist in the field and at the WA Herbarium. Three taxa could only be identified to family level only, 11 taxa could be identified to genus level only, and seven taxa could be tentatively identified to species level, due to lack of flowering and/or fruiting material required for identification. Some species, particularly grasses and herbs, may have been overlooked due to lack of material.</p> <p>The taxonomy and conservation status of the WA flora is dynamic. This report was prepared with reliance on taxonomy and conservation status current at the time report development, but it should be noted this may change in response to ongoing research and review of International Union for Conservation Nature criteria.</p>
Completeness and further work which might be needed (e.g. was the relevant area fully surveyed)	Nil	The survey area was accessed on foot or traversed by vehicle. The access tracks created as a result of infrastructure development (road, water and electrical services) allowed access to the whole survey area.



Aspect	Constraint	Comment
Mapping reliability	Minor	The vegetation was mapped at a scale of 1:10,000 using high-resolution ESRI aerial imagery obtained from Landgate, topographical features, previous broad scale mapping (Beard 1972, 1976) and field data. Data was recorded in the field using hand-held GPS tools (e.g. Nomad Juno and Garmin GPS). Certain atmospheric factors and other sources of error can affect the accuracy of GPS receivers. The Garmin GPS units used for this survey are accurate to within $\pm 5$ metres on average. Therefore the data points consisting of coordinates recorded from the GPS may contain inaccuracies.
Timing/weather/ season/cycle	Moderate	<p>The flora and fauna field surveys were conducted from 9-11 August 2017. In the three months prior to the survey (May-July) the Southern Cross Airfield weather recording station (No. 012320, Bureau of Meteorology (BoM) 2017) (located approximately 9.9 km from the Ghooli section of the survey area) recorded a total of 54.8 millimetres (mm) of rainfall. This total is approximately 40% lower than the long-term average for the same period (May - July; 90 mm) (BoM 2017).</p> <p>The weather conditions during the August field survey included:</p> <ul style="list-style-type: none"> <li>• Daily maximum temperature ranging from 12.1 to 17.9 °C</li> <li>• Daily minimum temperature ranging from 0.4 to 8.3 °C</li> <li>• Daily rainfall 0.0 to 6.0 mm.</li> </ul> <p>In the three months prior to the survey (May-July), the Kalgoorlie-Boulder Airport weather recording station (No. 012038, BoM 2017) (located approximately 90 km from the Dedari section of the survey area) recorded a total of 12.2 mm of rainfall. This total is significantly lower than the average for this period, which is 77.4 mm (BoM 2017).</p> <p>The weather conditions during the autumn field survey included:</p> <ul style="list-style-type: none"> <li>• Daily maximum temperature ranging from 14.1 to 18.3 °C</li> <li>• Daily minimum temperature ranging from 1.6 to 10.0 °C</li> <li>• Daily rainfall 0.0 to 2.6 mm.</li> </ul> <p>The weather conditions recorded during the survey periods are considered unlikely to have impacted upon the vegetation and flora survey.</p>
Disturbances (e.g. fire, flood, accidental human intervention)	Nil	There were no disturbances observed that impacted the survey.
Intensity (in retrospect, was the intensity adequate)	Nil	<p>The vascular flora of the survey area was sampled in accordance with EPA (2016a) and terrestrial fauna sampled in accordance to EPA (2016b, c).</p> <p>The survey area was sufficiently covered by the GHD zoologist and botanist during the survey.</p>
Resources	Nil	Adequate resources were employed during the field survey. Six person days were spent undertaking the survey using a zoologist and botanist.

Aspect	Constraint	Comment
Access restrictions	Nil	A number of areas within the survey area were not accessible due to the presence of dumped waste materials containing asbestos. These areas were surveyed from adjacent area. No other access problems were encountered during the survey.
Experience levels	Nil	The zoologist and botanist who executed the survey are practitioners suitably qualified and experienced in their respective fields. Glen Gaikhorst (senior zoologist) has over 22 years' experience undertaking fauna surveys within WA. Jordan Tindiglia (senior botanist) has over 11 years' experience undertaking flora and vegetation surveys within WA.

## 3. Desktop assessment

### 3.1 Regional biogeography

The survey areas are situated in the Eremaean Botanical Province (Beard 1990), within the Coolgardie bioregion and the Southern Cross subregion as described by the Interim Biogeographic Region of Western Australia (IBRA).

The Coolgardie bioregion is comprised of granite rocky outcrops, low greenstone hills, lateritic uplands, broad plains and numerous salt lakes. The Southern Cross subregion is gently undulating uplands dissected by broad valleys with bands of low greenstone hills. Vegetation includes diverse Eucalyptus woodlands (*Eucalyptus salmonophloia*, *E. salubris*, *E. transcontinentalis* and *E. longicornis*) (Cowan *et al.* 2001).

### 3.2 Landform and soils

The survey area is located within the Southern Cross Zone of the Kalgoorlie Soil-landscape Province. This zone is characterised by undulating plains and uplands (with some salt lakes and low hills) on deeply weathered mantle, colluvium and alluvium over greenstone and granitic rocks of the Yilgarn Craton (Tille 2006).

Soil landscape mapping (Government of Western Australia (GoWA) 2017) indicates that two soil landscape types occur within the survey areas:

#### Ghooli

- DD15 – Undulating plains with some low dunes, seasonal lakes, and clay pans; chief soils are brown and grey-brown calcareous earths.

#### Dedari

- AC1 – Gently sloping to gently undulating plateau areas, or uplands, on granites, gneisses, and allied rocks, with long gentle slopes and, in places, abrupt erosional scarps, some granitic bosses, and tors; and irregularly traversed by narrow shallow valleys and flats; chief soils are yellow earthy sands and sandy yellow earths on depositional sites, and ironstone gravels on erosional sites where they are underlain by hardened mottled-zone material.

### 3.3 Hydrology

A summary of the DWER (GoWA 2017) queries for the survey areas are provided in Table 3.

The survey areas are located within the Deborah sub-area of the Goldfields Groundwater Area as proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act). No surface water areas including wetlands and rivers listed under the RIWI Act were identified within the survey areas.

Table 3 Hydrology features within the survey areas

Aspect	Details	Result
Groundwater areas	Groundwater areas proclaimed under the RIWI Act.	Goldfields
Surface water areas	Surface water areas proclaimed under the RIWI Act.	None present
Irrigation district	Irrigation Districts proclaimed under the RIWI Act.	None present
Rivers	Rivers proclaimed under the RIWI Act.	None present

Aspect	Details	Result
Public Drinking Water Source Areas (PDWSA)	PDWSAs is a collective term used for the description of Water Reserves, Catchment Areas and Underground Pollution Control Areas declared (gazetted) under the provisions of the <i>Metropolitan Water Supply, Sewage and Drainage Act 1909</i> or the <i>Country Area Water Supply Act 1947</i> .	None present
Waterway Management Areas	Areas proclaimed under the <i>Waterway Conservation Act 1976</i> .	None present

### 3.4 Land use

#### 3.4.1 Conservation reserves and estate

No DBCA managed conservation areas are located within or adjacent to the Ghooli survey area. The closest conservation area is Yellowdine Nature Reserve (R 41936, Class C), located approximately 14 km east of the Ghooli survey area. One DBCA managed land, Goldfields Woodlands Conservation Park (R 46127, Class C) intersects the western and southern extents of the Dedari survey area (Figure 2, Appendix A).

#### 3.4.2 Environmentally sensitive areas

No Environmentally Sensitive Areas (ESAs) are located within or adjacent to the survey areas. The closest ESA is aligned with Yellowdine Nature Reserve, located approximately 14 km east of the Ghooli survey area (Figure 2, Appendix A).

### 3.5 Vegetation and flora

#### 3.5.1 Broad vegetation associations and extent

Broad scale (1:250,000) pre-European vegetation mapping of the Southern Cross and Boorabbin areas was completed by Beard (1972, 1976) at an association level. The mapping indicates three vegetation associations are present within the survey areas:

##### **Ghooli**

- Shrublands; Acacia, Casuarina and Melaleuca thicket (association 1413)

##### **Dedari**

- Shrublands; Acacia neurophylla, A. beauverdiana & A. resinomarginea thicket (association 435)
- Medium woodland; salmon gum & morrel (association 511)

The pre-European mapping has been adapted and digitised by Shepherd *et al.* (2002). The extent of the vegetation associations have been determined by the State-wide vegetation remaining extent calculations maintained by DBCA (latest update October 2016 – GoWA 2016). As shown in Table 4, the current extents remaining of all vegetation associations are greater than 73 per cent (%) 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 per cent threshold level<sup>1</sup>.

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

Table 4 Broad vegetation extents (Beard 1972, 1976, GoWA 2016)

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	% Current extent in all DBCA managed lands
435	State: WA	994,575.29	762,428.27	76.66	13.43
	IBRA bioregion: Coolgardie	738,211.24	732,467.37	99.22	17.59
	IBRA sub-region: Southern Cross	732,093.33	726,349.46	99.22	17.73
	LGA: Shire of Coolgardie	365,870.51	365,870.51	100.00	6.18
511	State: WA	700,692.61	520,624.79	74.30	13.76
	IBRA bioregion: Coolgardie	464,423.62	435,177.22	93.70	17.46
	IBRA sub-region: Southern Cross	464,423.62	435,177.22	93.70	17.46
	LGA: Shire of Coolgardie	160,926.93	160,926.93	100.00	22.39
1413	State: WA	1,679,917.00	1,286,966.98	76.61	11.46
	IBRA bioregion: Coolgardie	1,061,213.00	1,042,554.48	98.24	16.79
	IBRA sub-region: Southern Cross	953,238.45	934,826.67	98.07	18.69
	LGA: Shire of Yilgarn	538,791.10	395,458.56	73.40	18.46

### 3.5.2 Conservation significant ecological communities

A search of the EPBC Act PMST database did not identify any Commonwealth listed TECs within the study areas. Similarly, a search of the DBCA TEC and PEC database did not identify any TECs or PECs within the study areas.

### 3.5.3 Flora diversity

#### *Ghooli*

The *NatureMap* database identified 586 plant taxa, representing 64 families and 235 genera, previously been recorded within the Ghooli study area. This total comprised 552 native flora taxa and 34 naturalised (non-native) flora taxa. Dominant families included Myrtaceae (97 taxa), Fabaceae (77 taxa) and Asteraceae (59 taxa).

#### *Dedari*

The *NatureMap* database identified 315 plant taxa, representing 60 families and 158 genera, previously been recorded within the Dedari study area. This total comprised 314 native flora taxa and 1 naturalised (non-native) flora taxon. Dominant families included Myrtaceae (62 taxa), Fabaceae (40 taxa) and Asteraceae (30 taxa).

### 3.5.4 Conservation significant flora

Desktop searches of the EPBC Act PMST database, *NatureMap* database, and the DBCA TPFL and WAHERB databases identified the presence/potential presence of 31 and 13 conservation significant flora taxa within the Ghooli and Dedari study areas respectively. The classification of the conservation significant flora are summarised in Table 5.

The locations of conservation significant flora registered on the DBCA databases are provided in Figure 2, Appendix A.

Table 5 Conservation significant flora desktop searches in the Ghooli and Dedari study sites

Study site	Threatened (EPBC Act and WC Act)	Priority 1	Priority 2	Priority 3	Priority 4	Total
Ghooli	9	8	2	12	-	31
Dedari	1	3	-	8	1	13

## 3.6 Fauna

### 3.6.1 Fauna diversity

#### *Ghooli*

The *NatureMap* database search identified 149 fauna species previously recorded within the Ghooli study area. This total included 84 birds, 30 reptiles, six amphibians and five mammals. The remainder of species are invertebrates and were not considered as part of this survey, unless recorded opportunistically.

#### *Dedari*

The *NatureMap* database search identified 94 fauna species previously recorded within the Dedari study area. This total included 55 birds, 30 reptiles, two amphibians and three mammals.

The remainder of species are invertebrates and were not considered as part of this survey, unless recorded opportunistically.

#### 3.6.2 Conservation significant fauna

The EPBC Act PMST and *NatureMap* database identified the presence/potential presence of eight and six conservation significant fauna species within the Ghooli and Dedari study areas respectively. These results exclude marine or migratory/marine as no marine habitat is present within the survey areas.



## 4. Field survey results

### 4.1 Vegetation and flora

#### 4.1.1 Vegetation associations

Six native vegetation and two modified associations, as well as highly disturbed areas were identified and described for the survey area (Table 6 and Figure 3, Appendix A). Both survey areas comprised highly degraded areas; generally located around existing infrastructure.

##### *Ghooli*

The Ghooli survey area comprised two native vegetation associations, and two modified associations. The western part of the Ghooli survey area was dominated by *Eucalyptus* woodland (VA02), whilst the eastern part of the survey area was dominated by *Allocasuarina* and *Acacia* shrubland (VA01). Large parts of the Ghooli survey area were mapped as scattered natives over weedy grasses and herbs (MA01), with one small patch of revegetation (MA02) present.

##### *Dedari*

The Dedari survey area comprised four native vegetation associations, including two shrubland and two woodland associations. The western part of the Dedari survey area was dominated by *Eucalyptus salubris* woodland (VA05), with *Eucalyptus* mallee woodland (VA06) occurring in the central part of the Dedari survey area. The eastern part of the Dedari survey area was dominated by mixed shrubland (VA03) and *Acacia* and *Melaleuca* shrubland (VA04). Small patches of scattered natives over weedy grasses and herbs (MA01) were also present near existing infrastructure in the northern part of the survey area.



#### 4.1.2 Conservation significant ecological communities



The vegetation units identified within the survey areas during the field survey do not align with any known Commonwealth or State listed TECs or PECs.



#### 4.1.3 Other significant vegetation

No other significant vegetation as defined by the EPA (2016a) or vegetation that grows in, or in association with watercourses or wetlands was identified within the survey areas during the field survey.



Table 6 Recorded vegetation associations for Dedari and Ghooli survey areas


Vegetation association	Description	Landforms and substrate	Extent and sample locations	Photograph
<i>Allocasuarina</i> and <i>Acacia</i> shrubland (VA01)	<i>Acacia resinimarginea</i> , <i>Allocasuarina corniculata</i> tall shrubland with <i>Eucalyptus ?rigidula</i> , <i>E. horistes</i> isolated mallees over <i>Thryptomene kochii</i> , <i>Phebalium filifolium</i> <i>Baeckea</i> spp. mid- shrubland over <i>Micromyrtus obovata</i> , <i>Euryomyrtus maidenii</i> , <i>Beyeria sulcata</i> var. <i>sulcata</i> low open shrubland over ± <i>Triodia rigidissima</i> isolated hummock grasses.	Plains with yellow to brown sandy/ loamy soils	Ghooli: 9.76 ha Q08, Q10, Q11, PP07, PP09	
<i>Eucalyptus</i> woodland (VA02)	<i>Eucalyptus salubris</i> , <i>E. salmonophloia</i> woodland over <i>Santalum acuminatum</i> low isolated trees over <i>Melaleuca sheathiana</i> tall isolated shrubs over <i>Eremophila ionantha</i> , <i>E. scoparia</i> mid- open shrubland over <i>Olearia muelleri</i> , <i>Daviesia benthamii</i> subsp. <i>acanthoclada</i> , <i>Maireana villosa</i> low open shrubland over <i>Austrostipa elegantissima</i> isolated tussock grasses.	Plains with orange loam/clay soils	Ghooli: 10.11 ha Q09, Q12	

Vegetation association	Description	Landforms and substrate	Extent and sample locations	Photograph
Mixed shrubland (VA03)	<i>Eucalyptus pileata</i> low sparse mallee woodland over <i>Leptospermum fastigiatum</i> , <i>Acacia yorkrakinensis</i> subsp. <i>acrita</i> tall sparse shrubland over <i>Thryptomene kochii</i> , <i>Melaleuca cordata</i> , <i>Euryomyrtus maidenii</i> over <i>Triodia rigidissima</i> open hummock grassland and <i>Schoenus</i> sp. A1 Boorabbin sparse sedgelands.	Plains with yellow sands	Dedari: 4.19 ha Q01	
<i>Acacia</i> and <i>Melaleuca</i> shrubland (VA04).	<i>Melaleuca ?atroviridis</i> , <i>Allocasuarina corniculata</i> tall open shrubland over <i>Acacia resinimarginea</i> , <i>Thryptomene kochii</i> , <i>Micromyrtus obovata</i> mid-shrubland over <i>Euryomyrtus maidenii</i> , <i>Melaleuca cordata</i> , <i>Baeckea</i> sp. Boorabbin low shrubland over <i>Triodia rigidissima</i> isolated hummock grasses.	Plains with yellow/brown sands	Dedari: 10.46 ha Q04, Q05	

Vegetation association	Description	Landforms and substrate	Extent and sample locations	Photograph
<i>Eucalyptus salubris</i> woodland (VA05)	<i>Eucalyptus salubris</i> low mallee woodland with ± <i>E. salmonophloia</i> isolated trees over <i>Eremophila scoparia</i> , <i>E. ionantha</i> , <i>Exocarpos aphyllus</i> tall to mid- sparse shrubland over <i>Daviesia benthamii</i> subsp. <i>anthoclada</i> , <i>Olearia muelleri</i> , <i>Grevillea acuaria</i> low open shrubland over <i>Maireana villosa</i> , <i>Sclerolaena diacantha</i> isolated chenopods.	Plains orange clayey sand	Dedari: 15.00 ha Q02, Q03, Q06	
<i>Eucalyptus</i> mallee woodland (VA06)	<i>Eucalyptus griffithsii</i> low open mallee woodland over <i>Melaleuca ?atroviridis</i> tall isolated shrubs over <i>Acacia</i> , <i>Eremophila caperata</i> mid- isolated shrubs over <i>Olearia pimeleoides</i> low sparse shrubland over <i>Lomandra</i> sp. sparse sedgeland over <i>Podolepis capillaris</i> isolated herbs.	Plains with orange clayey sand	Dedari: 15.52 ha Q07, R01, PP02	



Vegetation association	Description	Landforms and substrate	Extent and sample locations	Photograph
Scattered natives (MA01)	Scattered native species including <i>Eucalyptus salmonophloia</i> , <i>E. salubris</i> over <i>Senna artemisioides</i> subsp. <i>filifolia</i> , <i>Eremophila ionantha</i> , <i>Acacia hemiteles</i> , <i>A. erinacea</i> over weedy grasses and herbs.	Plains	Ghooli: 8.64 ha PP06, PP08, PP12  Dedari: 0.94 ha PP01	
Revegetation/ regrowth (MA02)	Previously cleared areas that have been ripped and revegetated. Age of revegetation varies. Largely include species present in adjacent vegetation associations.	Plains	Ghooli: 1.11 ha PP04	

Vegetation association	Description	Landforms and substrate	Extent and sample locations	Photograph
Highly Disturbed (HD) and Cleared	Areas that have been previously cleared and are dominated by non-native species	Plains	Ghooli: 14.66 ha PP05, PP10, PP11  Dedari: 13.28 ha	

#### 4.1.4 Vegetation condition

The vegetation within the survey area was rated as Excellent to Completely Degraded condition. The extents of the vegetation condition ratings mapped within the survey areas are detailed in Table 7 and mapped in Figure 4, Appendix A.

##### *Ghooli*

Large parts of the Ghooli survey area were rated as Degraded or Completely Degraded, due to historical clearing, the presence of access tracks, dumped rubbish and significant weed incursion. Areas on the south side of Great Eastern Highway were rated as Excellent, with the exception of one area containing dumped rubbish. Areas rated as Excellent had largely intact vegetation structure and limited disturbances.

##### *Dedari*

The majority of the Dedari survey area was rated Excellent in condition. The vegetation structure was intact and disturbances limited throughout these areas. A number of areas were rated as Very Good; in these areas disturbances such as dumped rubbish was more prevalent. Areas around the pumping station were rated as Degraded or Completely Degraded, due to historical clearing, the presence of access tracks dumped rubbish and significant weed incursion.

Table 7 Extent of vegetation condition ratings mapped within the survey areas

Vegetation Condition	Ghooli (ha)	Dedari (ha)	Total (ha)
Excellent	14.80	32.74	47.54
Very Good		11.73	11.73
Good	1.58	0.69	2.27
Good - Degraded	5.91		5.91
Degraded	7.33	0.94	8.27
Completely Degraded	8.43	2.59	11.02
Cleared	6.23	10.69	16.92
<b>Total</b>	<b>44.28</b>	<b>59.39</b>	<b>103.67</b>

#### 4.1.5 Flora diversity

##### *Ghooli*

One hundred and seventeen (117) flora taxa representing 35 families and 77 genera were recorded from the Ghooli survey area during the field survey. This total comprised 93 native taxa and 24 introduced taxa. Dominant families recorded from the survey area included Myrtaceae, Fabaceae and Poaceae.

The Ghooli survey area is considered to have a low-moderate level of floristic diversity. Based on described quadrats, species diversity ranged from 9 to 18 taxa per 400 m<sup>2</sup>.

##### *Dedari*

Ninety-four (94) taxa representing 31 families and 61 genera were recorded from the Dedari survey area. This total comprised 87 native taxa and seven introduced taxa. Dominant families recorded from the survey area included Myrtaceae, Fabaceae and Chenopodiaceae.

The Dedari survey area is considered to have a low-moderate level of floristic diversity. Based on described quadrats, species diversity ranged from 11 to 19 taxa per 400 m<sup>2</sup>.



#### 4.1.6 Conservation significant flora

No EPBC Act, WC Act or DBCA Priority-listed flora were recorded within the survey areas during the field survey.

##### *Likelihood of occurrence*

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

##### **Ghooli**

The likelihood of occurrence assessment concluded five taxa may possibly occur and the remaining 26 taxa are unlikely or highly unlikely to occur within the survey area. The taxa that may possibly occur include *Goodenia heatheriana* (P1), *Millotia newbeyi* (P1), *Rinzia fimbriolata* (P1), *Teucrium* sp. dwarf (R. Davis 8813) (P1) and *Stylidium choreanthum* (P3). There is habitat present within the Ghooli survey area for all of these species, they can be cryptic and the field survey was undertaken outside of the reported flowering period for all species.

##### **Dedari**

The likelihood of occurrence assessment concluded one taxon, *Gompholobium cinereum* (P3) may possibly occur within the Dedari survey area as there is suitable habitat present, it can be cryptic and the field survey was undertaken outside of the reported flowering period for this species. The remaining 12 taxa are unlikely or highly unlikely to occur within the Dedari survey area.

#### 4.1.7 Introduced flora

Seventeen (17) introduced flora taxa were recorded from the survey areas. Of the introduced taxa, two are listed as Declared Pests under the *Biosecurity and Management Act 2007* and one of these is also listed as a Weed of National Significance (WONS):

- *\*Echium plantagineum* (Paterson's Curse) – Declared Pest (Ghooli)
- *\*Opuntia stricta* (Common Prickly Pear) – Declared Pest and WONS (Ghooli).

The remaining introduced taxa are considered environmental weeds and all have been previously recorded within the Southern Cross IBRA bioregion. The locations of Paterson's Curse and Common Prickly Pear within the survey areas are mapped in Figure 4, Appendix A.

#### 4.1.8 Rehabilitation species list

A list of locally endemic native flora species, suitable for rehabilitation of the site post construction is provided in Appendix D.

## 4.2 Fauna

#### 4.2.1 Fauna habitats

Five habitat types were identified within the project area during the field survey, based on the predominant landforms, soils and vegetation structure. These fauna habitat types are closely aligned with the vegetation associations outlined in section 4.1.1, and include:


- Mallee Eucalypt woodlands
- Tall open Woodland


- Mixed shrublands
- Rehabilitated/scattered trees
- Highly modified areas

The five habitat types are discussed further in Table 8.


Overall, while large sections of the survey areas have previously been disturbed, where native vegetation remains it is mostly intact and provides habitat for fauna. Anthropogenic disturbances include past clearing for infrastructure (roads, tracks, water pipeline and buildings), grazing and other contamination management practices and weed encroachment.


Table 8 Fauna habitat types


Description	Habitat Present	Indicative Photograph
<p><b>Mallee Eucalypt woodlands</b></p> <p>Vegetation association: VA05, VA06</p> <p>Mallee woodlands are characterised by single or multi-stemmed mallee eucalypt trees (5-15 m) typically over low shrubs, sedges, grasses and herbs with different levels of ground cover. Ground cover often consisted of bark and leaf litter of varying densities with denser patches typically occurring at the base of trees or tall shrubs. Where historical contamination (rubbish debris) was present this formed part of the ground cover. Fallen tree limbs and small hollow logs were sparse and scattered throughout this habitat type with only small tree hollows present.</p> <p>This habitat appeared long unburnt but appeared all similar in age implying the areas had been historically cleared or a large extensive fire had occurred.</p> <p><u>Conservation Significant Species</u></p> <p><u>Dedari</u></p> <p>The Chuditch, Malleefowl and Rainbow Bee-eater may utilise this habitat within the Dedari survey area. The Chuditch is known to occupy large areas of habitat and the survey area may form part of an individual's home range. Dense and aged thickets may provide hiding areas (in vegetation, hollows or cavities in mallee roots) for the species. The Malleefowl is present in the region in low numbers however could utilise the habitat for nesting and foraging. No mounds or evidence of use was recorded during the survey. The Rainbow Bee-eater could use the habitat for foraging purposes, however typically this habitat would not be utilised for breeding purposes.</p>	<p>Dedari: 30.51 ha</p>	

Description	Habitat Present	Indicative Photograph
<p><b>Tall Open Woodland</b></p> <p>Vegetation association: VA02</p> <p>Tall open eucalypt woodlands occur throughout the Ghooli survey area, but more predominantly in the western half. The woodlands comprise tall eucalypt-dominated vegetation (20-30 m) such as Salmon Gum (<i>E. salmonophloia</i>).</p> <p>The woodlands vary in structural diversity ranging from very open tall woodlands with a sparse understorey, to woodlands where the mid-shrub layer is very thick. Typically the leaf litter is patchy around trees and shrubs, and the ground cover relatively sparse. Throughout the woodlands there are also several micro-habitat features, such as tree hollows, cavities and hollow logs. Most of the eucalypt species in the Ghooli survey area readily form hollows, which provide important habitat for birds (such as Galahs and Parrots) and potentially arboreal mammals. Both small and medium sized hollows are scattered throughout this woodland habitat type, and can be locally dense. Larger hollows (&gt;20 cm diameter) were occasionally observed, with a number showing signs of use via chews present. These hollows may have been utilised by Red-tailed Black Cockatoo or Major Mitchells which were both recorded during the survey.</p> <p>There are some sections of this habitat type that are in good condition which provide particularly high value habitat for fauna species, however a number of sections were disturbed with contaminants present. Other disturbances to this habitat type include previous clearing for infrastructure, and weed incursion (mostly along the road edge and around dwellings). However, although these disturbances have resulted in some areas having little to no understorey, the overstorey mostly remains intact.</p> <p>This habitat type is well represented in the Ghooli survey area as well as in the local and broader areas.</p> <p><u>Conservation Significant Species</u></p> <p><u>Ghooli</u></p> <p>The Peregrine Falcon and Rainbow Bee-eater may utilise this habitat for breeding and foraging purposes. Trees with large hollows have the potential to support Peregrine Falcon nesting and Rainbow Bee-eater may build burrows in open areas. Ghooli is on the edge of Carnaby's Black Cockatoo distribution and the species may rarely visit the area and be unlikely to utilise habitat features. Two other species that are not listed but considered significant to the region are the Red-tailed Black</p>	<p>Ghooli: 10.11 ha</p>	



Description	Habitat Present	Indicative Photograph
<p>Cockatoo and Major Mitchell Cockatoo. Both species we observed in the Ghooli survey area and would utilise large tree hollows (for breeding) to persist.</p>		
<p><b>Mixed shrublands</b>  Vegetation association: VA01, VA03, VA04  A variety of different mixed shrublands occur throughout both Ghooli and Dedari survey areas. These shrublands are characterised by differing dominance of <i>Acacia</i>, <i>Melaleuca</i>, <i>Allocasuarina</i> species. The composition and structural diversity of these shrublands varies, ranging from open shrublands to areas with dense patches of shrubs, dependent on the position in the landscape, age since fire and level of disturbance. Typically there is a dominant mid-storey layer of shrubs, with open patches of bare ground and scattered trees. Dominant ground covers included <i>Lomandra effusa</i> clumps or <i>Triodia</i> hummocks which provide excellent cover to small terrestrial reptiles.  The shrublands provide high value habitat for birds, with foraging opportunities and the dense patches of shrubs providing refuge areas. In areas with older fire history there are large amounts of non-vascular ground cover present, including fallen branches, bark and leaf litter. There are also numerous flowering species, in particular proteaceous species (e.g. <i>Grevillea</i>, <i>Hakea</i>).  This habitat type is well represented in the survey areas, as well as in the local and the broader areas.</p> <p><u>Conservation Significant Species</u>  <u>Ghooli</u>  The Peregrine Falcon and Rainbow Bee-eater may utilise this habitat for foraging purposes, however typically this habitat would not be utilised for breeding purposes (The Rainbow Bee-eater may build burrows in open areas). Cockatoo feeding evidence was recorded in the Ghooli survey area, however this was attributed to Red-tailed Black Cockatoo and Major Mitchell Cockatoo which are not listed.</p>	<p>Ghooli: 9.76 ha  Dedari: 14.66 ha</p>	

Description	Habitat Present	Indicative Photograph
<p><u>Dedari</u></p> <p>The Chuditch, Malleefowl and Rainbow Bee-eater may utilise this habitat within the Dedari survey area. The Chuditch is known to occupy large areas of habitat and the survey area may form part of an individual's home range. Dense and aged thickets may provide hiding areas for the species. The Malleefowl is present in the region in low numbers, however could utilise the habitat for nesting and foraging. No mounds or evidence of use was recorded during the survey. The Rainbow Bee-eater could use the habitat for foraging purposes, however typically this habitat would not be utilised for breeding purposes. Cockatoo feeding evidence was recorded in the survey area however this was attributed to Red-tailed Black Cockatoo and Major Mitchell Cockatoo which are not listed.</p>		
<p><b>Rehabilitated/Scattered trees</b></p> <p>Vegetation association: MA01, MA02</p> <p>Areas of scattered native species and rehabilitated areas were present in the survey areas. These areas comprised a combination of remnant species as well as species that had been planted or have opportunistically regrown. Ground cover in these areas varied from sparse native shrubs to areas dominated by weeds.</p> <p>The rehabilitated areas provide typically more structurally uniform habitat for fauna species, and depending on the age of the vegetation vary in the resources present. Older rehabilitated areas and areas with remnant vegetation tend to provide more refuge opportunities due to the density of the vegetation, while younger vegetation provides connectivity for fauna dispersal.</p> <p><u>Ghooli</u></p> <p>The Peregrine Falcon and Rainbow Bee-eater may utilise this habitat for foraging purposes, however typically this habitat would not be utilised for breeding purposes (The Rainbow Bee-eater may build burrows in open areas).</p> <p><u>Dedari</u></p> <p>The Chuditch, Malleefowl and Rainbow Bee-eater may opportunistically utilise this habitat within the survey area. The Chuditch is known to occupy large areas of habitat and the survey area may form part of an individual's home range. Dense and aged thickets may provide hiding areas (in vegetation, hollows or cavities in mallee roots) for the species. The Malleefowl is present in the region in low numbers and could utilise the habitat for nesting and foraging. No mounds or evidence of use was</p>	<p>Ghooli: 9.75 ha Dedari: 0.94 ha</p>	

Description	Habitat Present	Indicative Photograph
<p>recorded during the survey. The Rainbow Bee-eater could use the habitat for foraging purposes, however typically this habitat would not be utilised for breeding purposes.</p>		
<p><b>Highly modified areas</b>  Vegetation association: HD, Cleared  There are sections of the survey areas that are highly modified and are partially cleared and/or dominated by introduced species. These highly modified areas are in degraded condition and have been impacted by a number of disturbances such as past clearing, agriculture activities, rubbish dumping, the water pipeline, roads, tracks, and weed incursion.  These areas consist of a range of vegetation present from regrowth amongst rubbish to little or no overstorey or shrub species, and comprised of mainly weeds with some isolated trees. This vegetation would provide very limited habitat for fauna species, however in some areas the scattered trees or shrubs may provide cover for birds and reptiles, as well as foraging opportunities for small birds.</p>	<p>Ghooli: 14.66 ha  Dedari: 13.28 ha</p>	



#### 4.2.2 Fauna diversity

##### Ghooli

The field survey recorded 46 fauna species, consisting of 39 birds, two reptiles and five mammals. Of these, 41 are native species and five are introduced species. The five introduced species include four mammals, the Cat (*Felis catus*), Dog (*Canis lupus familiaris*), Rabbit (*Oryctolagus cuniculus*) and House Mouse (*Mus musculus*), and one bird, the Laughing Dove (*Streptopelia senegalensis*). A summary of the species recorded is presented in Table 9 and a list of the fauna species recorded during the field survey is provided in Appendix E.

##### Dedari

The field survey recorded 48 fauna species, consisting of 37 birds, five reptiles and six mammals. Of these, 43 are native species and five are introduced species. The five introduced species include all mammals, the Cat, Fox (*Vulpes vulpes*), Dog, Rabbit and House Mouse. A summary of the species recorded is present below in Table 9 and a list of the fauna species recorded during the field survey is provided in Appendix E.

Table 9 Species recorded in the Ghooli and Dedari survey areas

Ghooli	Dedari
39 Birds (one introduced)	37 Birds
2 Reptiles	5 Reptiles
5 Mammals (four Introduced)	6 Mammals (Five Introduced)
46 species	48 species

##### Motion sensor camera results

One fauna species was recorded on the motion sensor camera traps deployed in the survey area at Dedari, the Grey Currawong (*Strepera versicolor*). No other species were recorded, however the cameras were only deployed for one night and the weather was not conducive to wildlife activity.

#### 4.2.3 Conservation significant fauna

During the field survey no conservation significant fauna species were recorded. However several species considered likely to occur are discussed below.

##### Targeted Black Cockatoo assessment

In the south-west of Western Australia, this species mostly occurs in the Wheatbelt, where the species breeds between July/August to January/February. The Carnaby's Black Cockatoo is highly mobile and displays a seasonal migratory pattern that is linked to breeding, with the majority of birds moving to the higher rainfall coastal areas to forage during the non-breeding season (DSEWPac 2012). The species is listed as Endangered under the EPBC Act and the WC Act.

The Ghooli survey area is located at the eastern extent of the mapped breeding range of Carnaby's Black Cockatoo (DSEWPac 2012), and there is suitable habitat for the species within the survey area. The field survey was carried out during the breeding season of Carnaby's Black Cockatoo, however no birds were sighted and there was no evidence of breeding, foraging or roosting recorded within the Ghooli survey area. The species does not typically occur in high numbers east of Merredin.

Some feeding evidence was recorded by cockatoo species on Native Pine (*Callitris preissii*) and Mallee (*Eucalyptus sp.*) within the mixed shrublands habitat type, however this feeding evidence (see Plate 1) was consistent with Major Mitchells Cockatoo foraging behaviour and Native Pine is a known feeding species (Johnstone and Storr 1998). Some feeding evidence of Major Mitchell's Cockatoo was also recorded in shrublands within the Dedari survey area.



Plate 1 *Callitris preissii* branches and seed husks

Feeding evidence was also recorded in Salmon Gum, however the Red-tailed Black Cockatoo (*Calyptorhynchus banksii samueli*) was recorded feeding close by and feathers were found under feeding trees with evidence. *Calyptorhynchus banksii samueli* is a wide spread member of the Red-tailed Black Cockatoo group and is not listed. The evidence of feeding observed by this species can be seen below in Plate 2.

Although both the Major Mitchell Cockatoo and Red-tailed Black Cockatoo are not listed both species are considered significant to the region and any habitat where possible should be retained.





Plate 2 Red-tailed Black Cockatoo feeding evidence and male tail feather

A description of the extent of the foraging, potential breeding and roosting habitat for Carnaby's Black Cockatoo within the survey area is summarised in Table 10. Potential breeding habitat (trees with large hollow with chews present) is mapped in Figure 5, Appendix A and habitat breeding tree information is provided in Table 10.

Table 10 **Summary and extent of Carnaby's Black Cockatoo habitat within the Ghooli survey area**

Habitat type	Presence within the Ghooli survey area / Evidence
Foraging habitat	<ul style="list-style-type: none"> <li>While some of the habitat types within the survey area contain suitable foraging species, none are considered to provide high quality foraging habitat for a Carnaby's Black Cockatoo (i.e. do not contain a high density of foraging species).</li> <li>There are scattered proteaceous species (e.g. <i>Hakea</i> and <i>Grevillea</i> species) throughout the mixed shrublands and eucalypt woodlands (including mallee) and some of the eucalypt species also provide food items (e.g. Salmon Gum).</li> <li>No evidence of foraging by Carnaby's Black Cockatoos was recorded within the survey area.</li> </ul>
Actual breeding habitat	<ul style="list-style-type: none"> <li>No breeding events were recorded by Black Cockatoos.</li> </ul>
Potential breeding habitat	<ul style="list-style-type: none"> <li>182 potential breeding habitat trees (&gt;300 mm DBH), of which 19 contain small hollows (small &lt;10 cm) and 11 contain medium or large hollows (medium 10-20 cm, large &gt;20 cm), including Salmon Gum, Gimlet and stag.</li> <li>Six of these trees within the survey area contained hollows that were of a suitable size to currently provide nesting opportunities for the Carnaby's Black Cockatoo (hollows with an entrance diameter greater than 20 cm) and chews were present where by a Cockatoo had used the hollow previously.</li> </ul>

Habitat type	Presence within the Ghooli survey area / Evidence
Roosting habitat	<ul style="list-style-type: none"> <li>No roosting sites were recorded as being used by Black Cockatoos.</li> </ul>

### **Likelihood of occurrence assessment**

A likelihood of occurrence assessment was conducted for all terrestrial vertebrate conservation significant fauna species identified in the desktop assessment for both Ghooli and Dedari. This assessment is based on species biology, habitat requirements, the quality and availability of suitable habitat as determined during the field survey and records of the species in the survey areas. The likelihood of occurrence assessment and parameters used to determine it are described in Appendix E.

No fauna of conservation significance were recorded in either Ghooli or Dedari survey areas. However the assessment concluded two species are likely to occur in Ghooli survey area and three species are likely to occur in Dedari survey area. These species are presented below.

#### **Ghooli**

- Peregrine Falcon (*Falco peregrines*) – Other specially protected fauna (Schedule 7) under WC Act.
- Rainbow Bee-eater (*Merops ornatus*) – Marine under the EPBC Act and Migratory birds protected under an international agreement (Schedule 5) under the WC Act.

#### **Dedari**

- Rainbow Bee-eater (*Merops ornatus*) – Marine under the EPBC Act and Migratory birds protected under an international agreement (Schedule 5) under the WC Act.
- Malleefowl (*Leipoa ocellata*) – Vulnerable under EPBC Act and Vulnerable (Schedule 3) under the WC Act.
- Chuditch (*Dasyurus geoffroii*) – Vulnerable under the EPBC Act and Vulnerable (Schedule 3) under WC Act

It should be noted that although the Carnaby's Black Cockatoo (*Calyptrorhynchus latirostris*) was considered unlikely to occur in Ghooli survey area, in very good years the species may opportunistically utilise the area. However these events would be rare and the habitats in the Ghooli survey area would not support a population of this species long term.

The likelihood assessment revealed that other fauna species of conservation significance could occasionally occur within the habitats of the survey areas. However, it is considered unlikely that the survey areas provide important habitat (e.g. breeding habitat or key foraging habitat) for any of these species. These other species may occasional use the habitats of the survey areas for temporary refuge and dispersal between other areas of habitat.

## 5. Conclusions

### 5.1 Key findings

#### 5.1.1 Vegetation and flora

The survey areas comprised six vegetation associations and two modified associations. All vegetation associations were well represented in areas adjacent to the survey area as well as in the local and broader areas. The vegetation associations are not considered representative of any Federal or State listed TECs or PECs, other significant vegetation as defined by the EPA (2016a) nor considered to be growing in association with watercourses or wetlands. The vegetation condition within the survey area was rated from Excellent to Completely Degraded.

No EPBC Act, WC Act or DBCA Priority-listed flora were recorded within the survey areas. A likelihood of occurrence assessment post-field survey concluded that no taxa are likely to occur, six taxa may possibly occur and the remaining 38 taxa are unlikely to occur within the survey areas. The six taxa that may possibly occur (*Goodenia heatheriana* (P1), *Millotia newbeyi* (P1), *Rinzia fimbriolata* (P1), *Teucrium* sp. dwarf (R. Davis 8813) (P1) and *Stylidium choreanthum* (P3) within the Ghooli survey area and *Gompholobium cinereum* (P3) within the Dedari survey area) have been recorded within the study areas, can be cryptic species and field survey was undertaken outside of the reported flowering periods for all of the species.

#### 5.1.2 Fauna

No conservation significant fauna species were recorded during the current survey in either Ghooli or Dedari survey areas. The survey did identify Major Mitchell's Cockatoo and Red-tailed Black Cockatoo (Wheatbelt race) within both survey areas feeding recorded at both Dedari and Ghooli and breeding habitat was recorded at Ghooli. Although these species are not listed as species of conservation significance, they are considered regionally significant and wherever possible their habitat protected, in particular large breeding trees (6 were identified to have large hollows with chews present in the Ghooli survey area).

The Rainbow Bee-eater and Peregrine Falcon are widespread species that is unlikely to solely rely on the habitats present within the survey areas. The mallee eucalypt woodlands and mixed shrublands provide suitable habitat for the Malleefowl and Chuditch within the Dedari survey area, with the areas of greatest value adjoining vegetation which is well connected to other patches of remnant vegetation. It is likely that these species utilise the Dedari survey area for dispersal between remnants in the region.

In addition, it should be noted that although the Carnaby's Black Cockatoo (*Calyptrorhynchus latirostris*) was considered unlikely to occur in Ghooli and Dedari, in very good years the species may opportunistically utilise the Ghooli area, however these event would be rare and the habitat in the Ghooli survey area would not support a population of this species long term.

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# Appendices

# Appendix A – Figures

Figure 1 Project location

Figure 2 Biological constraints

Figure 3 Vegetation associations and sample locations

Figure 4 Vegetation condition and significant weeds

Figure 5 Fauna habitat types

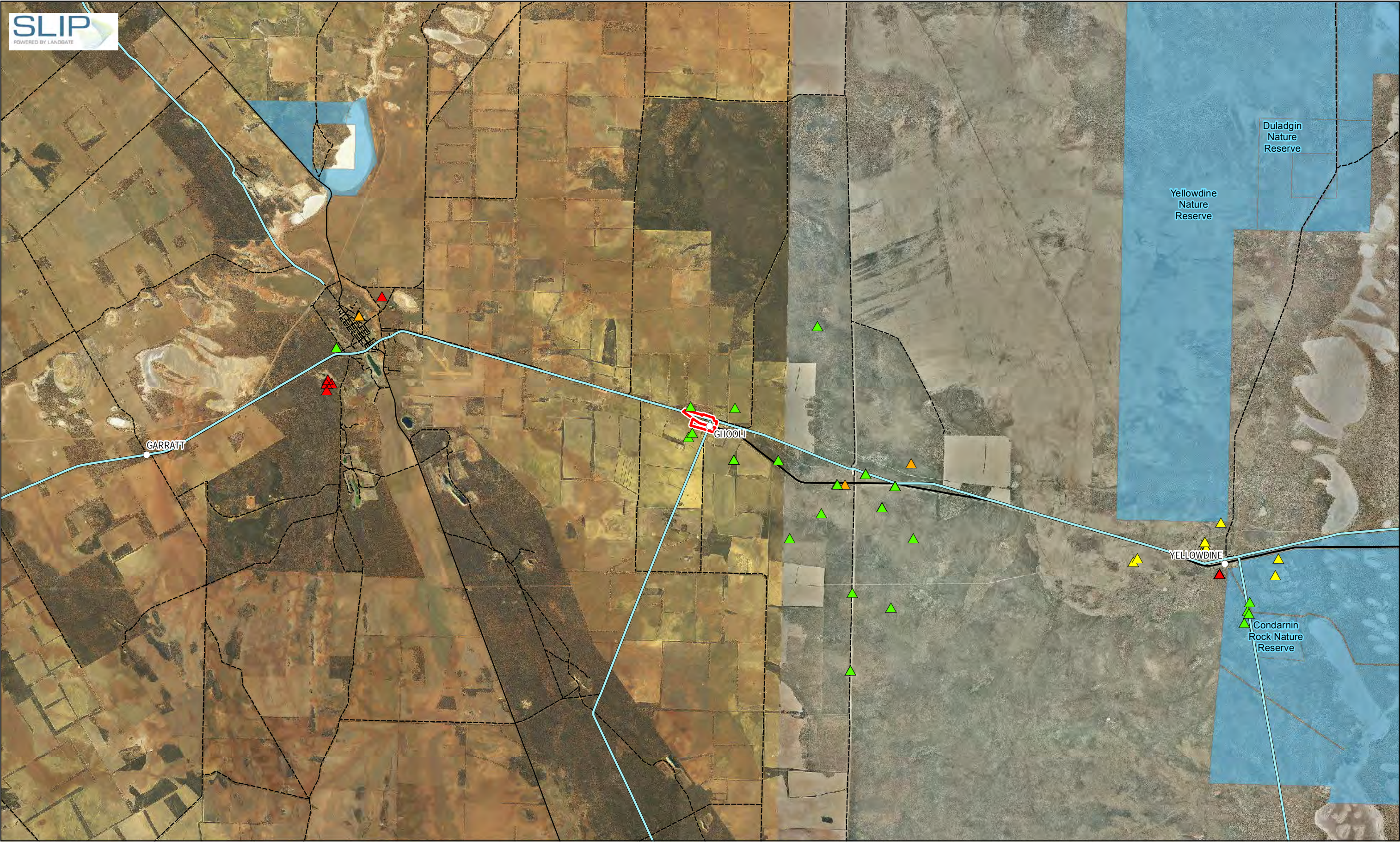




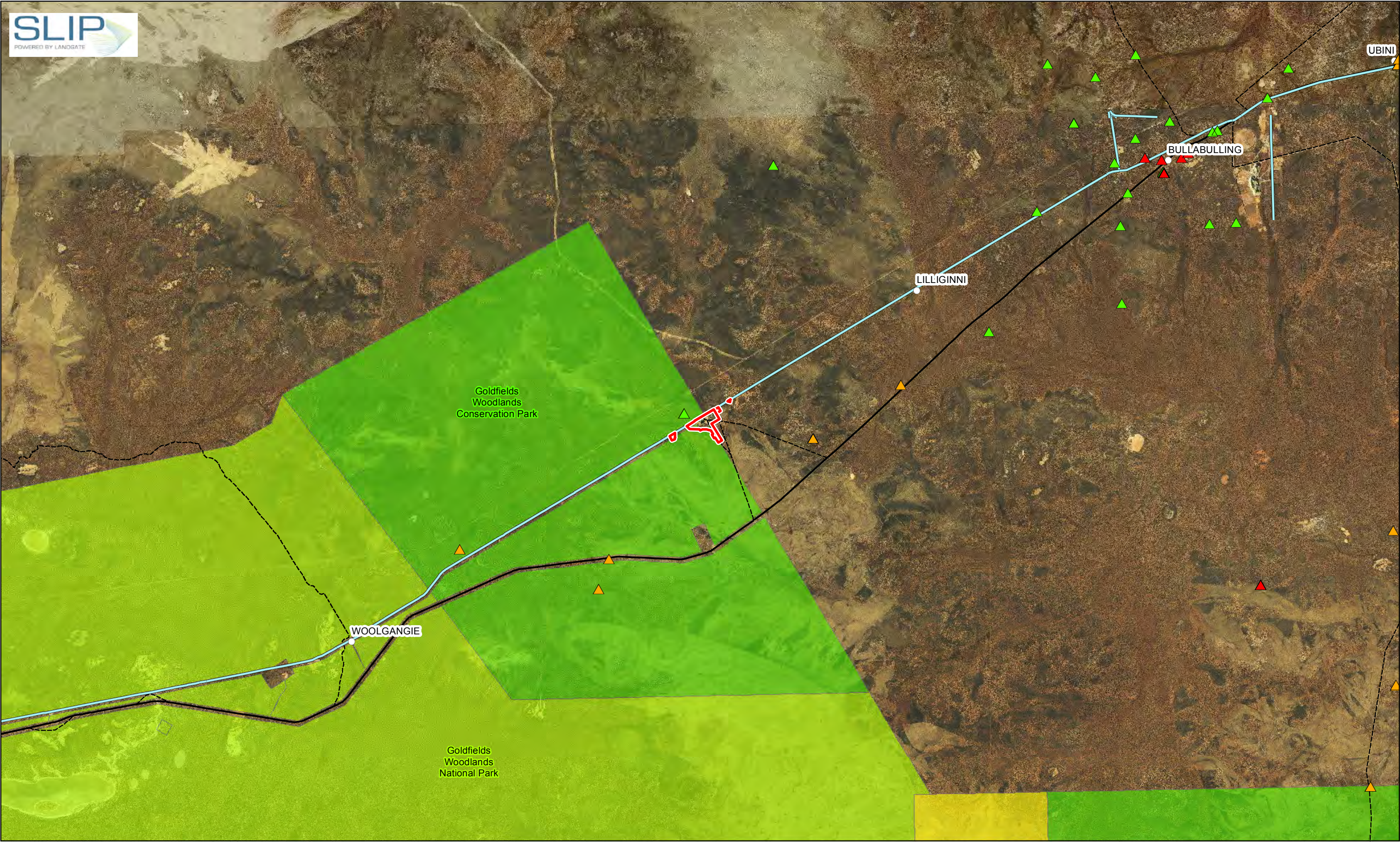




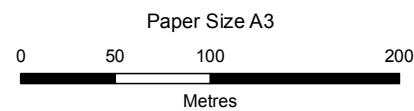
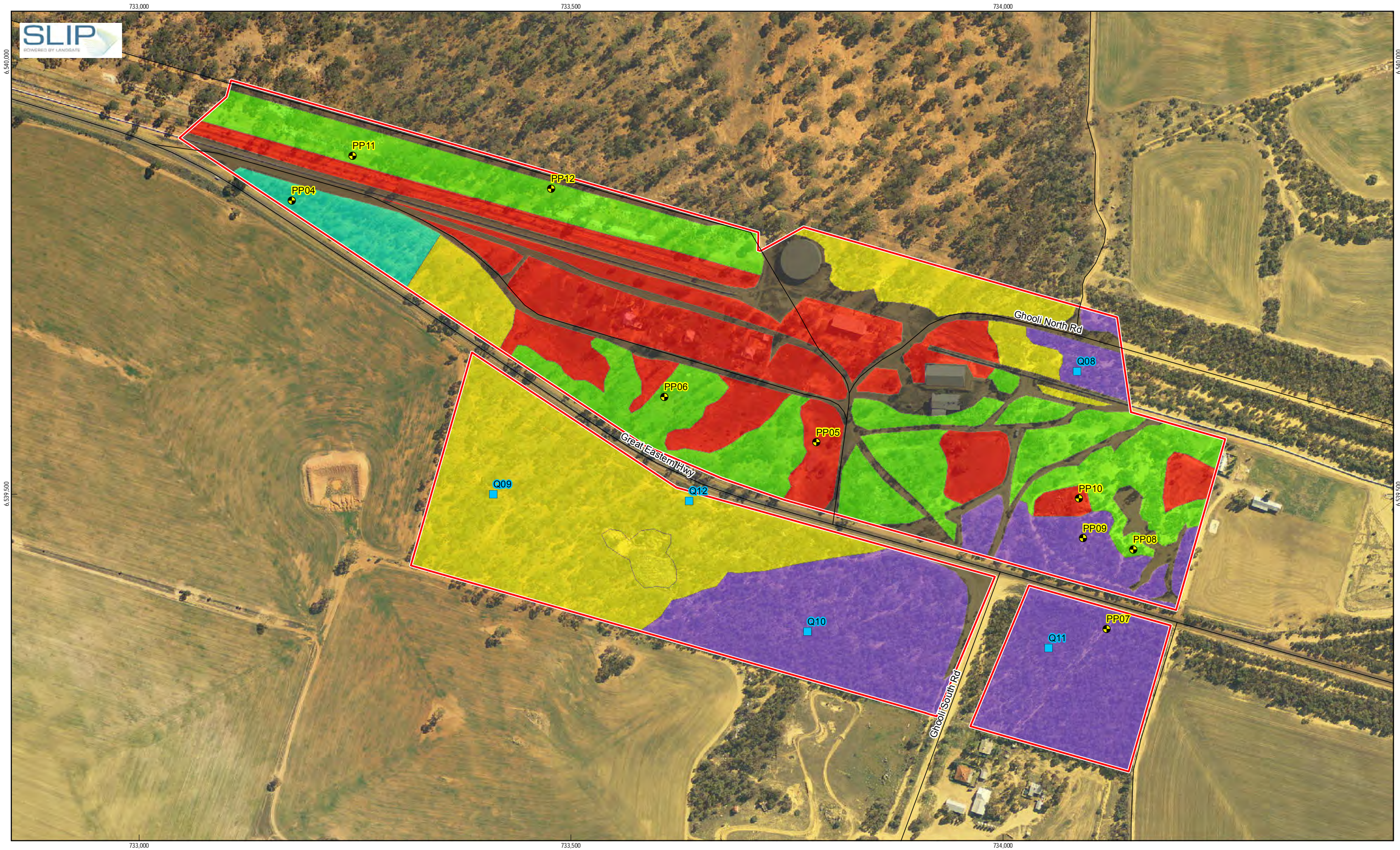




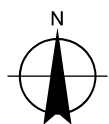








Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 50



#### LEGEND

- Photo Point
- Quadrat
- Relevè
- Road

Site Boundary

#### Vegetation Association

- VT1 *Allocasuarina* and *Acacia* shrubland
- VT2 *Eucalyptus* woodland

- MA01 Scattered natives
- MA02 Revegetation/regrowth
- HD Highly Disturbed
- Cleared



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### Vegetation associations and sample locations

Figure 3

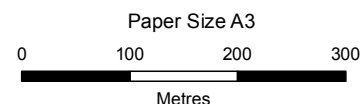
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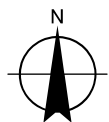
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Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 51



#### LEGEND

- Photo Point
- Quadrat
- Relevé
- Road

Site Boundary

#### Vegetation Association

- MA01 Scattered natives
- VT3 Mixed shrubland
- VT4 *Acacia* and *Melaleuca* shrubland

- VT5 *Eucalyptus salubris* woodland
- VT6 *Eucalyptus mallee* woodland
- HD Highly Disturbed
- Cleared



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### Vegetation associations and sample locations

Figure 3

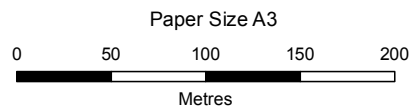
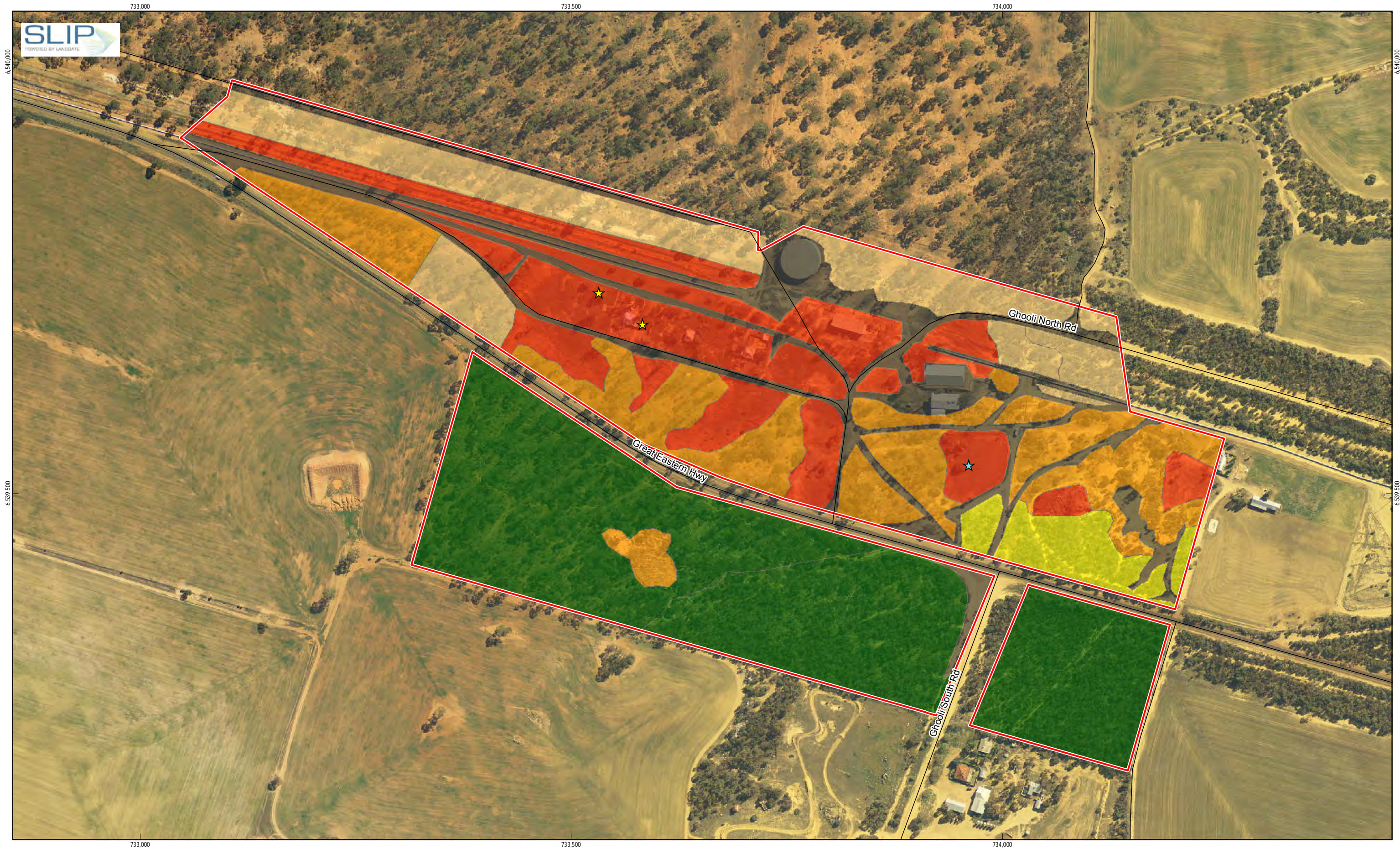
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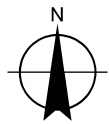
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Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 50



#### LEGEND

##### Introduced Flora

- ★ *Echium plantagineum* (declared pest)
- ★ *Opuntia stricta* (weed of national significance, declared pest)

- Road
- Site Boundary

##### Vegetation Condition

- Green: Excellent
- Yellow: Very Good
- Orange: Good
- Red: Degraded
- Dark Red: Completely Degraded
- Black: Cleared



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### Vegetation condition and significant weeds

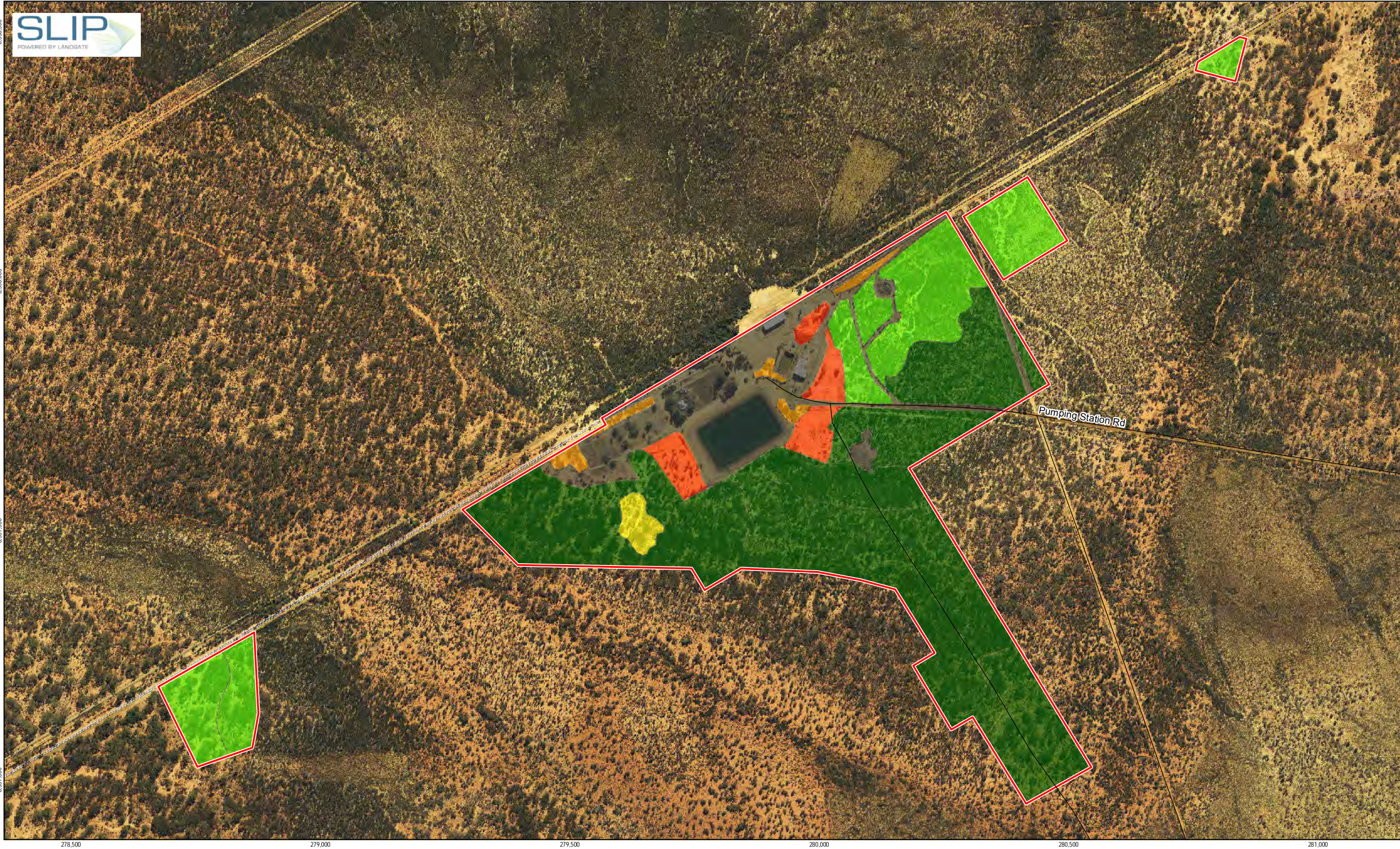
Figure 4

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Data source: GHD: Vegetation Condition, Weeds - 20170906; Landgate: Aerial photography - Virtual Mosaic 20170906, Roads - 20160915. Created by:afeeny





Paper Size A3

0 100 200 300

Metres

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

**LEGEND**

— Road

□ Site Boundary

**Vegetation Condition**

Excellent	Degraded
Very Good	Completely Degraded
Good	Cleared

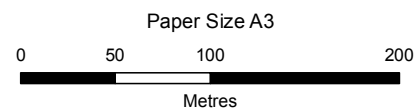
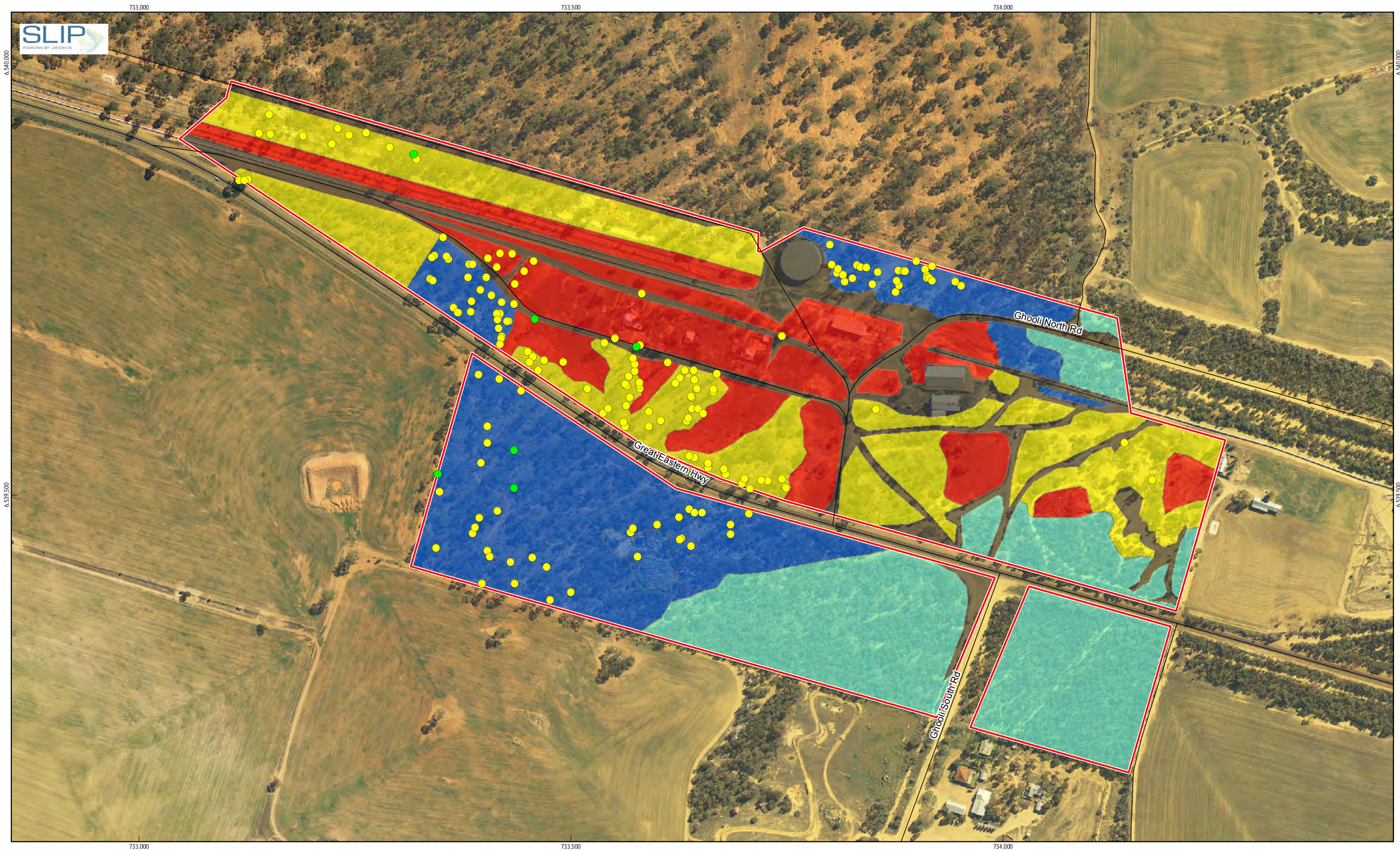
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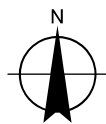
**Vegetation condition and significant weeds**

Figure 4





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



#### LEGEND

##### Potential Black Cockatoo Habitat Trees

- Potential breeding >300 mm
- Potential breeding large hollow, evidence of use

- Road
- Site Boundary

##### Fauna Habitat Type

- Tall open woodland
- Mixed shrublands

- Rehabilitated/Scattered trees
- Highly modified areas
- Cleared



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### Fauna habitats and sample locations

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Figure 5

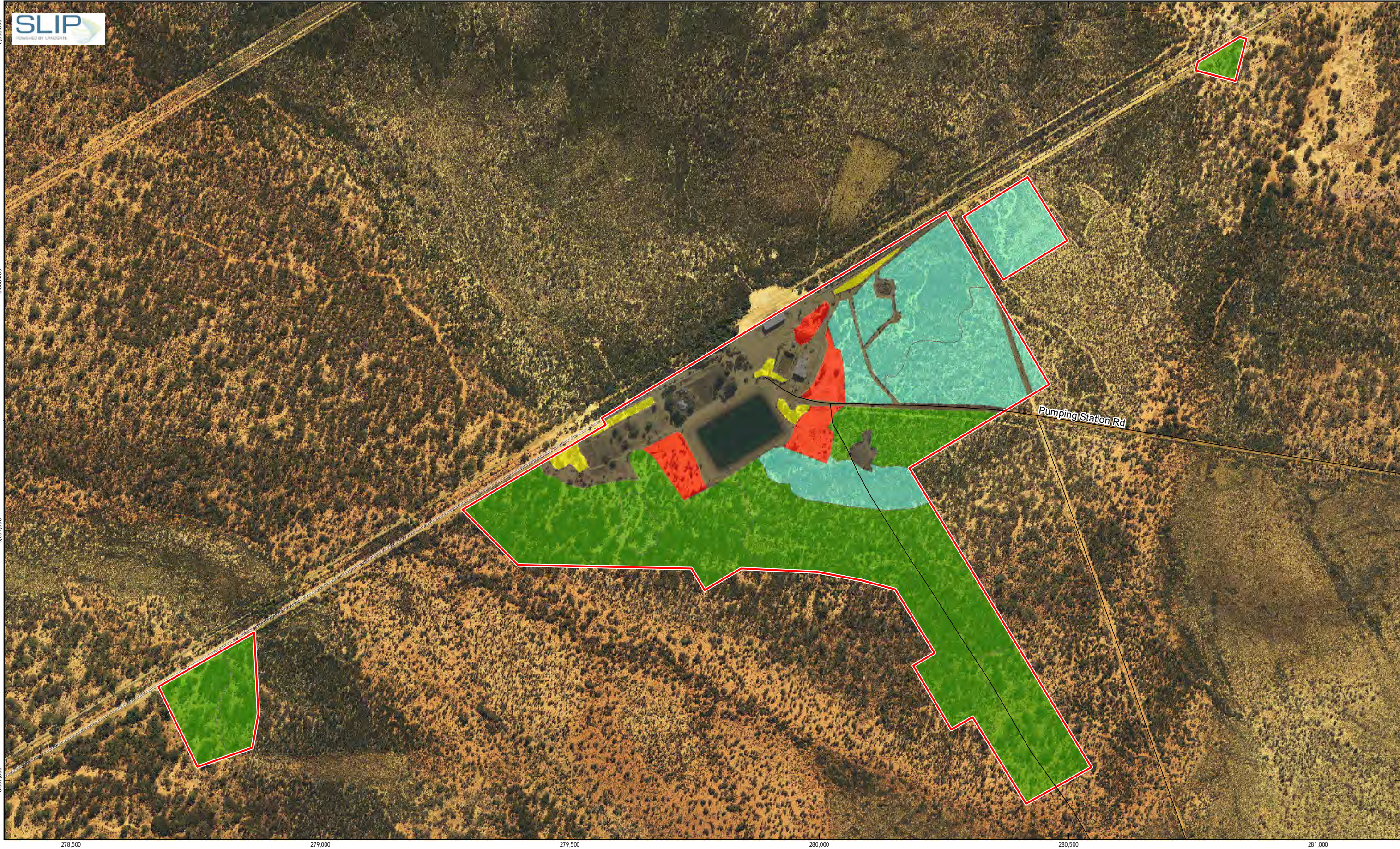
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Paper Size A3

0 100 200 300

Metres

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

N

**LEGEND**

— Road	<b>Fauna Habitat Type</b>	Rehabilitated/Scattered trees
Site Boundary	Mallee Eucalypt woodlands	Highly modified areas
	Mixed shrublands	Cleared

Water Corporation  
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Flora and Fauna Assessment

**Fauna habitats and sample locations**

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Figure 5



## Appendix B – Relevant legislation, conservation codes and background information

## Relevant legislation

### *Federal Environment Protection and Biodiversity Conservation Act 1999*

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

The biological aspects listed as MNES include:

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

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

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

### *State Environmental Protection Act 1986*

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

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

- a) Native vegetation should not be cleared if it comprises a high level of biodiversity.
- b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significance habitat for fauna indigenous to Western Australia.
- c) Native vegetation should not be cleared if it includes, or is necessary, for the continued existence of rare flora.
- d) Native vegetation should not be cleared if it comprises the whole or part of native vegetation in an area that has been extensively cleared.
- e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.
- f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.
- g) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.
- h) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.



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

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

#### *State Biodiversity and Conservation Act 2016*

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

Several parts of the BC Act were proclaimed by the State Governor in the Government Gazette and came into effect on 3 December 2016. However, provisions that replace those existing under the WC Act and Sandalwood Act (including threatened species listings and controls over the taking and keeping of native species) and their associated Regulations cannot be brought into effect until the necessary Biodiversity Conservation Regulations have been made. 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 Biodiversity, Conservation and Attractions (DBCA) and applies to both flora and fauna. Any person wanting to capture, collect, disturb or study fauna requires a permit to do so. A permit is required under the WC Act if removal of threatened species is required.

#### *State Biosecurity and Agriculture Management Act 2007*

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

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

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

## DPIRD Categories for Declared Pests under the BAM Act

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

## Background information

### 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 <i>Australian Heritage Commission Act 1975</i> of the Commonwealth (the RNE was closed in 2007 and is no longer a statutory list – all references to the RNE were removed from the EPBC Act on 19 February 2012).
A defined wetland and the area within 50 m of the wetland. 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 <i>Environmental Protection (Gnangara Mound Crown Land) Policy 1992</i> .
The areas covered by the <i>Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002</i> .
The areas covered by the lakes to which the <i>Environmental Protection (Swan Coastal Plain Lakes) Policy 1992</i> (EPP Lakes) applies.
Protected wetlands as defined in the <i>Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998</i> .

### Reserves and conservation areas

#### Department of Biodiversity, Conservation and Attractions managed lands and waters

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

#### Wetlands

Wetlands include not only lakes with open water, but areas of seasonally, intermittently or permanently waterlogged soil.

## 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” (DEE 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” (DEE 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 (DEE 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

## 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 (2016), based on broadscale vegetation association mapping by Beard (various publications). The GoWA produces Statewide Vegetation Statistics Reports that are used for a number of purposes including conservation planning, land use planning and when assessing development applications. The reports are updated at least every two years.

## Vegetation condition

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

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

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

## Conservation codes

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

### Ecological communities

#### Conservation significant communities

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

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

[Conservation codes and definitions for TECs listed under the EPBC Act or endorsed by the WA Minister for the Environment](#)

Categories	Definition
<b>Federal Government Conservation Categories (EPBC Act)</b>	
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)
<b>Western Australia Conservation Categories</b>	
Presumed Totally Destroyed (PD)	An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.



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

#### Conservation categories and definitions for PECS as listed by the DBCA

Category	Description
Priority 1	<p>Poorly known ecological communities.</p> <p>Ecological communities that are known from very few occurrences with a very restricted distribution (generally <math>\leq 5</math> occurrences or a total area of <math>\leq 100</math> ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.</p>
Priority 2	<p>Poorly known ecological communities.</p> <p>Communities that are known from few occurrences with a restricted distribution (generally <math>\leq 10</math> occurrences or a total area of <math>\leq 200</math> ha). At least some occurrences are not believed to be under immediate threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.</p>
Priority 3	<p>Poorly known ecological communities.</p> <ul style="list-style-type: none"> <li>(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:</li> <li>(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;</li> <li>(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.</li> </ul> <p>Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.</p>

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

### Other significant vegetation

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

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

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

Flora and fauna

### Conservation significant flora and fauna

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

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

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

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

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

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

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

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

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

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

Conservation category	Definition
Vulnerable	<p>A) A species not critically endangered or endangered; and</p> <p>B) A species facing a high risk of extinction in the wild in the medium-term, as determined in accordance with the prescribed criteria.</p>
Conservation Dependent	<p>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</p> <p>B) The following subparagraphs are satisfied:</p> <ul style="list-style-type: none"> <li>(i) the species is a species of fish;</li> <li>(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;</li> <li>(iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory;</li> <li>(iv) cessation of the plan of management would adversely affect the conservation status of the species.</li> </ul>

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

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

## Conservation codes for DBCA listed Priority flora and fauna

Priority category	Definition
Priority 1	<p>Poorly-known taxa</p> <p>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.</p>
Priority 2	<p>Poorly-known taxa</p> <p>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.</p>
Priority 3	<p>Poorly-known taxa</p> <p>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.</p>
Priority 4	<p>Rare, Near Threatened and other taxa in need of monitoring</p> <p>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.</p> <p>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.</p> <p>C. Taxa that have been removed from the list of threatened taxa during the past five years for reasons other than taxonomy.</p>

### Other significant flora

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

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



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

#### **Other significant fauna**

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

Introduced plants (weeds)

#### **Declared Pests**

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

#### **Weeds of National Significance**

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

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

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

## References

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## Appendix C – Desktop searches



# EPBC Act Protected Matters Report

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

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

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

Report created: 07/08/17 19:52:45

[Summary](#)

[Details](#)

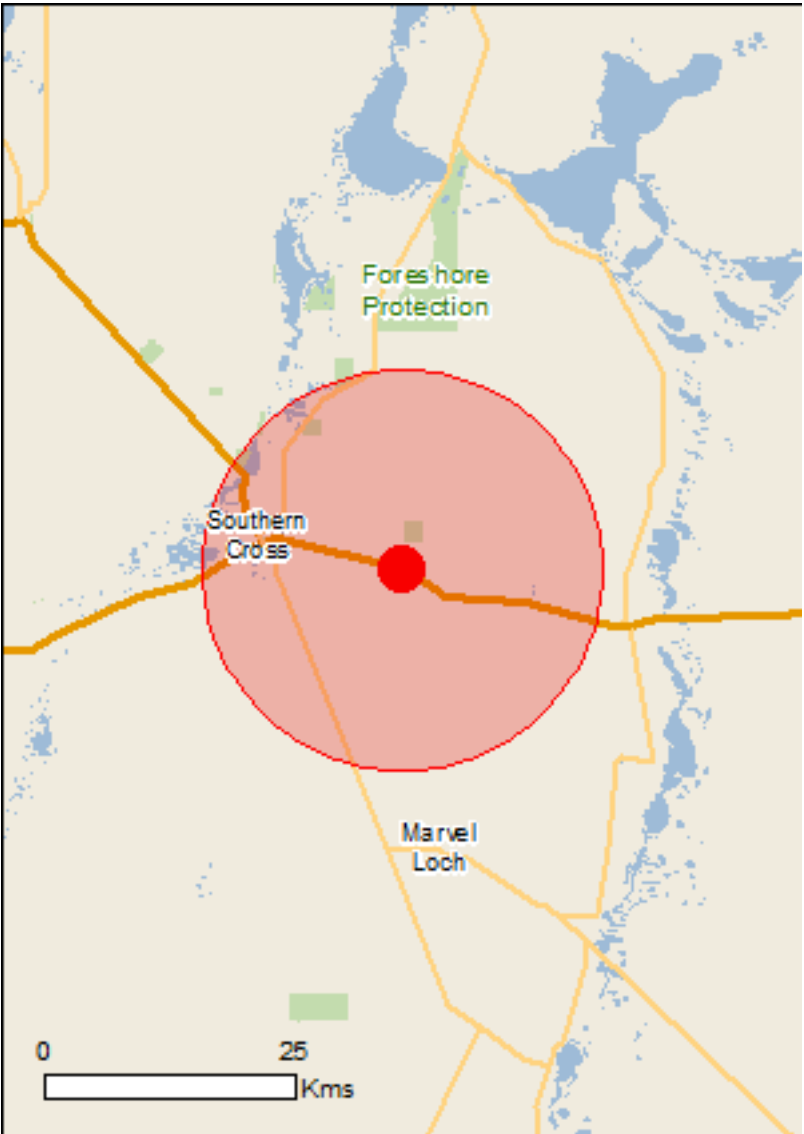
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

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# Summary

## Matters of National Environmental Significance

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

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	1
<a href="#">Wetlands of International Importance:</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	None
<a href="#">Listed Threatened Species:</a>	10
<a href="#">Listed Migratory Species:</a>	6

## 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.

<a href="#">Commonwealth Land:</a>	1
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	10
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Commonwealth Reserves Marine:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	2
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	11
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">Key Ecological Features (Marine)</a>	None

# Details

## Matters of National Environmental Significance

National Heritage Properties		[ Resource Information ]
Name	State	Status
Historic		
<a href="#">Goldfields Water Supply Scheme, Western Australia</a>	WA	Listed place

Listed Threatened Species		[ Resource Information ]
Name	Status	Type of Presence
Birds		
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Pezoporus occidentalis</a> Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Mammals		
<a href="#">Dasyurus geoffroii</a> Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area
Plants		
<a href="#">Acacia lobulata</a> Chiddarcooping Wattle [55567]	Endangered	Species or species habitat likely to occur within area
<a href="#">Dasymalla axillaris</a> Native Foxglove [38829]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Eremophila virens</a> Campion Eremophila, Green-flowered Emu bush [21433]	Endangered	Species or species habitat may occur within area
<a href="#">Eremophila viscida</a> Varnish Bush [2394]	Endangered	Species or species habitat likely to occur within area
<a href="#">Ricinocarpos brevis</a> [82879]	Endangered	Species or species habitat may occur within area
<a href="#">Roycea pycnophylloides</a> Saltmat [21161]	Endangered	Species or species habitat may occur within area

Listed Migratory Species		[ Resource Information ]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence



Name	Threatened	Type of Presence
Migratory Marine Birds		
<a href="#">Apus pacificus</a>		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
<a href="#">Motacilla cinerea</a>		
Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
<a href="#">Actitis hypoleucos</a>		
Common Sandpiper [59309]		Species or species habitat likely to occur within area
<a href="#">Calidris acuminata</a>		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a>		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a>		
Pectoral Sandpiper [858]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land	[ <a href="#">Resource Information</a> ]
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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	Threatened	Type of Presence
Commonwealth Land -		
Listed Marine Species		
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name		
Birds		
<a href="#">Actitis hypoleucos</a>		
Common Sandpiper [59309]		Species or species habitat likely to occur within area
<a href="#">Apus pacificus</a>		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea alba</a>		
Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
<a href="#">Ardea ibis</a>		
Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a>		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a>		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a>		
Pectoral Sandpiper [858]		Species or species habitat may occur within

Name	Threatened	Type of Presence
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		area  Species or species habitat may occur within area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
<a href="#">Thinornis rubricollis</a> Hooded Plover [59510]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[ Resource Information ]
Name	State
Unnamed WA25801	WA
Yellowdine	WA

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

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Carrichtera annua Ward's Weed [9511]		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

-31.25371 119.45397

# 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.

# NatureMap Flora Species Report 20km

Created By Guest user on 07/08/2017

Kingdom Plantae  
Current Names Only Yes  
Core Datasets Only Yes  
Method 'By Circle'  
Centre 119° 27' 19" E, 31° 15' 04" S  
Buffer 20km  
Group By Family

Family	Species	Records
Aizoaceae	6	12
Amaranthaceae	8	14
Apiaceae	4	7
Apocynaceae	1	2
Araliaceae	2	8
Asparagaceae	7	16
Asphodelaceae	1	1
Asteraceae	59	107
Boraginaceae	2	3
Boryaceae	1	3
Brassicaceae	8	13
Cactaceae	3	4
Casuarinaceae	4	10
Celastraceae	4	5
Centrolepidaceae	3	3
Chenopodiaceae	43	133
Cupressaceae	2	8
Cyperaceae	4	6
Dicranaceae	1	1
Dilleniaceae	6	16
Droseraceae	3	9
Ecdeiocoleaceae	1	1
Elaeocarpaceae	1	6
Ericaceae	6	16
Euphorbiaceae	4	13
Fabaceae	77	322
Frankeniaceae	4	11
Geraniaceae	1	1
Goodeniaceae	23	55
Gyrostemonaceae	2	2
Haemodorumaceae	2	6
Haloragaceae	2	3
Hemerocallidaceae	1	2
Iridaceae	2	3
Juncaceae	2	2
Lamiaceae	21	72
Lauraceae	1	1
Loganiaceae	2	2
Loranthaceae	1	1
Lythraceae	1	1
Malvaceae	8	9
Myrtaceae	97	294
Orchidaceae	16	21
Pittosporaceae	3	4
Plumbaginaceae	2	7
Poaceae	22	35
Polygalaceae	3	4
Portulacaceae	2	3
Pottiaceae	3	7
Primulaceae	1	1
Proteaceae	39	120
Pteridaceae	1	1
Rhamnaceae	1	2
Ricciaceae	1	3
Rutaceae	14	52
Santalaceae	3	7
Sapindaceae	7	16
Scrophulariaceae	12	34
Solanaceae	4	8
Stylidiaceae	8	21
Thymelaeaceae	8	15
Typhaceae	1	1
Violaceae	1	1
Zygophyllaceae	3	4
<b>TOTAL</b>	<b>586</b>	<b>1571</b>

Name ID Species Name

Naturalised

Conservation Code

<sup>1</sup>Endemic To Query Area



	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Aizoaceae</b>					
1.	11681	<i>Disphyma crassifolium</i> subsp. <i>clavellatum</i>			
2.	11571	<i>Galenia pubescens</i> var. <i>pubescens</i>	Y		
3.	2805	<i>Gunniopsis intermedia</i> (Yellow Salt Star)			
4.	2810	<i>Gunniopsis septifraga</i>			
5.	2813	<i>Mesembryanthemum crystallinum</i> (Iceplant)	Y		
6.	2814	<i>Mesembryanthemum nodiflorum</i> (Slender Iceplant)	Y		
<b>Amaranthaceae</b>					
7.	2707	<i>Ptilotus carlsonii</i>			
8.	2727	<i>Ptilotus gaudichaudii</i>			
9.	2729	<i>Ptilotus grandiflorus</i>			
10.	2732	<i>Ptilotus holosericeus</i>			
11.	41001	<i>Ptilotus nobilis</i> subsp. <i>nobilis</i> (Yellow Tails)			
12.	2747	<i>Ptilotus obovatus</i> (Cotton Bush)			
13.	2760	<i>Ptilotus spathulatus</i>			
14.	43203	<i>Surreya diandra</i>			
<b>Apiaceae</b>					
15.	6208	<i>Actinotus superbus</i>			
16.	6215	<i>Chlaenosciadium gardneri</i>			
17.	6255	<i>Platysace juncea</i>			
18.	14999	<i>Platysace trachymenioides</i>			
<b>Apocynaceae</b>					
19.	6565	<i>Alyxia buxifolia</i> (Dysentery Bush)			
<b>Araliaceae</b>					
20.	6228	<i>Hydrocotyle corynophora</i>		P1	
21.	6268	<i>Trachymene cyanopetala</i>			
<b>Asparagaceae</b>					
22.	1215	<i>Chamaexeros fimbriata</i>			
23.	1300	<i>Laxmannia arida</i>			
24.	1306	<i>Laxmannia paleacea</i>			
25.	1224	<i>Lomandra collina</i> (Pale Mat Rush)			
26.	1226	<i>Lomandra effusa</i> (Scented Matrush)			
27.	1338	<i>Thysanotus manglesianus</i> (Fringed Lily)			
28.	1248	<i>Xerolirion divaricata</i> (Basil's Asparagus)			
<b>Asphodelaceae</b>					
29.	1364	<i>Asphodelus fistulosus</i> (Onion Weed)	Y		
<b>Asteraceae</b>					
30.	7817	<i>Actinobole uliginosum</i> (Flannel Cudweed)			
31.	7836	<i>Angianthus tomentosus</i> (Camel-grass)			
32.	7846	<i>Asteridea athrixioides</i>			
33.	7852	<i>Bellida graminea</i> (Rosy Bellida)			
34.	7856	<i>Blennospora drummondii</i>			
35.	7857	<i>Blennospora phlegmatocarpa</i>			
36.	7871	<i>Brachyscome ciliaris</i>			
37.	7878	<i>Brachyscome iberidifolia</i>			
38.	7883	<i>Brachyscome pusilla</i>			
39.	7903	<i>Calotis hispidula</i> (Bindy Eye)			
40.	7911	<i>Carthamus lanatus</i> (Saffron Thistle)	Y		
41.	7922	<i>Cephalopterum drummondii</i> (Pompom Head)			
42.	7924	<i>Ceratogyne obionoides</i> (Wingwort)			
43.	7933	<i>Chthonocephalus pseudevax</i> (Woolly Groundheads)			
44.	7960	<i>Dithyrostegia amplexicaulis</i>			
45.	14377	<i>Erymophyllum ramosum</i> subsp. <i>ramosum</i>			
46.	8002	<i>Gnephosis tenuissima</i>			
47.	8003	<i>Gnephosis tridens</i>			
48.	8085	<i>Hyalochlamys globifera</i>			
49.	12742	<i>Hyalosperma demissum</i>			
50.	15447	<i>Hyalosperma glutinosum</i> subsp. <i>glutinosum</i>			
51.	12756	<i>Hyalosperma zacchaeus</i>			
52.	8086	<i>Hypochoeris glabra</i> (Smooth Catsear)	Y		
53.	29046	<i>Lactuca serriola</i> forma <i>serriola</i>	Y		
54.	13284	<i>Lawrencella rosea</i>			
55.	44490	<i>Leontodon rhagadioloides</i>	Y		
56.	14338	<i>Millotia newbeyi</i>		P1	
57.	8106	<i>Millotia tenuifolia</i> (Soft Millotia)			
58.	14344	<i>Millotia tenuifolia</i> var. <i>tenuifolia</i> (Soft Millotia)			
59.	29418	<i>Monoculus monstrosus</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
		Y		
60.	8134 <i>Olearia exiguifolia</i> (Small-leaved Daisy Bush)			
61.	8136 <i>Olearia homolepis</i>			
62.	19023 <i>Olearia incana</i>			
63.	8139 <i>Olearia magniflora</i>			
64.	8140 <i>Olearia muelleri</i> (Goldfields Daisy)			
65.	8141 <i>Olearia muricata</i> (Rough-leaved Daisy Bush)			
66.	8145 <i>Olearia pimeleoides</i> (Pimelea Daisybush, Burrobunga)			
67.	12646 <i>Ozothamnus occidentalis</i>			
68.	8173 <i>Podolepis capillaris</i> (Wiry Podolepis)			
69.	8175 <i>Podolepis gracilis</i> (Slender Podolepis)			
70.	8177 <i>Podolepis lessonii</i>			
71.	8182 <i>Podotricha angustifolia</i> (Sticky Longheads)			
72.	8184 <i>Podotricha gnaphalioides</i> (Golden Long-heads)			
73.	8187 <i>Pogonolepis muelleriana</i>			
74.	8188 <i>Pogonolepis stricta</i>			
75.	13241 <i>Rhodanthe chlorocephala</i> subsp. <i>rosea</i>			
76.	13300 <i>Rhodanthe citrina</i>			
77.	13294 <i>Rhodanthe laevis</i>			
78.	13249 <i>Rhodanthe oppositifolia</i> subsp. <i>oppositifolia</i>			
79.	13252 <i>Rhodanthe pygmaea</i>			
80.	13253 <i>Rhodanthe rubella</i>			
81.	8200 <i>Schoenia cassiniana</i> (Schoenia)			
82.	8207 <i>Senecio glossanthus</i> (Slender Groundsel)			
83.	8231 <i>Sonchus oleraceus</i> (Common Sowthistle)	Y		
84.	13298 <i>Thiseltonia gracillima</i>			
85.	8266 <i>Vittadinia gracilis</i>			
86.	8268 <i>Vittadinia humerata</i>			
87.	13331 <i>Waitzia acuminata</i> var. <i>acuminata</i>			
88.	46093 <i>Waitzia fitzgibbonii</i>			
<b>Boraginaceae</b>				
89.	6684 <i>Halgania andromedifolia</i>			
90.	6691 <i>Halgania integerrima</i>			
<b>Boryaceae</b>				
91.	1267 <i>Borya constricta</i>			
<b>Brassicaceae</b>				
92.	3000 <i>Brassica tournefortii</i> (Mediterranean Turnip)	Y		
93.	3018 <i>Lepidium africanum</i> (Rubble Peppergrass)	Y		
94.	3044 <i>Lepidium rotundum</i> (Veined Peppergrass)			
95.	3059 <i>Phlegmatospermum eremaeum</i>		P3	
96.	3072 <i>Sisymbrium orientale</i> (Indian Hedge Mustard)	Y		
97.	3073 <i>Sisymbrium runcinatum</i>	Y		
98.	3076 <i>Stenopetalum filifolium</i>			
99.	19419 <i>Stenopetalum salicola</i>			
<b>Cactaceae</b>				
100.	29276 <i>Opuntia monacantha</i> (Barbary Fig)	Y		
101.	5227 <i>Opuntia stricta</i> (Common Prickly Pear)	Y		
102.	46207 <i>Opuntia tomentosa</i>	Y		
<b>Casuarinaceae</b>				
103.	1720 <i>Allocasuarina acutivalvis</i>			
104.	1722 <i>Allocasuarina corniculata</i>			
105.	12655 <i>Allocasuarina spinosissima</i>			
106.	1742 <i>Casuarina obesa</i> (Swamp Sheoak, Kuli)			
<b>Celastraceae</b>				
107.	4725 <i>Psammomoya choretroides</i>			
108.	4734 <i>Stackhousia muricata</i>			
109.	4735 <i>Stackhousia scoparia</i>			
110.	4737 <i>Tripterococcus brunonis</i> (Winged Stackhousia)			
<b>Centrolepidaceae</b>				
111.	1126 <i>Centrolepis eremica</i>			
112.	1130 <i>Centrolepis humillima</i> (Dwarf Centrolepis)			
113.	1134 <i>Centrolepis polygyna</i> (Wiry Centrolepis)			
<b>Chenopodiaceae</b>				
114.	11435 <i>Atriplex acutibractea</i> subsp. <i>acutibractea</i>			
115.	11489 <i>Atriplex acutibractea</i> subsp. <i>karoniensis</i>			
116.	2453 <i>Atriplex codonocarpa</i> (Flat-topped Saltbush)			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
117.	2455 <i>Atriplex eardleyae</i>			
118.	2459 <i>Atriplex holocarpa</i> (Pop Saltbush)			
119.	2461 <i>Atriplex hymenotheca</i>			
120.	12042 <i>Atriplex lindleyi</i> subsp. <i>inflata</i>			
121.	11516 <i>Atriplex nummularia</i> subsp. <i>spathulata</i> (Old Man Saltbush)			
122.	11525 <i>Atriplex paludosa</i> subsp. <i>baudinii</i>			
123.	2472 <i>Atriplex pumilio</i>			
124.	11791 <i>Atriplex quadrivalvata</i> var. <i>quadrivalvata</i>			
125.	2476 <i>Atriplex semilunaris</i> (Annual Saltbush)			
126.	2479 <i>Atriplex stipitata</i> (Mallee Saltbush)			
127.	2480 <i>Atriplex suberecta</i>			
128.	2481 <i>Atriplex vesicaria</i> (Bladder Saltbush)			
129.	2498 <i>Didymanthus roei</i>			
130.	2499 <i>Dissocarpus paradoxus</i> (Curious Saltbush)			
131.	2511 <i>Enchylaena tomentosa</i> (Barrier Saltbush)			
132.	12064 <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> (Barrier Saltbush)			
133.	2514 <i>Eriochiton sclerolaenoides</i> (Woolly Bindii)			
134.	2533 <i>Maireana amoena</i>			
135.	2537 <i>Maireana brevifolia</i> (Small Leaf Bluebush)			
136.	2538 <i>Maireana carnosae</i> (Cottony Bluebush)			
137.	2544 <i>Maireana georgei</i> (Satiny Bluebush)			
138.	2568 <i>Maireana trichoptera</i> (Downy Bluebush)			
139.	2581 <i>Rhagodia drummondii</i>			
140.	2587 <i>Roycea divaricata</i>			
141.	30434 <i>Salsola australis</i>			
142.	2609 <i>Sclerolaena diacantha</i> (Grey Copperburr)			
143.	2615 <i>Sclerolaena fusiformis</i>			
144.	2626 <i>Sclerolaena parviflora</i> (Small-flower Saltbush)			
145.	31492 <i>Tecticornia disarticulata</i>			
146.	33236 <i>Tecticornia halocnemoides</i> (Shrubby Samphire)			
147.	33319 <i>Tecticornia indica</i> subsp. <i>bidens</i>			
148.	31675 <i>Tecticornia lylei</i>			
149.	31551 <i>Tecticornia moniliformis</i>			
150.	31674 <i>Tecticornia peltata</i>			
151.	33297 <i>Tecticornia pergranulata</i> subsp. <i>pergranulata</i> (Blackseed Samphire)			
152.	31618 <i>Tecticornia pruinosa</i>			
153.	33218 <i>Tecticornia pterygosperma</i> subsp. <i>pterygosperma</i>			
154.	33216 <i>Tecticornia</i> sp. Dennys Crossing (K.A. Shepherd & J. English KS 552)			
155.	31600 <i>Tecticornia tenuis</i>			
156.	31717 <i>Tecticornia undulata</i>			

### Cupressaceae

157.	92 <i>Callitris canescens</i>			
158.	96 <i>Callitris preissii</i> (Rottneist Island Pine, Maro)			

### Cyperaceae

159.	41647 <i>Lepidosperma sanguinolentum</i>			
160.	<i>Lepidosperma</i> sp.			
161.	993 <i>Schoenus hexandrus</i>			
162.	1015 <i>Schoenus subaphyllus</i>			

### Dicranaceae

163.	32336 <i>Campylopus clavatus</i>			
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### Dilleniaceae

164.	19692 <i>Hibbertia ancistrophylla</i>			
165.	5115 <i>Hibbertia conspicua</i> (Leafless Hibbertia)			
166.	5122 <i>Hibbertia eatoniae</i>			
167.	19779 <i>Hibbertia glomerata</i> var. <i>glomerata</i>			
168.	5165 <i>Hibbertia rostellata</i>			
169.	15863 <i>Hibbertia stowardii</i>			

### Droseraceae

170.	3088 <i>Drosera andersoniana</i> (Sturdy Sundew)			
171.	3098 <i>Drosera glanduligera</i> (Pimpernel Sundew)			
172.	14298 <i>Drosera macrantha</i> subsp. <i>macrantha</i>			

### Ecdeiocolaeaceae

173.	1066 <i>Ecdeiocola monostachya</i>			
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### Elaeocarpaceae

174.	4530 <i>Tetradlea efoliata</i>			
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### Ericaceae

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	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
175.	6336	<i>Astroloma serratifolium</i> (Kondrung)			
176.	6401	<i>Leucopogon hamulosus</i>			
177.	41770	<i>Leucopogon</i> sp. Boorabbin (K.R. Newbey 8374)			
178.	36059	<i>Leucopogon</i> sp. Yellowdine (M. Hislop & F. Hort MH 3194)		P1	
179.	20645	<i>Lissanthe scabra</i>		P2	
180.	34736	<i>Lysinema pentapetalum</i>			

### Euphorbiaceae

181.	34261	<i>Beyeria minor</i>			
182.	34276	<i>Beyeria sulcata</i> var. <i>brevipes</i>			
183.	34257	<i>Beyeria sulcata</i> var. <i>sulcata</i>			
184.	19587	<i>Monotaxis grandiflora</i> var. <i>obtusifolia</i>			

### Fabaceae

185.	3200	<i>Acacia acuminata</i> (Jam, Mangard)			
186.	14048	<i>Acacia ancistrophylla</i> var. <i>perarcuata</i>		P3	
187.	3218	<i>Acacia anfractuosa</i>			
188.	15467	<i>Acacia assimilis</i> subsp. <i>assimilis</i>			
189.	3236	<i>Acacia beauverdiana</i> (Pukkati)			
190.	3264	<i>Acacia colletioides</i> (Wait-a-while)			
191.	16117	<i>Acacia consanguinea</i>			
192.	3269	<i>Acacia coolgardiensis</i> (Spinifex Wattle)			
193.	14068	<i>Acacia cylindrica</i>		P3	
194.	16169	<i>Acacia deficiens</i>			
195.	14069	<i>Acacia desertorum</i> var. <i>nudipes</i>		P3	
196.	16119	<i>Acacia dissona</i> var. <i>dissona</i>			
197.	16168	<i>Acacia enervia</i> subsp. <i>enervia</i>			
198.	12257	<i>Acacia enervia</i> subsp. <i>explicata</i>			
199.	3324	<i>Acacia erinacea</i>			
200.	3337	<i>Acacia filifolia</i>		P3	
201.	14076	<i>Acacia formidabilis</i>		P3	
202.	15282	<i>Acacia gibbosa</i>			
203.	3366	<i>Acacia hemiteles</i>			
204.	15285	<i>Acacia heteroneura</i> var. <i>jutsonii</i>			
205.	3378	<i>Acacia inaequiloba</i>			
206.	3389	<i>Acacia intricata</i>			
207.	3393	<i>Acacia jennerae</i>			
208.	14610	<i>Acacia kalgoorliensis</i>			
209.	3426	<i>Acacia longispinea</i>			
210.	3440	<i>Acacia merrallii</i>			
211.	3451	<i>Acacia multispicata</i>			
212.	3452	<i>Acacia murrayana</i> (Sandplain Wattle)			
213.	15290	<i>Acacia neurophylla</i> subsp. <i>erugata</i>			
214.	15479	<i>Acacia nigripilosa</i> subsp. <i>nigripilosa</i>			
215.	3463	<i>Acacia nyssophylla</i>			
216.	3495	<i>Acacia prainii</i> (Prain's Wattle)			
217.	3513	<i>Acacia resinimarginea</i>			
218.	3514	<i>Acacia resinistipulea</i>			
219.	3524	<i>Acacia rossei</i>			
220.	15484	<i>Acacia sphacelata</i> subsp. <i>sphacelata</i>			
221.	3555	<i>Acacia steedmanii</i>			
222.	23525	<i>Acacia steedmanii</i> subsp. <i>steedmanii</i>			
223.	15294	<i>Acacia stereophylla</i> var. <i>stereophylla</i>			
224.	3577	<i>Acacia tetragonophylla</i> (Kurara, Wakalpuka)			
225.	46473	<i>Acacia verriculum</i>			
226.	15292	<i>Acacia yorkrakinensis</i> subsp. <i>acrita</i>			
227.	41993	<i>Aotus</i> sp. <i>Tortile</i> (G.J. Keighery 3767)			
228.	17963	<i>Aotus tietkensii</i>			
229.	30234	<i>Bossiaea barbarae</i>			
230.	3722	<i>Bossiaea walkeri</i>			
231.	16576	<i>Daviesia argillacea</i>			
232.	12975	<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>			
233.	3802	<i>Daviesia croniniana</i>			
234.	3813	<i>Daviesia grahamii</i>			
235.	16581	<i>Daviesia intricata</i> subsp. <i>xiphophylla</i>			
236.	12327	<i>Daviesia microcarpa</i>		T	
237.	16587	<i>Daviesia rubiginosa</i>			
238.	3869	<i>Erichsenia uncinata</i>			
239.	19292	<i>Eutaxia lasiophylla</i>			
240.	20742	<i>Eutaxia rubricarina</i>		P3	
241.		<i>Eutaxia</i> sp.			

	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
242.	3900	<i>Gastrolobium floribundum</i> (Wodjil Poison)			
243.	10777	<i>Gompholobium gompholobioides</i>			
244.	3959	<i>Gompholobium viscidulum</i>			
245.	14779	<i>Jacksonia arida</i>			
246.	4021	<i>Jacksonia nematoclada</i>			
247.	20709	<i>Jacksonia ramulosa</i>			
248.	4043	<i>Kennedia prorepens</i>			
249.	4061	<i>Lotus cruentus</i> (Redflower Lotus)			
250.	4077	<i>Medicago minima</i> (Small Burr Medic)	Y		
251.	4078	<i>Medicago orbicularis</i> (Button Medic)	Y		Y
252.	4099	<i>Mirbelia seorsifolia</i>			
253.	4104	<i>Mirbelia trichocalyx</i>			
254.	3674	<i>Petalostylis cassioides</i>			
255.	17645	<i>Senna artemisioides</i>			
256.	12276	<i>Senna artemisioides</i> subsp. <i>filifolia</i>			
257.	4248	<i>Templetonia aculeata</i>			
258.	35840	<i>Templetonia ceracea</i>			
259.	4257	<i>Templetonia smithiana</i>			
260.	15509	<i>Trifolium tomentosum</i> var. <i>tomentosum</i>	Y		
261.	9008	<i>Urodon dasyphyllus</i> (Mop Bushpea)			

#### Frankeniaceae

262.	5191	<i>Frankenia cinerea</i>			
263.	5205	<i>Frankenia irregularis</i>			
264.	5209	<i>Frankenia pauciflora</i> (Seaheath)			
265.	5212	<i>Frankenia setosa</i> (Bristly Frankenia)			

#### Geraniaceae

266.	4335	<i>Erodium cygnorum</i> (Blue Heronsbill)			
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#### Goodeniaceae

267.	7419	<i>Coopermookia strophiolata</i>			
268.	7449	<i>Dampiera juncea</i> (Rush-like Dampiera)			
269.	7454	<i>Dampiera linearis</i> (Common Dampiera)			
270.	7456	<i>Dampiera luteiflora</i> (Yellow Dampiera)			
271.	7475	<i>Dampiera spicigera</i> (Spiked Dampiera)			
272.	7477	<i>Dampiera stenostachya</i> (Narrow-spiked Dampiera)			
273.	13158	<i>Dampiera tenuicaulis</i> var. <i>curvula</i>			
274.	7483	<i>Dampiera tomentosa</i> (Felted Dampiera)			
275.	7495	<i>Goodenia berardiana</i>			
276.	7504	<i>Goodenia dyeri</i>			
277.	7506	<i>Goodenia elderi</i>			
278.	19349	<i>Goodenia heatheriana</i>		P1	
279.	12523	<i>Goodenia helmsii</i>			
280.	7517	<i>Goodenia incana</i> (Hoary Goodenia)			
281.	7527	<i>Goodenia mimuloides</i>			
282.	7565	<i>Goodenia xanthosperma</i> (Yellow-seeded Goodenia)			
283.	7569	<i>Lechenaultia brevifolia</i>			
284.	7639	<i>Scaevola restiacea</i>			
285.	13170	<i>Scaevola restiacea</i> subsp. <i>restiacea</i>			
286.	7644	<i>Scaevola spinescens</i> (Currant Bush, Maroon)			
287.	7656	<i>Velleia cynopotamica</i>			
288.	7658	<i>Velleia discophora</i> (Cabbage Poison)			
289.	38061	<i>Verreauxia dyeri</i> (Hairy Verreauxia)			

#### Gyrostemonaceae

290.	2778	<i>Codonocarpus cotinifolius</i> (Native Poplar, Kundurangu)			
291.	2783	<i>Gyrostemon racemiger</i>			

#### Haemodoraceae

292.	1424	<i>Conostylis bealiana</i>			
293.	1465	<i>Haemodorum discolor</i>			

#### Haloragaceae

294.	6144	<i>Glischrocaryon flavescens</i>			
295.	6180	<i>Haloragis trigonocarpa</i>			

#### Hemerocallidaceae

296.	1363	<i>Tricoryne tenella</i>			
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#### Iridaceae

297.	19177	<i>Moraea setifolia</i>	Y		
298.	16735	<i>Patersonia drummondii</i> subsp. <i>drummondii</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Juncaceae</b>				
299.	1176 <i>Juncus aridicola</i>			
300.	1178 <i>Juncus bufonius</i> (Toad Rush)	Y		
<b>Lamiaceae</b>				
301.	19437 <i>Brachysola coerulea</i>			
302.	6747 <i>Cyanostegia angustifolia</i> (Tinsel-flower)			
303.	6751 <i>Cyanostegia microphylla</i> (Tinsel Flower)			
304.	41026 <i>Dasymalla teckiana</i>			
305.	41025 <i>Dasymalla terminalis</i> (Native Foxglove)			
306.	6843 <i>Hemigenia brachyphylla</i>			
307.	19390 <i>Hemigenia</i> sp. Newdegate (E. Bishop 75)		P1	
308.	6776 <i>Hemiphora elderi</i> (Red Velvet)			
309.	6891 <i>Microcorys ericifolia</i>			
310.	17402 <i>Microcorys</i> sp. stellate (A. Strid 21885)			
311.	6812 <i>Pityrodia lepidota</i>			
312.	6912 <i>Prostanthera campbellii</i>			
313.	6916 <i>Prostanthera grylloana</i>			
314.	12704 <i>Prostanthera nanophylla</i>		P3	
315.	6923 <i>Prostanthera semiteres</i>			
316.	12120 <i>Prostanthera semiteres</i> subsp. <i>semiteres</i>			
317.	19396 <i>Teucrium</i> sp. Norseman (T.E.H. Aplin 1851)			
318.	19393 <i>Teucrium</i> sp. dwarf (R. Davis 8813)		P1	
319.	6938 <i>Westringia cephalantha</i>			
320.	34603 <i>Westringia cephalantha</i> var. <i>caterva</i>			
321.	9247 <i>Westringia rigida</i> (Stiff Westringia)			
<b>Lauraceae</b>				
322.	11211 <i>Cassytha glabella</i> forma <i>dispar</i>			
<b>Loganiaceae</b>				
323.	46253 <i>Orianthera tortuosa</i>			
324.	16824 <i>Phyllangium sulcatum</i>			
<b>Loranthaceae</b>				
325.	2396 <i>Lysiana casuarinae</i>			
<b>Lythraceae</b>				
326.	5281 <i>Lythrum hyssopifolia</i> (Lesser Loosestrife)	Y		
<b>Malvaceae</b>				
327.	40903 <i>Androcalva aphrix</i>			
328.	4999 <i>Brachychiton gregorii</i> (Desert Kurrajong, Ngalta)			
329.	10915 <i>Brachychiton populneus</i> (Kurrajong)	Y		
330.	40923 <i>Commersonia crauophylla</i> (Brittle Leaved Rulingia)			
331.	4957 <i>Lawrencia repens</i>			
332.	4961 <i>Malva parviflora</i> (Marshmallow)	Y		
333.	4964 <i>Radyera farragei</i> (Knobby Hibiscus)			
334.	46824 <i>Seringia velutina</i> (Velvet firebush)			
<b>Myrtaceae</b>				
335.	20726 <i>Astus subroseus</i>			
336.	5344 <i>Baeckea elderiana</i>			
337.	5349 <i>Baeckea grandibracteata</i>			
338.	20687 <i>Baeckea</i> sp. Mt Clara (R.J. Cranfield 11693)			
339.	5375 <i>Balaustion pulcherrimum</i> (Native Pomegranate)			
340.	46826 <i>Beaufortia puberula</i> (Hairy-leaved Beaufortia)			
341.	5408 <i>Calothamnus gilesii</i>			
342.	5465 <i>Calytrix leschenaultii</i>			
343.	5466 <i>Calytrix merrelliana</i>			
344.	5476 <i>Calytrix sapphirina</i>			
345.	35640 <i>Chamelaucium pauciflorum</i> subsp. <i>Perenjori</i> (B.J. Conn 2181)			
346.	42180 <i>Chamelaucium</i> sp. Bendering (T.J. Alford 110)			
347.	35618 <i>Darwinia</i> sp. Karonie (K. Newbey 8503)			
348.	5579 <i>Eucalyptus calycogona</i> (Gooseberry Mallee)			
349.	19508 <i>Eucalyptus calycogona</i> subsp. <i>calycogona</i>			
350.	14300 <i>Eucalyptus celastroides</i> subsp. <i>celastroides</i> (Mirret)			
351.	11978 <i>Eucalyptus celastroides</i> subsp. <i>virella</i>			
352.	5592 <i>Eucalyptus clelandii</i> (Cleland's Blackbutt)			
353.	5607 <i>Eucalyptus corrugata</i> (Rough-fruited Mallee)			
354.	11294 <i>Eucalyptus crucis</i> subsp. <i>crucis</i> (Silver Mallee)		T	
355.	34811 <i>Eucalyptus distuberosa</i> subsp. <i>distuberosa</i>			
356.	15667 <i>Eucalyptus eremophila</i> subsp. <i>eremophila</i> (Sand Mallee)			
357.	5649 <i>Eucalyptus foecunda</i> (Narrow-leaved Red Mallee)			



Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
358.	5662 <i>Eucalyptus gracilis</i> (Yorrell)			
359.	5673 <i>Eucalyptus horistes</i>			
360.	15670 <i>Eucalyptus kochii</i> subsp. <i>plenissima</i>			
361.	20404 <i>Eucalyptus kochii</i> subsp. <i>yellowdinensis</i>			
362.	15682 <i>Eucalyptus leptophylla</i> (Narrow-leaved Red Mallee)			
363.	13059 <i>Eucalyptus leptopoda</i> subsp. <i>leptopoda</i>			
364.	13056 <i>Eucalyptus leptopoda</i> subsp. <i>subluta</i>			
365.	5697 <i>Eucalyptus lesouefii</i> (Goldfields Blackbutt)			
366.	5701 <i>Eucalyptus longicornis</i> (Red Morrel, Moril)			
367.	20802 <i>Eucalyptus longissima</i>			
368.	13037 <i>Eucalyptus loxophleba</i> subsp. <i>lissophloia</i>			
369.	5711 <i>Eucalyptus melanoxylon</i> (Black Morrel)			
370.	19323 <i>Eucalyptus moderata</i>			
371.	5717 <i>Eucalyptus myriadena</i>			
372.	13513 <i>Eucalyptus myriadena</i> subsp. <i>myriadena</i>			
373.	13514 <i>Eucalyptus myriadena</i> subsp. <i>parviflora</i>		P1	
374.	5726 <i>Eucalyptus oleosa</i> (Giant Mallee)			
375.	13524 <i>Eucalyptus olivina</i>			
376.	5742 <i>Eucalyptus petraea</i> (Granite Rock Box)			
377.	5745 <i>Eucalyptus pileata</i> (Capped Mallee)			
378.	5747 <i>Eucalyptus platycorys</i> (Boorabbin Mallee)			
379.	13520 <i>Eucalyptus polita</i>			
380.	19064 <i>Eucalyptus prolixa</i>			
381.	12379 <i>Eucalyptus protensa</i>			
382.	5761 <i>Eucalyptus rigidula</i> (Stiff-leaved Mallee)			
383.	12693 <i>Eucalyptus salicola</i> (Salt Gum)			
384.	5766 <i>Eucalyptus salmonophloia</i> (Salmon Gum, Wurak)			
385.	5767 <i>Eucalyptus salubris</i> (Gimlet)			
386.	5772 <i>Eucalyptus sheathiana</i> (Ribbon-barked Gum)			
387.	<i>Eucalyptus</i> sp.			
388.	46828 <i>Eucalyptus</i> sp. Southern smooth-bark (D. Nicolle & M. French DN 6916)			
389.	34775 <i>Eucalyptus vittata</i>			
390.	5802 <i>Eucalyptus yilgarnensis</i> (Yorrell)			
391.	17027 <i>Euryomyrtus leptospermoides</i>			
392.	16722 <i>Euryomyrtus maidenii</i>			
393.	5813 <i>Homalocalyx pulcherrimus</i>			
394.	5815 <i>Homalocalyx thryptomenoides</i>			
395.	5840 <i>Kunzea pulchella</i> (Granite Kunzea)			
396.	5852 <i>Leptospermum nitens</i>			
397.	5855 <i>Leptospermum roei</i>			
398.	5864 <i>Malleostemon peltiger</i>			
399.	5865 <i>Malleostemon roseus</i>			
400.	5866 <i>Malleostemon tuberculatus</i>			
401.	15063 <i>Melaleuca acuminata</i> subsp. <i>acuminata</i>			
402.	20284 <i>Melaleuca atroviridis</i>			
403.	19380 <i>Melaleuca calyptroides</i>			
404.	5896 <i>Melaleuca cordata</i>			
405.	19486 <i>Melaleuca hamata</i>			
406.	5917 <i>Melaleuca hamulosa</i>			
407.	5925 <i>Melaleuca lateriflora</i> (Gorada)			
408.	5927 <i>Melaleuca laxiflora</i>			
409.	5929 <i>Melaleuca leiocarpa</i>			
410.	15663 <i>Melaleuca pauperiflora</i> subsp. <i>fastigiata</i>			
411.	20289 <i>Melaleuca vinnula</i>			
412.	20287 <i>Melaleuca zeteticorum</i>			
413.	9187 <i>Micromyrtus erichsenii</i>			
414.	48265 <i>Rinzia fimbriolata</i> (Wheatbelt Rinzia)		P1	
415.	42065 <i>Tetrapora tenuiramea</i>			
416.	19696 <i>Thryptomene costata</i>			
417.	6058 <i>Thryptomene kochii</i>			
418.	6071 <i>Verticordia brachypoda</i>			
419.	6073 <i>Verticordia chrysantha</i>			
420.	14711 <i>Verticordia dasystylis</i> subsp. <i>dasystylis</i>		P2	
421.	12422 <i>Verticordia eriocephala</i> (Common Cauliflower)			
422.	12428 <i>Verticordia halophila</i>			
423.	6087 <i>Verticordia helmsii</i>			
424.	12432 <i>Verticordia inclusa</i>			
425.	36801 <i>Verticordia mitchelliana</i> subsp. <i>implexior</i>			
426.	12442 <i>Verticordia mitodes</i>		P3	
427.	6109 <i>Verticordia picta</i> (Painted Featherflower)			

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428.	6113	<i>Verticordia pritzelii</i> (Pritzel's Featherflower)			
429.	15267	<i>Verticordia roei</i> subsp. <i>roei</i>			
430.	14718	<i>Verticordia sieberi</i> var. <i>sieberi</i>			
431.	6121	<i>Verticordia stenopetala</i>		P3	
<b>Orchidaceae</b>					
432.	19219	<i>Caladenia mesocera</i>			
433.	15374	<i>Caladenia pachychila</i>			
434.	1614	<i>Caladenia roei</i> (Ant Orchid)			
435.	18594	<i>Caladenia</i> sp. Muddarning Hill (S.D. Hopper 4013)			
436.	15400	<i>Cyanicula amplexans</i>			
437.	10858	<i>Diuris picta</i>			
438.	20718	<i>Ericksonella saccharata</i>			
439.		<i>Oligochaetochilus trypherus</i>			
440.	16688	<i>Prasophyllum gracile</i>			
441.	1689	<i>Pterostylis mutica</i> (Midget Greenhood)			
442.	10778	<i>Pterostylis picta</i>			
443.	1693	<i>Pterostylis recurva</i> (Jug Orchid)			
444.	1696	<i>Pterostylis sargentii</i> (Frog Greenhood)			
445.	10897	<i>Pterostylis spathulata</i>			
446.	1700	<i>Spiculaea ciliata</i> (Elbow Orchid)			
447.	1714	<i>Thelymitra sargentii</i> (Freckled Sun Orchid)			
<b>Pittosporaceae</b>					
448.	3168	<i>Cheiranthra filifolia</i>			
449.	19421	<i>Marianthus bicolor</i> (Painted Marianthus)			
450.	19744	<i>Pittosporum angustifolium</i>			
<b>Plumbaginaceae</b>					
451.	6488	<i>Limonium lobatum</i>	Y		
452.	6489	<i>Limonium sinuatum</i> (Perennial Sea Lavender)	Y		
<b>Poaceae</b>					
453.	12025	<i>Amphipogon caricinus</i> var. <i>caricinus</i>			
454.	207	<i>Aristida contorta</i> (Bunched Kerosene Grass)			
455.	17237	<i>Austrostipa elegantissima</i>			
456.	17246	<i>Austrostipa nitida</i>			
457.	17250	<i>Austrostipa pycnostachya</i>			
458.	17254	<i>Austrostipa tenuifolia</i>			
459.	11964	<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>			
460.	378	<i>Eragrostis dielsii</i> (Mallee Lovegrass)			
461.	415	<i>Eriachne ovata</i>			
462.	448	<i>Hordeum glaucum</i> (Northern Barley Grass)	Y		
463.	490	<i>Monachather paradoxus</i>			
464.	40424	<i>Pentameris airoides</i> subsp. <i>airoides</i>	Y		
465.	571	<i>Poa annua</i> (Winter Grass)	Y		
466.	11151	<i>Rostraria pumila</i>	Y		
467.	40425	<i>Rytidosperma caespitosum</i>			
468.	40427	<i>Rytidosperma setaceum</i>			
469.	678	<i>Tragus australianus</i> (Small Burrgrass)			
470.	17881	<i>Triodia desertorum</i>			
471.	17874	<i>Triodia rigidissima</i>			
472.		<i>Triodia</i> sp.			
473.	13041	<i>Triodia tomentosa</i>			
474.		<i>Vulpia</i> sp.			
<b>Polygalaceae</b>					
475.	4553	<i>Comesperma drummondii</i> (Drummond's Milkwort)			
476.	4561	<i>Comesperma scoparium</i> (Broom Milkwort)			
477.	4566	<i>Comesperma volubile</i> (Love Creeper)			
<b>Portulacaceae</b>					
478.	2853	<i>Calandrinia eremaea</i> (Twining Purslane)			
479.	2854	<i>Calandrinia granulifera</i> (Pygmy Purslane)			
<b>Pottiaceae</b>					
480.	32342	<i>Crossidium geheebii</i>			
481.	32346	<i>Didymodon torquatus</i>			
482.	36437	<i>Microbryum davallianum</i>			
<b>Primulaceae</b>					
483.	36375	<i>Lysimachia arvensis</i> (Pimpernel)	Y		
<b>Proteaceae</b>					
484.	1770	<i>Adenanthos argyreus</i> (Little Woollybush)			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
485.	1801 <i>Banksia audax</i>			
486.	1815 <i>Banksia elderiana</i> (Swordfish Banksia)			
487.	1861 <i>Conospermum brownii</i> (Blue-eyed Smokebush)			
488.	1868 <i>Conospermum distichum</i>			
489.	1882 <i>Conospermum stoechadis</i> (Common Smokebush)			
490.	1949 <i>Grevillea acuaria</i>			
491.	1971 <i>Grevillea cagiana</i> (Red Toothbrushes)			
492.	8830 <i>Grevillea ceratocarpa</i>			
493.	13453 <i>Grevillea didymobotrya</i> subsp. <i>didymobotrya</i>			
494.	2002 <i>Grevillea eryngioides</i> (Curly Grevillea)			
495.	8832 <i>Grevillea excelsior</i> (Flame Grevillea)			
496.	19314 <i>Grevillea hookeriana</i> subsp. <i>apiculoba</i>			
497.	8834 <i>Grevillea incrassata</i>			
498.	15974 <i>Grevillea incurva</i>			
499.	2047 <i>Grevillea nematophylla</i>			
500.	2055 <i>Grevillea oncogyne</i>			
501.	2057 <i>Grevillea paradoxa</i> (Bottlebrush Grevillea)			
502.	2077 <i>Grevillea pterosperma</i>			
503.	15766 <i>Grevillea shuttleworthiana</i> subsp. <i>obovata</i>			
504.	2104 <i>Grevillea teretifolia</i> (Round Leaf Grevillea)			
505.	2106 <i>Grevillea tetrapleura</i>			
506.	2157 <i>Hakea erecta</i>			
507.	2163 <i>Hakea francisiana</i> (Emu Tree)			
508.	2181 <i>Hakea meisneriana</i>			
509.	2182 <i>Hakea minyma</i>			
510.	2184 <i>Hakea multilineata</i> (Grass Leaf Hakea)			
511.	12232 <i>Hakea pendens</i>		P3	
512.	2195 <i>Hakea platysperma</i> (Cricket Ball Hakea)			
513.	17556 <i>Hakea recurva</i> subsp. <i>arida</i>			
514.	16812 <i>Isopogon scabriusculus</i> subsp. <i>pubifloris</i>			
515.	14436 <i>Isopogon scabriusculus</i> subsp. <i>stenophyllus</i>			
516.	2259 <i>Persoonia coriacea</i> (Leathery-leaf Persoonia)			
517.	15630 <i>Persoonia inconspicua</i>			
518.	2274 <i>Persoonia saundersiana</i>			
519.	14446 <i>Petrophile arcuata</i>			
520.	14445 <i>Petrophile merrallii</i>			
521.	2308 <i>Petrophile seminuda</i>			
522.	15534 <i>Synaphea spinulosa</i> subsp. <i>major</i>			
<b>Pteridaceae</b>				
523.	37 <i>Cheilanthes lasiophylla</i> (Woolly Cloak Fern)			
<b>Rhamnaceae</b>				
524.	9076 <i>Cryptandra myriantha</i>			
<b>Ricciaceae</b>				
525.	<i>Riccia</i> sp.			
<b>Rutaceae</b>				
526.	4409 <i>Boronia coerulescens</i>			
527.	11498 <i>Boronia coerulescens</i> subsp. <i>spicata</i>			
528.	11201 <i>Boronia ternata</i> var. <i>ternata</i>			
529.	4459 <i>Drummondita hassellii</i>			
530.	4500 <i>Phebalium filifolium</i> (Slender Phebalium)			
531.	4501 <i>Phebalium lepidotum</i>			
532.	16556 <i>Phebalium megaphyllum</i>			
533.	4504 <i>Phebalium tuberculosum</i>			
534.	18539 <i>Philotheca brucei</i>			
535.	18537 <i>Philotheca brucei</i> subsp. <i>brucei</i>			
536.	18519 <i>Philotheca coccinea</i>			
537.	18385 <i>Philotheca deserti</i> subsp. <i>deserti</i>			
538.	18517 <i>Philotheca falcata</i>		T	
539.	18506 <i>Philotheca tomentella</i>			
<b>Santalaceae</b>				
540.	10977 <i>Exocarpos aphyllus</i> (Leafless Ballart)			
541.	2352 <i>Leptomeria preissiana</i>			
542.	2356 <i>Santalum acuminatum</i> (Quandong, Warnga)			
<b>Sapindaceae</b>				
543.	4753 <i>Dodonaea amblyophylla</i>			
544.	4755 <i>Dodonaea bursariifolia</i>			
545.	4760 <i>Dodonaea divaricata</i>			

	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
546.	12034	<i>Dodonaea microzyga</i> var. <i>acrolobata</i>			
547.	4775	<i>Dodonaea pinifolia</i>			
548.	4782	<i>Dodonaea viscosa</i> (Sticky Hopbush)			
549.	11247	<i>Dodonaea viscosa</i> subsp. <i>angustissima</i>			

### Scrophulariaceae

550.	13807	<i>Eremophila caperata</i>			
551.	7189	<i>Eremophila clarkei</i> (Turpentine Bush)			
552.	14895	<i>Eremophila decipiens</i> subsp. <i>decipiens</i>			
553.	7200	<i>Eremophila drummondii</i>			
554.	17175	<i>Eremophila glabra</i> subsp. <i>albicans</i>			
555.	7219	<i>Eremophila granitica</i> (Thin-leaved Poverty Bush)			
556.	15112	<i>Eremophila interstans</i> subsp. <i>interstans</i>			
557.	15111	<i>Eremophila interstans</i> subsp. <i>virgata</i>			
558.	7226	<i>Eremophila ionantha</i> (Violet-flowered Eremophila)			
559.	7242	<i>Eremophila miniata</i> (Kopi Poverty Bush)			
560.	18570	<i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>			
561.	7267	<i>Eremophila scoparia</i> (Broom Bush (			

### Solanaceae

562.	6966	<i>Duboisia hopwoodii</i> (Pituri, Kundugu)			
563.	6967	<i>Lycium australe</i> (Australian Boxthorn)			
564.	6974	<i>Nicotiana glauca</i> (Tree Tobacco)	Y		
565.	7022	<i>Solanum nigrum</i> (Black Berry Nightshade)	Y		

### Stylidiaceae

566.	7671	<i>Levenhookia leptantha</i> (Trumpet Stylewort)			
567.	7677	<i>Levenhookia stipitata</i> (Common Stylewort)			
568.	7685	<i>Stylidium arenicola</i>			
569.	7701	<i>Stylidium choreanthum</i> (Dancing Triggerplant)		P3	
570.	7714	<i>Stylidium dielsianum</i> (Tangle Triggerplant)			
571.	7751	<i>Stylidium limbatum</i> (Fringed-leaved Triggerplant)			
572.	7774	<i>Stylidium piliferum</i> (Common Butterfly Triggerplant)			
573.	7810	<i>Stylidium yilgarnense</i> (Yilgarn Triggerplant)			

### Thymelaeaceae

574.	5229	<i>Pimelea aeruginosa</i>			
575.	5231	<i>Pimelea angustifolia</i> (Narrow-leaved Pimelea)			
576.	11227	<i>Pimelea brevifolia</i> subsp. <i>modesta</i>			
577.	11402	<i>Pimelea imbricata</i> var. <i>piliger</i>			
578.	11185	<i>Pimelea microcephala</i> subsp. <i>microcephala</i>			
579.	12104	<i>Pimelea spiculigera</i> var. <i>thesioides</i>			
580.	11910	<i>Pimelea suaveolens</i> subsp. <i>flava</i>			
581.	5268	<i>Pimelea sulphurea</i> (Yellow Banjine)			

### Typhaceae

582.	98	<i>Typha domingensis</i> (Bulrush, Djandjidi)			
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### Violaceae

583.	12007	<i>Hybanthus floribundus</i> subsp. <i>floribundus</i>			
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### Zygophyllaceae

584.	4386	<i>Zygophyllum aurantiacum</i> (Shrubby Twinleaf)			
585.	4389	<i>Zygophyllum eremaeum</i>			
586.	4391	<i>Zygophyllum glaucum</i> (Pale Twinleaf)			

#### Conservation Codes

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

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

# NatureMap Fauna Species Report 20km

Created By Guest user on 07/08/2017

**Kingdom** Animalia  
**Current Names Only** Yes  
**Core Datasets Only** Yes  
**Method** 'By Circle'  
**Centre** 119° 27' 19" E, 31° 15' 04" S  
**Buffer** 20km  
**Group By** Species Group

Species Group	Species	Records
Amphibian	6	51
Bird	85	265
Invertebrate	23	51
Mammal	5	10
Reptile	30	99
<b>TOTAL</b>	<b>149</b>	<b>476</b>

	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Amphibian</b>					
1.	25408	<i>Heleioporus albopunctatus</i> (Western Spotted Frog)			
2.	25421	<i>Neobatrachus albipes</i> (White-footed Trilling Frog)			
3.	25425	<i>Neobatrachus kunapalari</i> (Kunapalari Frog)			
4.	25426	<i>Neobatrachus pelobatoides</i> (Humming Frog)			
5.	25433	<i>Pseudophryne guentheri</i> (Crawling Toadlet)			
6.	25434	<i>Pseudophryne occidentalis</i> (Western Toadlet)			
<b>Bird</b>					
7.	24559	<i>Acanthagenys rufogularis</i> (Spiny-cheeked Honeyeater)			
8.	24260	<i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
9.	24261	<i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
10.	24265	<i>Acanthiza uropygialis</i> (Chestnut-rumped Thornbill)			
11.	24282	<i>Accipiter fasciatus</i> subsp. <i>fasciatus</i> (Brown Goshawk)			
12.	25544	<i>Aegotheles cristatus</i> (Australian Owllet-nightjar)			
13.	24312	<i>Anas gracilis</i> (Grey Teal)			
14.	24561	<i>Anthochaera carunculata</i> (Red Wattlebird)			
15.	25528	<i>Aphelocephala leucopsis</i> (Southern Whiteface)			
16.	24266	<i>Aphelocephala leucopsis</i> subsp. <i>castaneiventris</i> (Southern Whiteface)			
17.	24285	<i>Aquila audax</i> (Wedge-tailed Eagle)			
18.	24318	<i>Aythya australis</i> (Hardhead)			
19.		<i>Barnardius zonarius</i>			
20.	42307	<i>Cacomantis pallidus</i> (Pallid Cuckoo)			
21.	25717	<i>Calyptorhynchus banksii</i> (Red-tailed Black-Cockatoo)			
22.	24564	<i>Certhionyx variegatus</i> (Pied Honeyeater)			
23.	24321	<i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
24.	47909	<i>Cheramoeca leucosterna</i> (White-backed Swallow)			
25.		<i>Chroicocephalus novaehollandiae</i>			
26.	24289	<i>Circus assimilis</i> (Spotted Harrier)			
27.	24774	<i>Cladorhynchus leucocephalus</i> (Banded Stilt)			
28.	25675	<i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
29.	24613	<i>Colluricincla harmonica</i> subsp. <i>rufiventris</i> (Grey Shrike-thrush)			
30.	25568	<i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
31.	24416	<i>Corvus bennetti</i> (Little Crow)			
32.	25592	<i>Corvus coronoides</i> (Australian Raven)			
33.	24420	<i>Cracticus nigrogularis</i> (Pied Butcherbird)			
34.	25595	<i>Cracticus tibicen</i> (Australian Magpie)			
35.	25596	<i>Cracticus torquatus</i> (Grey Butcherbird)			
36.	25673	<i>Daphoenositta chrysoptera</i> (Varied Sittella)			
37.	24470	<i>Dromaius novaehollandiae</i> (Emu)			
38.	24650	<i>Drymodes brunneopygia</i> (Southern Scrub-robin)			
39.		<i>Egretta novaehollandiae</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
40.	<i>Elanus axillaris</i>			
41.	24290 <i>Elanus caeruleus</i> subsp. <i>axillaris</i> (Australian Black-shouldered Kite)			
42.	<i>Eolophus roseicapillus</i>			
43.	24567 <i>Epthianura albiglans</i> (White-fronted Chat)			
44.	25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
45.	25623 <i>Falco longipennis</i> (Australian Hobby)			
46.	25624 <i>Falco peregrinus</i> (Peregrine Falcon)		S	
47.	25727 <i>Fulica atra</i> (Eurasian Coot)			
48.	47962 <i>Glyciphila melanops</i> (Tawny-crowned Honeyeater)			
49.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
50.	24295 <i>Haliastur sphenurus</i> (Whistling Kite)			
51.	24297 <i>Hamirostra melanosternon</i> (Black-breasted Buzzard)			
52.	47965 <i>Hieraaetus morphnoides</i> (Little Eagle)			
53.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
54.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
55.	24557 <i>Leipoa ocellata</i> (Malleefowl)		T	
56.	25659 <i>Lichenostomus leucotis</i> (White-eared Honeyeater)			
57.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
58.	<i>Lophochroa leadbeateri</i>			
59.	25652 <i>Malurus leucopterus</i> (White-winged Fairy-wren)			
60.	24551 <i>Malurus pulcherrimus</i> (Blue-breasted Fairy-wren)			
61.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
62.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
63.	25663 <i>Melithreptus brevirostris</i> (Brown-headed Honeyeater)			
64.	24654 <i>Microeca fascians</i> subsp. <i>assimilis</i> (Jacky Winter)			
65.	24742 <i>Nymphicus hollandicus</i> (Cockatiel)			
66.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
67.	24618 <i>Oreoica gutturalis</i> (Crested Bellbird)			
68.	24619 <i>Pachycephala inornata</i> (Gilbert's Whistler)			
69.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
70.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
71.	24630 <i>Pardalotus striatus</i> subsp. <i>westraliensis</i> (Striated Pardalote)			
72.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
73.	24659 <i>Petroica goodenovii</i> (Red-capped Robin)			
74.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
75.	24751 <i>Platycercus zonarius</i> subsp. <i>zonarius</i> (Port Lincoln Parrot)			
76.	25703 <i>Podargus strigoides</i> (Tawny Frogmouth)			
77.	25722 <i>Polytelis anthopeplus</i> (Regent Parrot)			
78.	24683 <i>Pomatostomus superciliosus</i> (White-browed Babbler)			
79.	34013 <i>Pomatostomus superciliosus</i> subsp. <i>ashbyi</i> (White-browed Babbler (western wheatbelt))			
80.	42344 <i>Purnella albiglans</i> (White-fronted Honeyeater)			
81.	24278 <i>Pyrrholaemus brunneus</i> (Redthroat)			
82.	24776 <i>Recurvirostra novaehollandiae</i> (Red-necked Avocet)			
83.	48096 <i>Rhipidura albiscapa</i> (Grey Fantail)			
84.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
85.	30948 <i>Smicromis brevirostris</i> (Weebill)			
86.	25597 <i>Strepera versicolor</i> (Grey Currawong)			
87.	25590 <i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)	Y		
88.	25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
89.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
90.	30870 <i>Taeniopygia guttata</i> (Zebra Finch)			
91.	25765 <i>Zosterops lateralis</i> (Grey-breasted White-eye, Silvereye)			

## Invertebrate

92.	33902 <i>Aganippe castellum</i> (Tree-stem Trapdoor Spider)		P4	
93.	<i>Aname mainae</i>			
94.	<i>Aname mellosa</i>			
95.	<i>Aname tepperi</i>			
96.	<i>Antichiropus</i> sp.			
97.	<i>Atelomastix bamfordi</i>			
98.	<i>Backobourkia heroine</i>			
99.	<i>Cercophonius michaelsoni</i>			
100.	<i>Cormocephalus turneri</i>			
101.	<i>Ethmostigmus rubripes</i>			
102.	<i>Hoggicosa forresti</i>			
103.	<i>Hoggicosa storri</i>			
104.	<i>Isometroides vascus</i>			
105.	<i>Lycosa godeffroyi</i>			
106.	<i>Masasteron plankai</i>			
107.	<i>Muscidae</i> sp. H (SAP)			



	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
108.		<i>Nicodamus mainae</i>			
109.		<i>Oecobius navus</i>			
110.		<i>Supunna funerea</i>			
111.		<i>Synsphyronus dorotheae</i>			
112.		<i>Tasmanicosa leuckartii</i>			
113.		<i>Urodacus armatus</i>			
114.		<i>Urodacus hoplurus</i>			

## Mammal

115.	24186	<i>Chalinolobus gouldii</i> (Gould's Wattled Bat)			
116.	24092	<i>Dasyurus geoffroii</i> (Chuditch, Western Quoll)		T	
117.	24146	<i>Myrmecobius fasciatus</i> (Numbat, Walpurti)		T	
118.	24232	<i>Pseudomys bolami</i> (Bolam's Mouse)			
119.	24206	<i>Vespadelus regulus</i> (Southern Forest Bat)			

## Reptile

120.	25236	<i>Aspidites ramsayi</i> (Woma)			
121.	42381	<i>Brachyuropsis semifasciatus</i> (Southern Shovel-nosed Snake)			
122.	24918	<i>Crenadactylus ocellatus</i> subsp. <i>ocellatus</i> (Clawless Gecko)			
123.	30893	<i>Cryptoblepharus buchananii</i>			
124.	24871	<i>Ctenophorus cristatus</i> (Bicycle Dragon)			
125.	24874	<i>Ctenophorus isolepis</i> subsp. <i>citrinus</i> (Yellowy Military Dragon)			
126.	24883	<i>Ctenophorus ornatus</i> (Ornate Crevice-Dragon)			
127.	24886	<i>Ctenophorus reticulatus</i> (Western Netted Dragon)			
128.	24889	<i>Ctenophorus scutulatus</i> (Lozenge-marked Dragon)			
129.	25026	<i>Ctenotus atlas</i>			
130.	25074	<i>Ctenotus schomburgkii</i>			
131.	24997	<i>Delma butleri</i>			
132.	24929	<i>Diplodactylus granariensis</i> subsp. <i>granariensis</i>			
133.	24959	<i>Gehyra variegata</i>			
134.	42408	<i>Hesperoedura reticulata</i>			
135.	24961	<i>Heteronotia binoei</i> (Bynoe's Gecko)			
136.	25137	<i>Lerista gerrardii</i>			
137.	41411	<i>Liopholis inornata</i> (Desert Skink)			
138.	30935	<i>Lucasium maini</i>			
139.	25184	<i>Menetia greyii</i>			
140.	24904	<i>Moloch horridus</i> (Thorny Devil)			
141.	25240	<i>Morelia spilota</i> subsp. <i>imbricata</i> (Carpet Python)			
142.	24907	<i>Pogona minor</i> subsp. <i>minor</i> (Dwarf Bearded Dragon)			
143.	42416	<i>Pseudonaja mengdeni</i> (Western Brown Snake)			
144.	25263	<i>Pseudonaja modesta</i> (Ringed Brown Snake)			
145.	25008	<i>Pygopus lepidopodus</i> (Common Scaly Foot)			
146.	25266	<i>Simoselaps bertholdi</i> (Jan's Banded Snake)			
147.	25269	<i>Suta fasciata</i> (Rosen's Snake)			
148.	25203	<i>Tiliqua occipitalis</i> (Western Bluetongue)			
149.	24983	<i>Underwoodisaurus milii</i> (Barking Gecko)			

### 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

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



# EPBC Act Protected Matters Report

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

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

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

Report created: 07/08/17 20:04:00

[Summary](#)

[Details](#)

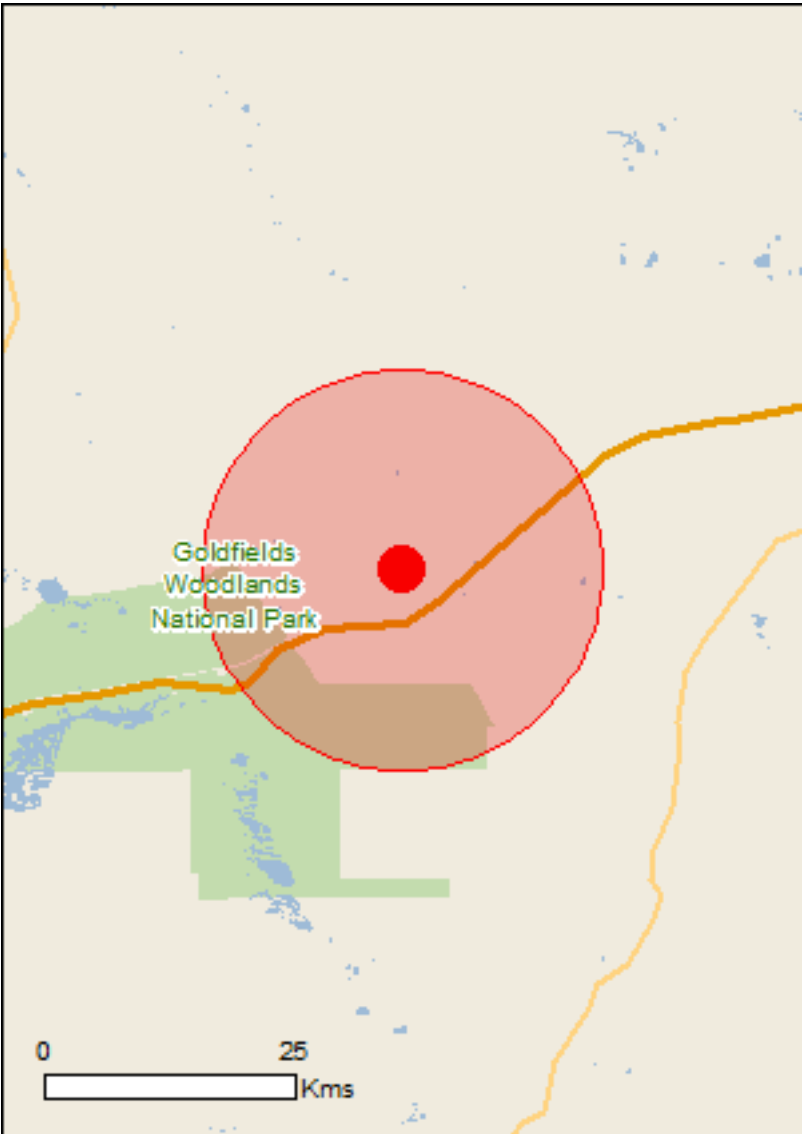
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



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

[Coordinates](#)

[Buffer: 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](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	1
<a href="#">Wetlands of International Importance:</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	None
<a href="#">Listed Threatened Species:</a>	5
<a href="#">Listed Migratory Species:</a>	6

## 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.

<a href="#">Commonwealth Land:</a>	1
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	9
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Commonwealth Reserves Marine:</a>	None

## Extra Information

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

<a href="#">State and Territory Reserves:</a>	2
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	7
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">Key Ecological Features (Marine)</a>	None

# Details

## Matters of National Environmental Significance

National Heritage Properties		[ Resource Information ]
Name	State	Status
Historic		
<a href="#">Goldfields Water Supply Scheme, Western Australia</a>	WA	Listed place

Listed Threatened Species		[ Resource Information ]
Name	Status	Type of Presence
Birds		
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
<a href="#">Pezoporus occidentalis</a> Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Mammals		
<a href="#">Dasyurus geoffroii</a> Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area
Plants		
<a href="#">Gastrolobium graniticum</a> Granite Poison [14872]	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		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area

### Other Matters Protected by the EPBC Act

Commonwealth Land	<a href="#">[ Resource Information ]</a>
-------------------	--

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	<a href="#">[ Resource Information ]</a>
-----------------------	--

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

Name	Threatened	Type of Presence
Birds		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within





# 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

-31.09417 120.69075

# 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.

# NatureMap Flora Species Report 20 km

Created By Guest user on 07/08/2017

Kingdom Plantae  
Current Names Only Yes  
Core Datasets Only Yes  
Method 'By Circle'  
Centre 120° 41' 26" E, 31° 05' 39" S  
Buffer 20km  
Group By Family

Family	Species	Records
Amaranthaceae	4	6
Apocynaceae	1	1
Asparagaceae	3	6
Aspleniaceae	1	1
Asteraceae	30	48
Boraginaceae	2	4
Boryaceae	1	4
Brassicaceae	1	1
Bryaceae	2	2
Campanulaceae	1	3
Casuarinaceae	8	15
Celastraceae	3	4
Centrolepidaceae	1	1
Chenopodiaceae	10	16
Colchicaceae	2	4
Convolvulaceae	1	1
Crassulaceae	1	1
Cupressaceae	1	2
Cyperaceae	2	2
Dicranaceae	1	1
Dilleniaceae	2	3
Ditrichaceae	2	2
Droseraceae	1	2
Ecdeiocoleaceae	1	1
Elaeocarpaceae	1	1
Ericaceae	3	12
Euphorbiaceae	3	7
Fabaceae	40	140
Frankeniaceae	1	1
Funariaceae	2	2
Geraniaceae	1	1
Gigaspermaceae	1	2
Goodeniaceae	14	17
Grimmiaceae	1	1
Gyrostemonaceae	2	5
Haloragaceae	6	9
Hemerocallidaceae	1	3
Isoetaceae	1	1
Lamiaceae	9	20
Lauraceae	1	1
Loranthaceae	1	2
Malvaceae	5	13
Myrtaceae	62	193
Orchidaceae	2	3
Phrymaceae	1	1
Poaceae	5	6
Pottiaceae	9	9
Proteaceae	15	40
Pteridaceae	1	1
Restionaceae	1	1
Rhamnaceae	4	8
Rubiaceae	1	1
Rutaceae	10	35
Santalaceae	1	1
Sapindaceae	2	4
Scrophulariaceae	16	43
Solanaceae	5	8
Stylidiaceae	2	2
Thymelaeaceae	1	1
Zygophyllaceae	2	2
<b>TOTAL</b>	<b>315</b>	<b>728</b>

Name ID Species Name

Naturalised

Conservation Code

<sup>1</sup>Endemic To Query Area

## Amaranthaceae

1. 2707 *Ptilotus carlsonii*
2. 41506 *Ptilotus gaudichaudii* subsp. *gaudichaudii*

	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
3.	41001	<i>Ptilotus nobilis</i> subsp. <i>nobilis</i> (Yellow Tails)			
4.	2747	<i>Ptilotus obovatus</i> (Cotton Bush)			
<b>Apocynaceae</b>					
5.	6565	<i>Alyxia buxifolia</i> (Dysentery Bush)			
<b>Asparagaceae</b>					
6.	1216	<i>Chamaexeros macranthera</i>			
7.	1343	<i>Thysanotus patersonii</i>			
8.	29456	<i>Thysanotus</i> sp. Twining Wheatbelt (N.H. Brittan 81/29)			
<b>Aspleniaceae</b>					
9.	65	<i>Pleurosorus rutifolius</i> (Blanket Fern)			
<b>Asteraceae</b>					
10.	7836	<i>Angianthus tomentosus</i> (Camel-grass)			
11.	7846	<i>Asteridea athrioides</i>			
12.	7871	<i>Brachyscome ciliaris</i>			
13.	7895	<i>Calocephalus multiflorus</i> (Yellow-top)			
14.	7903	<i>Calotis hispidula</i> (Bindy Eye)			
15.	19759	<i>Centipeda crateriformis</i> subsp. <i>crateriformis</i>			
16.	7922	<i>Cephalopterum drummondii</i> (Pompom Head)			
17.	7924	<i>Ceratogyne obionoides</i> (Wingwort)			
18.	7933	<i>Chthonocephalus pseudevax</i> (Woolly Groundheads)			
19.	8002	<i>Gnephosis tenuissima</i>			
20.	15447	<i>Hyalosperma glutinosum</i> subsp. <i>glutinosum</i>			
21.	19727	<i>Leiocarpa semicalva</i> subsp. <i>semicalva</i>			
22.	12631	<i>Millotia perpusilla</i>			
23.	14186	<i>Myriocephalus pygmaeus</i>			
24.	8131	<i>Olearia ciliata</i> (Fringed Daisy Bush)			
25.	8134	<i>Olearia exiguiifolia</i> (Small-leaved Daisy Bush)			
26.	8136	<i>Olearia homolepis</i>			
27.	8140	<i>Olearia muelleri</i> (Goldfields Daisy)			
28.	8145	<i>Olearia pimeleoides</i> (Pimelea Daisybush, Burrobunga)			
29.	8152	<i>Olearia subspicata</i> (Spiked Daisy Bush)			
30.	8187	<i>Pogonolepis muelleriana</i>			
31.	13241	<i>Rhodanthe chlorocephala</i> subsp. <i>rosea</i>			
32.	13253	<i>Rhodanthe rubella</i>			
33.	8200	<i>Schoenia cassiniana</i> (Schoenia)			
34.	25881	<i>Senecio lacustrinus</i>			
35.	25889	<i>Senecio spanomerus</i>			
36.	8253	<i>Triptilodiscus pygmaeus</i>			
37.	8263	<i>Vittadinia cuneata</i> (Woolly Vittadinia)			
38.	8268	<i>Vittadinia humerata</i>			
39.	13331	<i>Waitzia acuminata</i> var. <i>acuminata</i>			
<b>Boraginaceae</b>					
40.	6681	<i>Echium plantagineum</i> (Paterson's Curse)	Y		
41.	6684	<i>Halgania andromedifolia</i>			
<b>Boryaceae</b>					
42.	1267	<i>Borya constricta</i>			
<b>Brassicaceae</b>					
43.	3050	<i>Menkea australis</i> (Fairy Spectacles)			
<b>Bryaceae</b>					
44.	32417	<i>Ptychostomum angustifolium</i>			
45.	32426	<i>Rosulabryum campylothecium</i>			
<b>Campanulaceae</b>					
46.	7397	<i>Isotoma petraea</i> (Rock Isotome, Tundiwari)			
<b>Casuarinaceae</b>					
47.	13904	<i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>			
48.	1721	<i>Allocasuarina campestris</i>			
49.	1722	<i>Allocasuarina corniculata</i>			
50.	13906	<i>Allocasuarina eriochlamys</i> subsp. <i>eriochlamys</i>			
51.	13897	<i>Allocasuarina eriochlamys</i> subsp. <i>grossa</i>		P3	
52.	1730	<i>Allocasuarina helmsii</i>			
53.	1731	<i>Allocasuarina huegeliana</i> (Rock Sheoak, Kwool)			
54.	12655	<i>Allocasuarina spinosissima</i>			
<b>Celastraceae</b>					
55.	4725	<i>Psammomoya choretoides</i>			
56.	4734	<i>Stackhousia muricata</i>			

	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
57.	29813	<i>Stackhousia</i> sp. Mt Keith (G. Cockerton & G. O'Keefe 11017)			
<b>Centrolepidaceae</b>					
58.	1134	<i>Centrolepis polygyna</i> (Wiry Centrolepis)			
<b>Chenopodiaceae</b>					
59.	2449	<i>Atriplex acutibractea</i> (Toothed Saltbush)			
60.	2455	<i>Atriplex eardleyae</i>			
61.	11791	<i>Atriplex quadrivalvata</i> var. <i>quadrivalvata</i>			
62.	2479	<i>Atriplex stipitata</i> (Mallee Saltbush)			
63.	2481	<i>Atriplex vesicaria</i> (Bladder Saltbush)			
64.	2499	<i>Dissocarpus paradoxus</i> (Curious Saltbush)			
65.	11254	<i>Rhagodia preissii</i> subsp. <i>preissii</i>			
66.	2606	<i>Sclerolaena cuneata</i> (Yellow Bindii)			
67.	2609	<i>Sclerolaena diacantha</i> (Grey Copperburr)			
68.	2610	<i>Sclerolaena drummondii</i>			
<b>Colchicaceae</b>					
69.	1396	<i>Wurmbea graniticola</i>			
70.	1403	<i>Wurmbea tenella</i> (Eight Nancy)			
<b>Convolvulaceae</b>					
71.	6659	<i>Wilsonia humilis</i> (Silky Wilsonia)			
<b>Crassulaceae</b>					
72.	3144	<i>Crassula peduncularis</i> (Purple Stonecrop)			
<b>Cupressaceae</b>					
73.	96	<i>Callitris preissii</i> (Rottnest Island Pine, Maro)			
<b>Cyperaceae</b>					
74.	931	<i>Lepidosperma drummondii</i>			
75.		<i>Lepidosperma</i> sp.			
<b>Dicranaceae</b>					
76.	32461	<i>Campylopus bicolor</i> var. <i>bicolor</i>			
<b>Dilleniaceae</b>					
77.	19692	<i>Hibbertia ancistrophylla</i>			
78.	5122	<i>Hibbertia eatoniae</i>			
<b>Ditrichaceae</b>					
79.	32348	<i>Eccremidium arcuatum</i>			
80.	32351	<i>Eccremidium pulchellum</i>			
<b>Droseraceae</b>					
81.	19255	<i>Drosera moorei</i>			
<b>Ecdeiocoleaceae</b>					
82.	1066	<i>Ecdeiocolea monostachya</i>			
<b>Elaeocarpaceae</b>					
83.	4530	<i>Tetratheca efoliata</i>			
<b>Ericaceae</b>					
84.	16049	<i>Leucopogon</i> sp. Clyde Hill (M.A. Burgman 1207)			
85.	41784	<i>Melichrus</i> sp. Coolgardie (K.R. Newbey 8698)		P1	
86.	33018	<i>Styphelia</i> sp. Bullfinch (M. Hislop 3574)		P3	
<b>Euphorbiaceae</b>					
87.	4598	<i>Beyeria lechenaultii</i> (Pale Turpentine Bush)			
88.	34276	<i>Beyeria sulcata</i> var. <i>brevipes</i>			
89.	42867	<i>Euphorbia multifaria</i>			
<b>Fabaceae</b>					
90.	3200	<i>Acacia acuminata</i> (Jam, Mangard)			
91.	3251	<i>Acacia camptoclada</i>			
92.	3256	<i>Acacia chrysella</i>			
93.	3264	<i>Acacia colletioides</i> (Wait-a-while)			
94.	16117	<i>Acacia consanguinea</i>			
95.	14623	<i>Acacia crenulata</i>		P3	
96.	3292	<i>Acacia densiflora</i>			
97.	16168	<i>Acacia enervia</i> subsp. <i>enervia</i>			
98.	14074	<i>Acacia epedunculata</i>		P1	
99.	3324	<i>Acacia erinacea</i>			
100.	3366	<i>Acacia hemiteles</i>			
101.	3378	<i>Acacia inaequiloba</i>			
102.	3393	<i>Acacia jennerae</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
103.	3408 <i>Acacia lasiocalyx</i> (Silver Wattle, Wilyurwur)			
104.	3440 <i>Acacia merrallii</i>			
105.	15290 <i>Acacia neurophylla</i> subsp. <i>erugata</i>			
106.	3495 <i>Acacia prainii</i> (Prain's Wattle)			
107.	3513 <i>Acacia resinimarginea</i>			
108.	16145 <i>Acacia resinosa</i>			
109.	3524 <i>Acacia rossei</i>			
110.	3539 <i>Acacia sericocarpa</i>			
111.	23525 <i>Acacia steedmanii</i> subsp. <i>steedmanii</i>			
112.	15292 <i>Acacia yorkrakinensis</i> subsp. <i>acrita</i>			
113.	17417 <i>Cullen discolor</i>			
114.	12975 <i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>			
115.	19854 <i>Dillwynia</i> sp. <i>Coolgardie</i> (V.E. Sands 637.3.1)			
116.	11034 <i>Gastrolobium graniticum</i>		T	
117.	3943 <i>Glycyrrhiza acanthocarpa</i> (Native Liquorice)			
118.	29285 <i>Gompholobium cinereum</i>		P3	
119.	4021 <i>Jacksonia nematoclada</i>			
120.	4056 <i>Leptosema daviesioides</i>			
121.	4094 <i>Mirbelia microphylla</i>			
122.	3674 <i>Petalostylis cassioides</i>			
123.	12276 <i>Senna artemisioides</i> subsp. <i>filifolia</i>			
124.	18446 <i>Senna stowardii</i>			
125.	<i>Swainsona burkittii</i>			
126.	4220 <i>Swainsona canescens</i> (Grey Swainsona)			
127.	4221 <i>Swainsona colutooides</i> (Bladder Vetch)			
128.	4230 <i>Swainsona incei</i>			
129.	9008 <i>Urodon dasyphyllus</i> (Mop Bushpea)			
<b>Frankeniaceae</b>				
130.	5197 <i>Frankenia desertorum</i>			
<b>Funariaceae</b>				
131.	32353 <i>Entosthodon apophysatus</i>			
132.	32370 <i>Funaria hygrometrica</i>			
<b>Geraniaceae</b>				
133.	4334 <i>Erodium crinitum</i> (Corkscrew)			
<b>Gigaspermaceae</b>				
134.	32384 <i>Gigaspermum repens</i>			
<b>Goodeniaceae</b>				
135.	7413 <i>Brunonia australis</i> (Native Cornflower)			
136.	7419 <i>Coopermookia stropholata</i>			
137.	7438 <i>Dampiera eriocephala</i> (Woolly-headed Dampiera)			
138.	7451 <i>Dampiera lavandulacea</i>			
139.	7477 <i>Dampiera stenostachya</i> (Narrow-spiked Dampiera)			
140.	13158 <i>Dampiera tenuicaulis</i> var. <i>curvula</i>			
141.	7506 <i>Goodenia elderi</i>			
142.	19051 <i>Goodenia scapigera</i> subsp. <i>scapigera</i>			
143.	7565 <i>Goodenia xanthosperma</i> (Yellow-seeded Goodenia)			
144.	7644 <i>Scaevola spinescens</i> (Currant Bush, Maroon)			
145.	13151 <i>Scaevola thesioides</i> subsp. <i>filifolia</i>			
146.	7658 <i>Velleia discophora</i> (Cabbage Poison)			
147.	7664 <i>Velleia rosea</i> (Pink Velleia)			
148.	7665 <i>Velleia trinervis</i>			
<b>Grimmiaceae</b>				
149.	32473 <i>Grimmia pulvinata</i> var. <i>africana</i>			
<b>Gyrostemonaceae</b>				
150.	2778 <i>Codonocarpus cotinifolius</i> (Native Poplar, Kundurangu)			
151.	2783 <i>Gyrostemon racemiger</i>			
<b>Haloragaceae</b>				
152.	33620 <i>Glischrocaryon angustifolium</i>			
153.	6143 <i>Glischrocaryon aureum</i> (Common Popflower)			
154.	11801 <i>Gonocarpus confertifolius</i> var. <i>helmsii</i>			
155.	6159 <i>Gonocarpus nodulosus</i>			
156.	6180 <i>Haloragis trigonocarpa</i>			
157.	6197 <i>Myriophyllum petraeum</i> (Granite Myriophyllum)		P4	
<b>Hemerocallidaceae</b>				
158.	1260 <i>Stypandra glauca</i> (Blind Grass)			



Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Isoetaceae</b>				
159.	7 <i>Isoetes australis</i>			
<b>Lamiaceae</b>				
160.	6747 <i>Cyanostegia angustifolia</i> (Tinsel-flower)			
161.	6771 <i>Dicrastylis parvifolia</i>			
162.	6872 <i>Hemigenia teretiuscula</i>			
163.	6875 <i>Hemigenia westringioides</i> (Open Hemigenia)			
164.	6776 <i>Hemiphora elderi</i> (Red Velvet)			
165.	6779 <i>Lachnostachys coolgardiensis</i>			
166.	6916 <i>Prostanthera grylloana</i>			
167.	6938 <i>Westringia cephalantha</i>			
168.	9247 <i>Westringia rigida</i> (Stiff Westringia)			
<b>Lauraceae</b>				
169.	2953 <i>Cassytha melantha</i> (Large Dodder-laurel)			
<b>Loranthaceae</b>				
170.	2396 <i>Lysiana casuarinae</i>			
<b>Malvaceae</b>				
171.	4999 <i>Brachychiton gregorii</i> (Desert Kurrajong, Ngalta)			
172.	40923 <i>Commersonia crauophylla</i> (Brittle Leaved Rulingia)			
173.	4957 <i>Lawrenzia repens</i>			
174.	4964 <i>Radyera farragei</i> (Knobby Hibiscus)			
175.	46815 <i>Seringia cacaobrunnea</i> (Chocolate fire-bush)			
<b>Myrtaceae</b>				
176.	19467 <i>Aluta appressa</i>			
177.	20682 <i>Baeckea</i> sp. <i>Boorabbin</i> (J.H. Willis s.n. 4/10/1961)			
178.	20684 <i>Baeckea</i> sp. <i>Bulla Bulling</i> (D.J.E. Whibley 4648)		P1	
179.	20686 <i>Baeckea</i> sp. <i>Coolgardie</i> (A. Strid 21320)			
180.	5375 <i>Balaustion pulcherrimum</i> (Native Pomegranate)			
181.	5408 <i>Calothamnus gilesii</i>			
182.	5442 <i>Calytrix birdii</i>			
183.	5491 <i>Chamelaucium ciliatum</i>			
184.	13516 <i>Eucalyptus aequioperta</i>			
185.	13035 <i>Eucalyptus aspratilis</i>			
186.	5565 <i>Eucalyptus brachycorys</i> (Cowcowing Mallee)			
187.	12903 <i>Eucalyptus capillosa</i> subsp. <i>capillosa</i> (Wheatbelt Wandoo)			
188.	14300 <i>Eucalyptus celastroides</i> subsp. <i>celastroides</i> (Mirret)			
189.	5592 <i>Eucalyptus clelandii</i> (Cleland's Blackbutt)			
190.	5607 <i>Eucalyptus corrugata</i> (Rough-fruited Mallee)			
191.	15667 <i>Eucalyptus eremophila</i> subsp. <i>eremophila</i> (Sand Mallee)			
192.	13515 <i>Eucalyptus exigua</i>		P3	
193.	5648 <i>Eucalyptus flocktoniae</i> (Merri, Merid)			
194.	5665 <i>Eucalyptus griffithsii</i> (Griffith's Grey Gum)			
195.	5673 <i>Eucalyptus horistes</i>			
196.	5675 <i>Eucalyptus incrassata</i> (Lerp Mallee)			
197.	13056 <i>Eucalyptus leptopoda</i> subsp. <i>subluta</i>			
198.	12901 <i>Eucalyptus livida</i> (Mallee Wandoo)			
199.	13037 <i>Eucalyptus loxophleba</i> subsp. <i>lissophloia</i>			
200.	19323 <i>Eucalyptus moderata</i>			
201.	5726 <i>Eucalyptus oleosa</i> (Giant Mallee)			
202.	5742 <i>Eucalyptus petraea</i> (Granite Rock Box)			
203.	5745 <i>Eucalyptus pileata</i> (Capped Mallee)			
204.	18580 <i>Eucalyptus planipes</i>			
205.	5747 <i>Eucalyptus platycorys</i> (Boorabbin Mallee)			
206.	19064 <i>Eucalyptus prolixa</i>			
207.	12380 <i>Eucalyptus ravida</i> (Silver-topped Gimlet)			
208.	5761 <i>Eucalyptus rigidula</i> (Stiff-leaved Mallee)			
209.	12693 <i>Eucalyptus salicola</i> (Salt Gum)			
210.	5766 <i>Eucalyptus salmonophloia</i> (Salmon Gum, Wurak)			
211.	5767 <i>Eucalyptus salubris</i> (Gimlet)			
212.	12883 <i>Eucalyptus subangusta</i> subsp. <i>subangusta</i>			
213.	13521 <i>Eucalyptus tenuis</i>			
214.	5793 <i>Eucalyptus transcontinentalis</i> (Redwood, Pungul)			
215.	18293 <i>Eucalyptus urna</i>			
216.	34775 <i>Eucalyptus vittata</i>			
217.	5802 <i>Eucalyptus yilgarnensis</i> (Yorrell)			
218.	16722 <i>Euryomyrtus maidenii</i>			
219.	5815 <i>Homalocalyx thryptomenoides</i>			
220.	5840 <i>Kunzea pulchella</i> (Granite Kunzea)			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
221.	5847 <i>Leptospermum erubescens</i> (Roadside Teatree)			
222.	5848 <i>Leptospermum fastigiatum</i>			
223.	5865 <i>Malleostemon roseus</i>			
224.	5896 <i>Melaleuca cordata</i>			
225.	5909 <i>Melaleuca elliptica</i> (Granite Bottlebrush, Ngow)			
226.	5913 <i>Melaleuca glaberrima</i>			
227.	19486 <i>Melaleuca hamata</i>			
228.	5929 <i>Melaleuca leiocarpa</i>			
229.	15663 <i>Melaleuca pauperiflora</i> subsp. <i>fastigiata</i>			
230.	18598 <i>Melaleuca systema</i>			
231.	9187 <i>Micromyrtus erichsenii</i>			
232.	6018 <i>Rinzia carnosus</i> (Fleshy-leaved Rinzia)			
233.	48267 <i>Rinzia triplex</i> (Triad Rinzia)		P3	
234.	19698 <i>Thryptomene australis</i> subsp. <i>australis</i>			
235.	6058 <i>Thryptomene kochii</i>			
236.	6073 <i>Verticordia chrysantha</i>			
237.	12432 <i>Verticordia inclusa</i>			

### Orchidaceae

238.	16688 <i>Prasophyllum gracile</i>			
239.	18657 <i>Pterostylis</i> sp. <i>inland</i> (A.C. Beauglehole 11880)			

### Phrymaceae

240.	7061 <i>Glossostigma drummondii</i> (Mudmat)			
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### Poaceae

241.	12025 <i>Amphipogon caricinus</i> var. <i>caricinus</i>			
242.	492 <i>Neurachne alopecuroides</i> (Foxtail Mulga Grass)			
243.	17881 <i>Triodia desertorum</i>			
244.	699 <i>Triodia scariosa</i>			
245.	13041 <i>Triodia tomentosa</i>			

### Pottiaceae

246.	32315 <i>Barbula calycina</i>			
247.	32342 <i>Crossidium geheebii</i>			
248.	32346 <i>Didymodon torquatus</i>			
249.	32408 <i>Phascopsis rubicunda</i>			
250.	32437 <i>Syntrichia antarctica</i>			
251.	32444 <i>Tortula atrovirens</i>			
252.	32445 <i>Tortula muralis</i>			
253.	<i>Tortula recurvata</i>			
254.	32451 <i>Triquetrella papillata</i>			

### Proteaceae

255.	1946 <i>Grevillea acacioides</i>			
256.	1949 <i>Grevillea acutaria</i>			
257.	8832 <i>Grevillea excelsior</i> (Flame Grevillea)			
258.	14413 <i>Grevillea haplantha</i> subsp. <i>haplantha</i>			
259.	19314 <i>Grevillea hookeriana</i> subsp. <i>apiculoba</i>			
260.	19541 <i>Grevillea nematophylla</i> subsp. <i>nematophylla</i>			
261.	15981 <i>Grevillea obliquistigma</i> subsp. <i>obliquistigma</i>			
262.	15978 <i>Grevillea oligomera</i>			
263.	2077 <i>Grevillea pterosperma</i>			
264.	2163 <i>Hakea francisiana</i> (Emu Tree)			
265.	2182 <i>Hakea minyma</i>			
266.	19131 <i>Hakea scoparia</i> subsp. <i>scoparia</i>			
267.	2259 <i>Persoonia coriacea</i> (Leathery-leaf Persoonia)			
268.	2274 <i>Persoonia saundersiana</i>			
269.	14445 <i>Petrophile merrallii</i>			

### Pteridaceae

270.	37 <i>Cheilanthes lasiophylla</i> (Woolly Cloak Fern)			
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### Restionaceae

271.	18109 <i>Lepidobolus preissianus</i> subsp. <i>volubilis</i>			
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### Rhamnaceae

272.	16183 <i>Cryptandra aridicola</i>			
273.	31591 <i>Cryptandra crispula</i>		P3	
274.	16188 <i>Cryptandra minutifolia</i> subsp. <i>brevistyla</i>			
275.	16986 <i>Trymalium myrtillus</i> subsp. <i>myrtillus</i>			

### Rubiaceae

276.	18256 <i>Opercularia spermacoea</i>			
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Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Rutaceae</b>				
277.	11498 <i>Boronia coerulescens</i> subsp. <i>spicata</i>			
278.	4445 <i>Boronia ternata</i>			
279.	11201 <i>Boronia ternata</i> var. <i>ternata</i>			
280.	4497 <i>Phebalium canaliculatum</i>			
281.	4500 <i>Phebalium filifolium</i> (Slender Phebalium)			
282.	16556 <i>Phebalium megaphyllum</i>			
283.	4504 <i>Phebalium tuberosum</i>			
284.	18537 <i>Philotheca brucei</i> subsp. <i>brucei</i>			
285.	18510 <i>Philotheca pachyphylla</i>			
286.	18506 <i>Philotheca tomentella</i>			
<b>Santalaceae</b>				
287.	2356 <i>Santalum acuminatum</i> (Quandong, Warrga)			
<b>Sapindaceae</b>				
288.	4769 <i>Dodonaea lobulata</i> (Bead Hopbush)			
289.	12034 <i>Dodonaea microzyga</i> var. <i>acrolobata</i>			
<b>Scrophulariaceae</b>				
290.	14888 <i>Diocirea microphylla</i>		P3	
291.	7180 <i>Eremophila alternifolia</i> (Poverty Bush)			
292.	16377 <i>Eremophila caerulea</i> subsp. <i>caerulea</i>			
293.	13807 <i>Eremophila caperata</i>			
294.	7195 <i>Eremophila dempsteri</i>			
295.	7212 <i>Eremophila gibbosa</i>			
296.	7215 <i>Eremophila glabra</i> (Tar Bush)			
297.	14340 <i>Eremophila glabra</i> subsp. <i>glabra</i>			
298.	7219 <i>Eremophila granitica</i> (Thin-leaved Poverty Bush)			
299.	15112 <i>Eremophila interstans</i> subsp. <i>interstans</i>			
300.	7226 <i>Eremophila ionantha</i> (Violet-flowered Eremophila)			
301.	15003 <i>Eremophila oldfieldii</i> subsp. <i>angustifolia</i>			
302.	18570 <i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>			
303.	14594 <i>Eremophila parvifolia</i> subsp. <i>auricampa</i>			
304.	7264 <i>Eremophila saligna</i> (Willowy Eremophila)			
305.	7267 <i>Eremophila scoparia</i> (Broom Bush (			
<b>Solanaceae</b>				
306.	6978 <i>Nicotiana rotundifolia</i> (Round-leaved Tobacco)			
307.	7013 <i>Solanum hoplopetalum</i> (Thorny Solanum)			
308.	7018 <i>Solanum lasiophyllum</i> (Flannel Bush, Mindjulu)			
309.	7023 <i>Solanum nummularium</i> (Money-leaved Solanum)			
310.	7030 <i>Solanum plicatile</i>			
<b>Stylidiaceae</b>				
311.	7671 <i>Levenhookia leptantha</i> (Trumpet Stylewort)			
312.	7751 <i>Stylidium limbatum</i> (Fringed-leaved Triggerplant)			
<b>Thymelaeaceae</b>				
313.	11227 <i>Pimelea brevifolia</i> subsp. <i>modesta</i>			
<b>Zygophyllaceae</b>				
314.	4385 <i>Zygophyllum apiculatum</i> (Gallweed)			
315.	4389 <i>Zygophyllum eremaeum</i>			

#### Conservation Codes

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

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

# NatureMap Fauna Species Report 20 km

Created By Guest user on 07/08/2017

**Kingdom** Animalia  
**Current Names Only** Yes  
**Core Datasets Only** Yes  
**Method** 'By Circle'  
**Centre** 120° 41' 26" E, 31° 05' 39" S  
**Buffer** 20km  
**Group By** Species Group

Species Group	Species	Records
Amphibian	2	10
Bird	55	220
Invertebrate	4	6
Mammal	3	3
Reptile	30	96
<b>TOTAL</b>	<b>94</b>	<b>335</b>

	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Amphibian</b>					
1.	25425	<i>Neobatrachus kunapalari</i> (Kunapalari Frog)			
2.	25434	<i>Pseudophryne occidentalis</i> (Western Toadlet)			
<b>Bird</b>					
3.	24559	<i>Acanthagenys rufogularis</i> (Spiny-cheeked Honeyeater)			
4.	24260	<i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
5.	24261	<i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
6.	24265	<i>Acanthiza uropygialis</i> (Chestnut-rumped Thornbill)			
7.	25536	<i>Accipiter fasciatus</i> (Brown Goshawk)			
8.	24561	<i>Anthochaera carunculata</i> (Red Wattlebird)			
9.	25528	<i>Aphelocephala leucopsis</i> (Southern Whiteface)			
10.	24285	<i>Aquila audax</i> (Wedge-tailed Eagle)			
11.	24353	<i>Artamus cyanopterus</i> (Dusky Woodswallow)			
12.		<i>Barnardius zonarius</i>			
13.	24377	<i>Charadrius ruficapillus</i> (Red-capped Plover)			
14.	47909	<i>Cheramoeca leucosterna</i> (White-backed Swallow)			
15.	25675	<i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
16.	25568	<i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
17.	25592	<i>Corvus coronoides</i> (Australian Raven)			
18.	24420	<i>Cracticus nigrogularis</i> (Pied Butcherbird)			
19.	25595	<i>Cracticus tibicen</i> (Australian Magpie)			
20.	25596	<i>Cracticus torquatus</i> (Grey Butcherbird)			
21.	25607	<i>Dicaeum hirundinaceum</i> (Mistletoebird)			
22.	24470	<i>Dromaius novaehollandiae</i> (Emu)			
23.	24650	<i>Drymodes brunneopygia</i> (Southern Scrub-robin)			
24.		<i>Elanus axillaris</i>			
25.		<i>Eolophus roseicapillus</i>			
26.	25622	<i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
27.	24443	<i>Grallina cyanoleuca</i> (Magpie-lark)			
28.	24297	<i>Hamirostra melanostemon</i> (Black-breasted Buzzard)			
29.	24557	<i>Leipoa ocellata</i> (Malleefowl)		T	
30.	25659	<i>Lichenostomus leucotis</i> (White-eared Honeyeater)			
31.	25661	<i>Lichmera indistincta</i> (Brown Honeyeater)			
32.		<i>Lophochroa leadbeateri</i>			
33.	25654	<i>Malurus splendens</i> (Splendid Fairy-wren)			
34.	24583	<i>Manorina flavigula</i> (Yellow-throated Miner)			
35.	25663	<i>Melithreptus brevirostris</i> (Brown-headed Honeyeater)			
36.	24598	<i>Merops ornatus</i> (Rainbow Bee-eater)		IA	
37.	25693	<i>Microeca fascians</i> (Jacky Winter)			
38.	24407	<i>Ocyphaps lophotes</i> (Crested Pigeon)			
39.	24618	<i>Oreocitta gutturalis</i> (Crested Bellbird)			



	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
40.	24619	<i>Pachycephala inornata</i> (Gilbert's Whistler)			
41.	25680	<i>Pachycephala rufiventris</i> (Rufous Whistler)			
42.	25682	<i>Pardalotus striatus</i> (Striated Pardalote)			
43.	48061	<i>Petrochelidon nigricans</i> (Tree Martin)			
44.	24659	<i>Petroica goodenovii</i> (Red-capped Robin)			
45.	24667	<i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)			
46.	24409	<i>Phaps chalcoptera</i> (Common Bronzewing)			
47.	24681	<i>Poliiocephalus poliocephalus</i> (Hoary-headed Grebe)			
48.	25722	<i>Polytelis anthopeplus</i> (Regent Parrot)			
49.	24683	<i>Pomatostomus superciliosus</i> (White-browed Babbler)			
50.	42344	<i>Purnella albifrons</i> (White-fronted Honeyeater)			
51.	24278	<i>Pyrrholaemus brunneus</i> (Redthroat)			
52.	48096	<i>Rhipidura albiscapa</i> (Grey Fantail)			
53.	25614	<i>Rhipidura leucophrys</i> (Willie Wagtail)			
54.	30948	<i>Smicromis brevirostris</i> (Weebill)			
55.	25597	<i>Strepera versicolor</i> (Grey Currawong)			
56.	25705	<i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
57.	42351	<i>Todiramphus pyrrhopygius</i> (Red-backed Kingfisher)			

### Invertebrate

58.		<i>Ethmostigmus rubripes</i>			
59.		<i>Isometroides vescu</i>			
60.		<i>Scolopendra laeta</i>			
61.		<i>Tasmanicosa leuckartii</i>			

### Mammal

62.	24186	<i>Chalinolobus gouldii</i> (Gould's Wattle Bat)			
63.	24135	<i>Macropus robustus</i> subsp. <i>erubescens</i> (Euro, Biggada)			
64.	24229	<i>Notomys mitchellii</i> (Mitchell's Hopping-mouse)			

### Reptile

65.	24918	<i>Crenadactylus ocellatus</i> subsp. <i>ocellatus</i> (Clawless Gecko)			
66.	24871	<i>Ctenophorus cristatus</i> (Bicycle Dragon)			
67.	24873	<i>Ctenophorus fordii</i> (Mallee Sand Dragon)			
68.	24874	<i>Ctenophorus isolepis</i> subsp. <i>citrinus</i> (Yellow Military Dragon)			
69.	24883	<i>Ctenophorus ornatus</i> (Ornate Crevice-Dragon)			
70.	24886	<i>Ctenophorus reticulatus</i> (Western Netted Dragon)			
71.	24888	<i>Ctenophorus salinarum</i> (Salt Pan Dragon)			
72.	24889	<i>Ctenophorus scutulatus</i> (Lozenge-marked Dragon)			
73.	25026	<i>Ctenotus atlas</i>			
74.	25080	<i>Ctenotus uber</i> subsp. <i>uber</i> (Spotted Ctenotus)			
75.	25089	<i>Cyclodomorphus melanops</i> subsp. <i>elongatus</i> (Slender Blue-tongue)			
76.	24929	<i>Diplodactylus granariensis</i> subsp. <i>granariensis</i>			
77.	24940	<i>Diplodactylus pulcher</i>			
78.	25094	<i>Egernia formosa</i>			
79.	25109	<i>Eremiascincus richardsonii</i> (Broad-banded Sand Swimmer)			
80.	24959	<i>Gehyra variegata</i>			
81.	25115	<i>Hemiergis initialis</i> subsp. <i>initialis</i>			
82.	42408	<i>Hesperoedura reticulata</i>			
83.	24961	<i>Heteronotia binoei</i> (Bynoe's Gecko)			
84.	41411	<i>Liopholis inornata</i> (Desert Skink)			
85.	30935	<i>Lucasium maini</i>			
86.	25184	<i>Menetia greyii</i>			
87.	24904	<i>Moloch horridus</i> (Thorny Devil)			
88.	25190	<i>Morethia butleri</i>			
89.	25266	<i>Simoselaps bertholdi</i> (Jan's Banded Snake)			
90.	24923	<i>Strophurus assimilis</i> (Goldfields Spiny-tailed Gecko)			
91.	25269	<i>Suta fasciata</i> (Rosen's Snake)			
92.	25207	<i>Tiliqua rugosa</i> subsp. <i>rugosa</i>			
93.	25218	<i>Varanus gouldii</i> (Bungarra or Sand Monitor)			
94.	25526	<i>Varanus tristis</i> (Racehorse 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

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

# Appendix D – Flora data

Flora species list

Flora likelihood of occurrence assessment guidelines

Flora likelihood of occurrence assessment

Rehabilitation species list

Quadrat Data (excel format)



## Flora species list

Family	Taxon	Status	Dedari					Ghooli		
			HD	VA03	VA04	VA05	VA06	HD	VA01	VA02
Aizoaceae	<i>Carpobrotus modestus</i>					X		X		X
Aizoaceae	<i>Mesembryanthemum crystallinum</i>	*						X		
Aizoaceae	<i>Mesembryanthemum nodiflorum</i>	*								X
Amaranthaceae	<i>Amaranthus</i> sp.	*						X		
Amaranthaceae	<i>Ptilotus holosericeus</i>									X
Amaranthaceae	<i>Ptilotus macrocephalus</i>								X	
Amaranthaceae	<i>Ptilotus nobilis</i>					X			X	
Amaranthaceae	<i>Ptilotus polystachyus</i>							X		
Anacardiaceae	<i>Schinus molle</i>	*	X					X		
Apocynaceae	<i>Alyxia buxifolia</i>					X		X	X	
Arecaceae	<i>Phoenix dactylifera</i>	*						X		
Asparagaceae	<i>Lomandra effusa</i>						X			X
Asphodelaceae	<i>Asphodelus fistulosus</i>	*	X					X		
Asteraceae	<i>Arctotheca calendula</i>	*						X		X
Asteraceae	<i>Asteraceae</i> sp.		X							
Asteraceae	<i>Cratystylis subspinescens</i>					X				
Asteraceae	<i>Hypochaeris glabra</i>	*								X
Asteraceae	<i>Hypochaeris radicata</i>	*						X		
Asteraceae	<i>Olearia muelleri</i>					X				X
Asteraceae	<i>Olearia pimeleoides</i>					X	X			
Asteraceae	<i>Podolepis capillaris</i>						X	X	X	
Asteraceae	<i>Schoenia cassiniana</i>								X	
Asteraceae	<i>Waitzia acuminata</i> var. <i>acuminata</i>								X	
Bignoniaceae	<i>Jacaranda mimosifolia</i>	*	X							

Family	Taxon	Status	Dedari					Ghooli		
			HD	VA03	VA04	VA05	VA06	HD	VA01	VA02
Boraginaceae	<i>Echium plantagineum</i>	*, DP						X		
Boraginaceae	<i>Halgania andromedifolia</i>					X				
Brassicaceae	<i>Brassica tournefortii</i>	*						X		
Brassicaceae	<i>Carrichtera annua</i>	*	X					X		X
Brassicaceae	<i>Raphanus raphanistrum</i>	*						X		
Cactaceae	<i>Opuntia stricta</i>	*, WONS	X					X		
Casuarinaceae	<i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>			X						
Casuarinaceae	<i>Allocasuarina corniculata</i>			X	X				X	
Chenopodiaceae	<i>Atriplex codonocarpa</i>		X					X		
Chenopodiaceae	<i>Atriplex nummularia</i> subsp. <i>spathulata</i>							X		X
Chenopodiaceae	<i>Atriplex vesicaria</i>		X			X		X		X
Chenopodiaceae	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>					X		X	X	X
Chenopodiaceae	<i>Maireana brevifolia</i>							X		
Chenopodiaceae	<i>Maireana carnosa</i>									X
Chenopodiaceae	<i>Maireana georgei</i>									X
Chenopodiaceae	<i>Maireana radiata</i>					X				X
Chenopodiaceae	<i>Maireana trichoptera</i>		X							X
Chenopodiaceae	<i>Maireana villosa</i>		X			X		X		X
Chenopodiaceae	<i>Rhagodia preissii</i>					X				
Chenopodiaceae	<i>Salsola australis</i>							X		
Chenopodiaceae	<i>Sclerolaena diacantha</i>					X				X
Convolvulaceae	Convolvulaceae sp.							X		
Crassulaceae	<i>Crassula</i> sp.									X
Cucurbitaceae	<i>Cucumis myriocarpus</i>	*	X							
Cupressaceae	<i>Callitris preissii</i>			X	X				X	
Cyperaceae	<i>Lepidosperma sanguinolentum</i>			X						



Family	Taxon	Status	Dedari					Ghooli		
			HD	VA03	VA04	VA05	VA06	HD	VA01	VA02
Cyperaceae	<i>Schoenus</i> sp. A1 Boorabbin			X	X					
Droseraceae	<i>Drosera</i> sp.								X	
Ericaceae	<i>Leucopogon hamulosus</i>								X	
Euphorbiaceae	<i>Beyeria sulcata</i> var. <i>sulcata</i>			X		X			X	
Euphorbiaceae	<i>Euphorbia australis</i>							X		
Euphorbiaceae	<i>Triadica setifera</i>	*						X		
Fabaceae	<i>Acacia acuminata</i>		X	X	X	X		X	X	X
Fabaceae	<i>Acacia beauverdiana</i>		X							
Fabaceae	<i>Acacia colletioides</i>					X	X			
Fabaceae	<i>Acacia enervia</i> subsp. <i>enervia</i>					X		X		X
Fabaceae	<i>Acacia enervia</i> subsp. <i>explicata</i>									X
Fabaceae	<i>Acacia erinacea</i>					X		X		X
Fabaceae	<i>Acacia gibbosa</i>								X	
Fabaceae	<i>Acacia hemiteles</i>					X	X		X	
Fabaceae	<i>Acacia merrallii</i>							X		X
Fabaceae	<i>Acacia resinimarginea</i>				X	X			X	
Fabaceae	<i>Acacia resinistipulea</i>					X	X			X
Fabaceae	<i>Acacia yorkkrakinensis</i> subsp. <i>acrita</i>			X					X	
Fabaceae	<i>Daviesia benthamii</i> subsp. <i>acanthoclona</i>					X	X			X
Fabaceae	<i>Mirbelia microphylla</i>				X					
Fabaceae	<i>Senna artemisioides</i> subsp. <i>filifolia</i>					X				
Fabaceae	<i>Senna artemisioides</i> subsp. <i>petiolaris</i>					X				
Fabaceae	<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>					X				
Fabaceae	<i>Senna pleurocarpa</i> var. <i>angustifolia</i>		X					X		
Goodeniaceae	<i>Dampiera lavandulacea</i>				X					
Goodeniaceae	<i>Scaevola spinescens</i>					X		X		X

Family	Taxon	Status	Dedari					Ghooli		
			HD	VA03	VA04	VA05	VA06	HD	VA01	VA02
Hemerocallidaceae	<i>Dianella revoluta</i> var. <i>divaricata</i>									X
Lamiaceae	<i>Dicrastylis parvifolia</i>				X					
Lamiaceae	<i>Micromyrtus obovata</i>				X					
Lamiaceae	<i>Pityrodia lepidota</i>			X	X					
Lamiaceae	<i>Prostanthera semiteres</i> subsp. <i>semiteres</i>									X
Lamiaceae	<i>Salvia verbenaca</i>	*	X							
Lamiaceae	<i>Westringia cephalantha</i>								X	
Lauraceae	<i>Cassytha ?glabella</i>								X	X
Malvaceae	<i>Brachychiton</i> sp.	*						X		
Malvaceae	<i>Malva parvifolia</i>	*						X		
Malvaceae	<i>Seringa velutina</i>			X						
Montiaceae	<i>Calandrinia eremaea</i>						X			X
Myrtaceae	<i>Baeckea elderiana</i>								X	
Myrtaceae	<i>Baeckea muricata</i>								X	
Myrtaceae	<i>Baeckea</i> sp. <i>Boorabbin</i>			X	X					
Myrtaceae	<i>Calothamnus gilesii</i>								X	
Myrtaceae	<i>Ericomyrtus serpyllifolia</i>								X	
Myrtaceae	<i>Eucalyptus ?eremophila</i>						X			
Myrtaceae	<i>Eucalyptus ?sheathiana</i>						X			
Myrtaceae	<i>Eucalyptus celastroides</i> subsp. <i>celastroides</i>							X	X	
Myrtaceae	<i>Eucalyptus griffithsii</i>			X			X			
Myrtaceae	<i>Eucalyptus leptopoda</i> subsp. <i>leptopoda</i>				X				X	
Myrtaceae	<i>Eucalyptus pileata</i>			X						
Myrtaceae	<i>Eucalyptus salmonophloia</i>					X				X
Myrtaceae	<i>Eucalyptus salubris</i>					X		X		X
Myrtaceae	<i>Eucalyptus sheathiana</i>								X	

Family	Taxon	Status	Dedari					Ghooli		
			HD	VA03	VA04	VA05	VA06	HD	VA01	VA02
Myrtaceae	<i>Eucalyptus</i> sp.							X		
Myrtaceae	<i>Eucalyptus torquata</i>							X		
Myrtaceae	<i>Eucalyptus yilgarnensis</i>						X			
Myrtaceae	<i>Euryomyrtus maidenii</i>			X	X				X	
Myrtaceae	<i>Leptospermum fastigiatum</i>			X	X				X	
Myrtaceae	<i>Malleostemon roseus</i>			X					X	
Myrtaceae	<i>Melaleuca ?atroviridis</i>			X	X		X			
Myrtaceae	<i>Melaleuca cordata</i>			X	X				X	
Myrtaceae	<i>Melaleuca pauperiflora</i>					X	X	X		X
Myrtaceae	<i>Melaleuca sheathiana</i>									X
Myrtaceae	<i>Micromyrtus obovata</i>			X					X	
Myrtaceae	<i>Rinzia rubra</i>			X					X	
Myrtaceae	<i>Thryptomene kochii</i>			X	X				X	
Myrtaceae	<i>Verticordia</i> sp.								X	
Orchidaceae	<i>Pterostylis</i> sp. inland (A.C. Beaglehole 11880)								X	X
Oxalidaceae	<i>Oxalis pes-caprae</i>	*						X		
Pittosporaceae	<i>Billardiera ?coriacea</i>			X						
Poaceae	<i>Amphipogon</i> sp.						X			
Poaceae	<i>Austrostipa elegantissima</i>					X		X	X	X
Poaceae	<i>Austrostipa</i> sp.							X		
Poaceae	<i>Avena barbata</i>	*						X		
Poaceae	<i>Bromus</i> sp.	*								X
Poaceae	<i>Cortaderia selloana</i>	*	X							
Poaceae	<i>Cynodon dactylon</i>	*						X		
Poaceae	<i>Eragrostis ?minor</i>	*						X		
Poaceae	<i>Eragrostis curvula</i>	*						X		X



Family	Taxon	Status	Dedari					Ghooli		
			HD	VA03	VA04	VA05	VA06	HD	VA01	VA02
Poaceae	<i>Eragrostis</i> sp.									X
Poaceae	<i>Eriachne</i> sp.		X						X	X
Poaceae	<i>Lolium</i> sp. (insufficient material)	*								X
Poaceae	<i>Neurachne alopecuroidea</i>			X						
Poaceae	Poaceae sp.						X			X
Poaceae	<i>Triodia rigidissima</i>			X	X				X	
Polygalaceae	<i>Comesperma scoparium</i>				X					
Proteaceae	<i>Grevillea acuaria</i>					X				
Proteaceae	<i>Grevillea didymobotrya</i> subsp. <i>didymobotrya</i>				X				X	
Proteaceae	<i>Grevillea paradoxa</i>								X	
Proteaceae	<i>Grevillea pterosperma</i>								X	
Proteaceae	<i>Hakea erecta</i>				X					
Proteaceae	<i>Hakea francisiana</i>		X						X	
Proteaceae	<i>Hakea multilineata</i>			X						
Proteaceae	<i>Persoonia saundersiana</i>								X	
Rutaceae	<i>Phebalium filifolium</i>			X	X		X		X	
Rutaceae	<i>Phebalium lepidotum</i>								X	
Rutaceae	<i>Philothea</i> sp.								X	
Santalaceae	<i>Exocarpos aphyllus</i>					X				X
Santalaceae	<i>Santalum acuminatum</i>			X		X			X	X
Scrophulariaceae	<i>Eremophila caperata</i>						X			
Scrophulariaceae	<i>Eremophila decipiens</i> subsp. <i>decipiens</i>					X				
Scrophulariaceae	<i>Eremophila glabra</i> subsp. <i>glabra</i>					X				X
Scrophulariaceae	<i>Eremophila ionantha</i>					X				X
Scrophulariaceae	<i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>									X
Scrophulariaceae	<i>Eremophila scoparia</i>					X				X

Family	Taxon	Status	Dedari					Ghooli		
			HD	VA03	VA04	VA05	VA06	HD	VA01	VA02
Scrophulariaceae	<i>Eremophila</i> sp.				X					
Solanaceae	<i>Solanum nummularium</i>					X				
Stylidiaceae	<i>Stylidium ?limbatum</i>								X	

\* denotes introduced taxa

DP – Declared Pest

WONS – Weeds of National Significance

## 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 20 km and large areas of suitable habitat occur in the survey area.
Possible	Species previously recorded within 20 km and areas of suitable habitat occur/may occur in the survey area.
Unlikely	Species previously recorded within 20 km, but suitable habitat does not occur in the survey area.
Highly unlikely	Species not previously recorded within 20 km, suitable habitat does not occur in the survey 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 – DEE Protected Matters Search Tool (PMST) to identify flora listed under the EPBC Act potentially occurring within the study area

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

NM – DBCA *NatureMap* (accessed August 2017)

## Flora likelihood of occurrence assessment - Ghooli

Family	Taxon	Status		Description (if available) (WA Herbarium 2017, DEE 2017)	Likelihood of occurrence	Source
		EPBC Act	WC Act /DBCA			
Lamiaceae	<i>Dasymalla axillaris</i>	CE	T	Low, diffuse shrub growing to 30 cm tall. Flowers are vivid red to yellow-scarlet and flowering occurs between July–December. Known from sandy soils.	<b>Highly unlikely</b> – the species does not occur within 20 km of the survey area, and the survey area is outside the natural distribution of the species.	EPBC
Fabaceae	<i>Acacia lobulata</i>	E	T	Erect, open, often spindly shrub, 1-2 m high. Fl. yellow, Jul. Gritty loam or sand. Low granitic breakaways.	<b>Unlikely</b> – the species has not been recorded within 120 km of the survey area, and no suitable habitat occurs.	EPBC
Fabaceae	<i>Daviesia microcarpa</i>	E	T	Sprawling, tangled shrub, to 0.4 m high, ca 1 m wide. Fl. orange & red, Sep. Weathered gravel.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area, but no suitable habitat occurs.	DBCA, NM
Scrophulariaceae	<i>Eremophila virens</i>	E	T	Erect, slender shrub, 1.5-5 m high. Fl. green, Aug to Oct. Red/brown sand. Granite hillsides	<b>Unlikely</b> – the species has not been recorded within 20 km of the survey area, and no suitable habitat occurs.	EPBC



Family	Taxon	Status		Description (if available) (WA Herbarium 2017, DEE 2017)	Likelihood of occurrence	Source
		EPBC Act	WC Act /DBCA			
Scrophulariaceae	<i>Eremophila viscida</i>	E	T	Shrub, 1.2-4 m high. Fl. green-white-yellow, Sep to Nov. Granitic soils, sandy loam. Stony gullies, sandplains.	<b>Unlikely</b> – the species has not been recorded within 20 km of the survey area, some suitable habitat occurs.	EPBC
Euphorbiaceae	<i>Ricinocarpos brevis</i>	E	T	Shrub, to 1.8 m high. Fl. white, Jun to Jul. Rocky hillslopes, rock outcrops.	<b>Unlikely</b> – the species has not been recorded within 20 km of the survey area, and no suitable habitat occurs.	EPBC
Chenopodiaceae	<i>Roycea pycnophylloides</i>	E	T	Perennial, herb, forming densely branched, silvery mats to 1 m wide. Fl. Sep. Sandy soils, clay. Saline flats.	<b>Highly unlikely</b> – the species does not occur within 20 km of the survey area, the survey area is outside the natural distribution of the species and no suitable habitat occurs.	EPBC
Myrtaceae	<i>Eucalyptus crucis</i> subsp. <i>crucis</i>	V	T	Mallee, 2-8 m high, bark rough, 'minni-ritchi'. Fl. white, Oct or Dec or Jan to Mar. Sand, loam. Granite outcrops.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area, some suitable habitat occurs.	DBCA, NM
Rutaceae	<i>Philotheca falcata</i>		T	Small, much-branched shrub, 0.15-0.25 m high. Fl. white, Oct. Grows in Mulga shrubland on rocky slopes of red skeletal laterite (Wilson 1998)	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area, but no suitable habitat occurs.	DBCA, NM
Myrtaceae	<i>Eucalyptus myriadena</i> subsp. <i>parviflora</i>		P1	Mallee or tree, 3-10 m high, bark rough, coarse & flaky on trunk, smooth above. Loam. Swamps, plains.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area, but no suitable habitat occurs.	DBCA, NM
Goodeniaceae	<i>Goodenia heatheriana</i>		P1	Annual, herb, to 0.15 m high. Fl. yellow, Sep to Oct. Red crumbly clay, greenstone gravel and cobbles. Lower slopes, moderately exposed gently undulating plain, roadsides.	<b>Possible</b> – the species has been recorded within 20 km of the survey area, and some suitable habitat occurs.	DBCA, NM
Lamiaceae	<i>Hemigenia</i> sp. Newdegate (E. Bishop 75)		P1	Spindly, erect to spreading shrub, 0.2-0.45 m high, to 0.5 m wide. Fl. blue/purple, Sep to Oct. Clay loam. Disturbed sites.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area but no suitable habitat occurs. This species is not cryptic and the survey was undertaken during the reported flowering period.	NM

Family	Taxon	Status		Description (if available) (WA Herbarium 2017, DEE 2017)	Likelihood of occurrence	Source
		EPBC Act	WC Act /DBCA			
Araliaceae	<i>Hydrocotyle corynophora</i>		P1	Erect, glabrous annual, herb, to about 0.25 m high, basal leaves small, conspicuously stalked, orbicular to rhomboid. Known only from the type specimen.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area, but no suitable habitat occurs.	NM
Ericaceae	<i>Leucopogon</i> sp. Yellowdine (M. Hislop & F. Hort MH 3194)		P1	Erect, compact shrub, to 0.7 m high. Fl. White. Yellow sand, loamy sand. Undulating plains, sandplains.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area but no suitable habitat occurs. This species is not cryptic and the survey was undertaken during the reported flowering period.	DBCA, NM
Asteraceae	<i>Millotia newbeyi</i>		P1	Slender, upright annual, herb, 0.05-0.1 m high. Fl. cream-yellow, Sep. Red/brown loam, red clay. Undulating plains.	<b>Possible</b> – the species has been recorded within 20 km of the survey area, and some suitable habitat occurs.	NM
Myrtaceae	<i>Rinzia fimbriolata</i>		P1	-	<b>Possible</b> – the species has been recorded within 20 km of the survey area, and some suitable habitat occurs.	NM
Lamiaceae	<i>Teucrium</i> sp. dwarf (R. Davis 8813)		P1	Compact, dwarf shrub, 0.1 m high, to 0.1 m wide. Fl. white, Apr. Hills, road verges.	<b>Possible</b> – the species has been recorded within 20 km of the survey area, some suitable habitat occurs.	NM
Fabaceae	<i>Acacia ancistrophylla</i> var. <i>perarcuata</i>		P3	Rounded or obconic shrub, 0.6-1.6 m high, to 6 m wide. Fl. yellow, Aug to Sep. Red sand, clay loam, loam. Undulating plains.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area. Limited suitable habitat may occur.	DBCA, NM
Ericaceae	<i>Lissanthe scabra</i>		P2	Rigid, erect, fairly densely branched shrub, to 1 m high, leaf apex aristate, upper leaf surface scabrous; flowers pedicellate above bracteoles. Fl. white, Aug. Dry, white to orange-brown clay, sandy gravel loams, granite. Breakaways, uplands.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area, but no suitable habitat occurs.	DBCA, NM
Myrtaceae	<i>Verticordia dasystylis</i> subsp. <i>dasystylis</i>		P2	Shrub, 0.2-0.4 m high. Fl. green-yellow, Sep to Nov. Granitic sand or clay loam. Granite rocks.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area, but no suitable habitat occurs.	DBCA, NM

Family	Taxon	Status		Description (if available) (WA Herbarium 2017, DEE 2017)	Likelihood of occurrence	Source
		EPBC Act	WC Act /DBCA			
Fabaceae	<i>Acacia cylindrica</i>		P3	Spreading shrub, 1.5-3(-4) m high. Fl. yellow, Aug to Oct. Yellow/brown sand, gravelly soils. Undulating plains, flats.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area and suitable habitat does occur. However, this species is not cryptic and the survey was undertaken during the reported flowering period.	NM
Fabaceae	<i>Acacia desertorum</i> var. <i>nudipes</i>		P3	Dense or open shrub or tree (rarely), 0.6-2 m high, phyllodes 16-nerved. Fl. yellow, Aug to Oct. Yellow sand, lateritic gravel. Sandplains, flats.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area and suitable habitat does occur. However, this species is not cryptic and the survey was undertaken during the reported flowering period.	DBCA, NM
Fabaceae	<i>Acacia filifolia</i>		P3	Wispy, spindly, single-stemmed shrub or tree, 1.2-3 m high. Fl. yellow, May to Sep. Yellow sand, gravelly lateritic sand. Sandplains.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area and suitable habitat does occur. However, this species is not cryptic and the survey was undertaken during the reported flowering period.	DBCA, NM
Fabaceae	<i>Acacia formidabilis</i>		P3	Diffuse, pungent shrub, 0.2-0.6 m high. Fl. yellow, Aug to Sep. Yellow or red/brown sand. Undulating plains, hillsides.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area and suitable habitat does occur. However, this species is not cryptic and the survey was undertaken during the reported flowering period.	NM
Fabaceae	<i>Eutaxia rubricarina</i>		P3	Straggling shrub, to 0.5 m high. Fl. Orange & yellow & brown, Aug or Oct. Gravelly sand, grey to pinkish-white sandy clay, red loam. Flats, slopes, valley floors, road verges	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area, some suitable habitat occurs. However, this species is not cryptic and the survey was undertaken during the reported flowering period.	DBCA, NM
Proteaceae	<i>Hakea pendens</i>		P3	Shrub, 2-3 m high, 2.5-3.1 m wide. Fl. pink-white, Sep. Stony loam. Ironstone ridges.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area, but no suitable habitat occurs.	DBCA, NM



Family	Taxon	Status		Description (if available) (WA Herbarium 2017, DEE 2017)	Likelihood of occurrence	Source
		EPBC Act	WC Act /DBCA			
Brassicaceae	<i>Phlegmatospermum eremaeum</i>		P3	Prostrate to spreading annual, herb, 0.02-0.1(-0.2) m high. Fl. white-cream, Jun or Aug to Oct. Stony loam	<b>Possible</b> – the species has been recorded within 20 km of the survey area and suitable habitat occurs. This species can be cryptic, but the field survey was undertaken during the reported flowering period.	NM
Lamiaceae	<i>Prostanthera nanophylla</i>		P3	Shrub, 0.1-1 m high. Fl. blue-purple-white, Aug to Nov. Yellow sand over laterite, rocky loam. Sandplains.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area and suitable habitat does occur. However, this species is not cryptic and the survey was undertaken during the reported flowering period.	DBCA, NM
Stylidiaceae	<i>Stylidium choreanthum</i>		P3	Creeping perennial, herb, 0.01-0.03 m high, to 0.3 m wide. Fl. pink/white, Sep to Nov. White/yellow or red sand. Plains.	<b>Possible</b> – the species has been recorded within 20 km of the survey area and suitable habitat occurs. This species can be cryptic and the survey was outside of the reported flowering period.	DBCA, NM
Myrtaceae	<i>Verticordia mitodes</i>		P3	Spreading shrub, 0.15-0.7 m high. Fl. pink-purple, Oct to Dec or Jan. Yellow sand. Undulating plains.	<b>Unlikely</b> – the species has been recorded within 20 km of survey area and suitable habitat occurs. The GHD survey was not during the recorded flowering period for this species, however no <i>Verticordia</i> species with similar characters were recorded during the field survey.	DBCA, NM
Myrtaceae	<i>Verticordia stenopetala</i>		P3	Shrub, 0.2-0.6(-1.3) m high. Fl. pink/pink-purple-red, Oct to Dec or Jan. Yellow sand, sometimes with gravel. Undulating plains.	<b>Unlikely</b> – the species has been recorded within 20 km of survey area and suitable habitat occurs. The GHD survey was not during the recorded flowering period for this species, however no <i>Verticordia</i> species with similar characters were recorded during the field survey.	NM

## Flora likelihood of occurrence assessment – Dedari

Family	Taxon	Status		Description (if available) (WA Herbarium 2017, DEE 2017)	Likelihood of occurrence	Source
		EPBC Act	WC Act /DBCA			
Fabaceae	<i>Gastrolobium graniticum</i>	E	T	Erect, open shrub, to 2.5 m high. Flowers yellow & orange & red, Aug to Sep. Sand, sandy loam, granite. Margins of rock outcrops, along drainage lines.	<b>Highly Unlikely</b> – the species has been recorded within 20 km of the survey area, but no suitable habitat occurs.	EPBC NM, DBCA
Fabaceae	<i>Acacia epedunculata</i>		P1	Low spreading, becoming rounded, multi-stemmed shrub, 0.5-0.65 m high. Flowers yellow, Aug. Yellow sand. Sandplains.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area, and some suitable habitat occurs. However, this species is not cryptic and the survey was undertaken during the reported flowering period.	NM, DBCA
Myrtaceae	<i>Baeckea</i> sp. <i>Bulla Bulling</i> (D.J.E. Whibley 4648)		P1	Spreading shrub, to 1.6 m high. Yellow sandy loam.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area, and some suitable habitat occurs. However, this species is not cryptic and the survey was undertaken during the reported flowering period.	NM
Ericaceae	<i>Melichrus</i> sp. Coolgardie (K.R. Newbey 8698)		P1	Erect straggly shrub to 40 cm high, light pink flowers, August. Yellow sand	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area and suitable habitat does occur. However, this species is not cryptic and the survey was undertaken during the reported flowering period.	NM, DBCA
Fabaceae	<i>Acacia crenulata</i>		P3	Bushy shrub or tree, 0.7-3 m high. Fl. yellow. Clay, sandy clay, yellow sand. Rocky rises, granite outcrops, breakaways.	<b>Highly Unlikely</b> – the species has been recorded within 20 km of the survey area, but no suitable habitat occurs.	NM, DBCA
Casuarinaceae	<i>Allocasuarina eriochlamys</i> subsp. <i>grossa</i>		P3	Dioecious or monoecious shrub, 1-3 m high, bracteoles prominently exceeding cone. Stony loam, laterite clay. Granite outcrops	<b>Highly Unlikely</b> – the species has been recorded within 20 km of the survey area, but no suitable habitat occurs.	NM, DBCA

Family	Taxon	Status		Description (if available) (WA Herbarium 2017, DEE 2017)	Likelihood of occurrence	Source
		EPBC Act	WC Act /DBCA			
Rhamnaceae	<i>Cryptandra crispula</i>		P3	Non-spinescent shrub, 0.25-0.9 m high. Brown sandy clay, yellow loamy sand, red soil, pebbles. Dune ridges, hills, near salt lakes	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area and some areas of suitable habitat occur. This species is not cryptic and the survey was undertaken during the reported flowering period.	NM, DBCA
Scrophulariaceae	<i>Diocirea microphylla</i>		P3	Rounded shrub, 0.45-0.9 m high, to 1 m wide. Fl. Nov to Dec. Red-brown clay loam.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area, some suitable habitat occurs. However, this species is not cryptic and would not likely to have been overlooked.	NM, DBCA
Myrtaceae	<i>Eucalyptus exigua</i>		P3	(Mallee), 2-5 m high, bark smooth. Fl. white-cream, Mar. Sandy loam, white sand. Sandplains	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area and suitable habitat does occur. However, this species is distinctive and would not likely to have been overlooked.	NM, DBCA
Fabaceae	<i>Gompholobium cinereum</i>		P3	Shrub, to 0.3 m high. Fl mauve, Sep-Nov. Yellow sand, clayey sand, brown loam, sandy gravel, laterite. Well-drained open sites, slopes, plains, roadsides	<b>Possible</b> – the species has been recorded within 20 km of the survey area and some areas of suitable habitat occur. The GHD survey was not during the recorded flowering period for this species.	NM, DBCA
Myrtaceae	<i>Rinzia triplex</i>		P3	Shrub to 1.5 m tall. Fl. pink, Jun-Sep. Sandy plains in yellow to red, often gravelly or lateritic soils.	<b>Unlikely</b> – the species has been recorded within 20 km of the survey area and some areas of suitable habitat occur. This species is not cryptic and the survey was undertaken during the reported flowering period.	NM
Ericaceae	<i>Styphelia</i> sp. Bullfinch (M. Hislop 3574)		P3	Shrub to 60 cm. White/cream flowers. Clay, lateritic/granite outcropping	<b>Highly Unlikely</b> – the species has been recorded within 20 km of the survey area, but no suitable habitat occurs.	NM, DBCA



Family	Taxon	Status		Description (if available) (WA Herbarium 2017, DEE 2017)	Likelihood of occurrence	Source
		EPBC Act	WC Act /DBCA			
Haloragaceae	<i>Myriophyllum petraeum</i>		P4	Aquatic annual, herb, stems 0.15-0.3 m long. Fl. white, Aug to Dec. Strictly confined to ephemeral rock pools on granite outcrops.	<b>Highly Unlikely</b> – the species has been recorded within 20 km of the survey area, but no suitable habitat occurs	NM, DBCA

## Flora species suitable to rehabilitation

Species	Growth form
<i>Acacia acuminata</i>	Shrub to 7 m
<i>Acacia hemiteles</i>	Shrub to 2 m
<i>Acacia resinimarginea</i>	Shrub to 5 m
<i>Acacia yorkrakinensis</i> subsp. <i>acrita</i>	Tree or shrub to 4 m
<i>Allocasuarina corniculata</i>	Shrub to 5 m
<i>Alyxia buxifolia</i>	Shrub to 3 m
<i>Atriplex nummularia</i> subsp. <i>spathulata</i>	Shrub to 1.5 m
<i>Atriplex vesicaria</i>	Shrub to 1 m
<i>Austrostipa elegantissima</i>	Grass to 1.5 m
<i>Callitris preissii</i>	Tree or shrub to 6 m
<i>Daviesia aphylla</i>	Shrub to 3 m
<i>Dianella revoluta</i> var. <i>divaricata</i>	Shrub to 1 m
<i>Eremophila glabra</i>	Shrub to 1 m
<i>Eremophila ionantha</i>	Shrub to 2 m
<i>Eremophila scoparia</i>	Shrub to 3 m
<i>Eucalyptus griffithsii</i>	Mallee to 3 m
<i>Eucalyptus leptopoda</i> subsp. <i>leptopoda</i>	Mallee to 6 m
<i>Eucalyptus salmonophloia</i>	Tree to 10+ m
<i>Eucalyptus salubris</i>	Tree or mallee to 10 m
<i>Grevillea didymobotrya</i> subsp. <i>didymobotrya</i>	Shrub to 3 m
<i>Hakea francisiana</i>	Tree or shrub to 7 m
<i>Leptospermum fastigiatum</i>	Shrub to 3 m
<i>Lomandra effusa</i>	Sedge to 1 m
<i>Maireana villosa</i>	Shrub to 0.7 m
<i>Melaleuca pauperiflora</i>	Tree or shrub to 7 m
<i>Olearia muelleri</i>	Shrub to 1 m
<i>Santalum acuminatum</i>	Tree or shrub to 7 m
<i>Scaevola spinescens</i>	Shrub to 2 m
<i>Senna artemisioides</i>	Shrub to 2 m
<i>Thryptomene kochii</i>	Shrub to 2 m

# Appendix E – Fauna data

Fauna species list

Fauna likelihood of occurrence assessment guidelines

Fauna likelihood of occurrence assessment

Black Cockatoo habitat trees at Ghooli



## Species recorded in Ghooli and Dedari

Family	Scientific Name	Common Name	Listing	Recorded - Ghooli	Recorded - Dedari
<b>Birds</b>					
Acanthizidae	<i>Acanthiza apicalis</i>	Inland Thornbill		4	4
Acanthizidae	<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill			12
Acanthizidae	<i>Sericornis frontalis</i>	White-browed Scrubwren		2	4
Acanthizidae	<i>Smicrornis brevirostris</i>	Weebill			10
Acanthizidae	<i>Pyrholaemus brunneus</i>	Redthroat			8
Artamidae	<i>Cracticus nigrogularis</i>	Pied Butcherbird		1	1
Artamidae	<i>Cracticus tibicen</i>	Australian Magpie		4	2
Artamidae	<i>Cracticus torquatus</i>	Grey Butcherbird		1	1
Artamidae	<i>Strepera versicolor</i>	Grey Currawong		8	1
Cacatuidae	<i>Calyptorhynchus banksii samueli</i>	Red-tailed Black-Cockatoo		6	calling
Cacatuidae	<i>Eolophus roseicapillus</i>	Galah		6	2
Cacatuidae	<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo		4	evidence
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		1	
Casuariidae	<i>Dromaius novaehollandiae</i>	Emu			2
Columbidae	<i>Ocyphaps lophotes</i>	Crested Pigeon		6	16
Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing		1	1
Columbidae	<i>Streptopelia senegalensis</i>	Laughing Dove	int	1	
Corvidae	<i>Corvus coronoides</i>	Australian Raven		4	2
Cuculidae	<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo			1
Falconidae	<i>Falco berigora</i>	Brown Falcon		1	1
Falconidae	<i>Falco cenchroides</i>	Nankeen Kestrel		1	
Hirundinidae	<i>Petrochelidon nigricans</i>	Tree Martin		4	
Meliphagidae	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater		8	2
Meliphagidae	<i>Anthochaera carunculata</i>	Red Wattlebird		2	
Meliphagidae	<i>Anthochaera lunulata</i>	Western Wattlebird		1	
Meliphagidae	<i>Lichenostomus cratitius</i>	Purple-gaped Honeyeater		8	
Meliphagidae	<i>Lichenostomus leucotis</i>	White-eared Honeyeater			2
Meliphagidae	<i>Lichenostomus virescens</i>	Singing Honeyeater			1
Meliphagidae	<i>Lichmera indistincta</i>	Brown Honeyeater		6	2
Meliphagidae	<i>Manorina flavigula</i>	Yellow-throated Miner		6	6
Meliphagidae	<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater		10	2
Meliphagidae	<i>Purnella albifrons</i>	White-fronted Honeyeater		4	1
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark		2	2
Monarchidae	<i>Myiagra inquieta</i>	Restless Flycatcher		1	
Otididae	<i>Ardeotis australis</i>	Australian Bustard		1	
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-thrush		1	1
Pachycephalidae	<i>Oreoica gutturalis</i>	Crested Bellbird			1
Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden Whistler		1	1
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler			1
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote		4	2

Family	Scientific Name	Common Name	Listing	Recorded - Ghooli	Recorded - Dedari
Petroicidae	<i>Drymodes brunneopygia</i>	Southern Scrub-robin		1	1
Petroicidae	<i>Microeca fascinans</i>	Jacky Winter		1	1
Petroicidae	<i>Petroica goodenovii</i>	Red-capped Robin		2	
Podargidae	<i>Podargus strigoides</i>	Tawny Frogmouth		1	
Pomatostomidae	<i>Pomatostomus superciliosus</i>	White-browed Babbler		2	4
Psittacidae	<i>Barnardius zonarius</i>	Australian Ringneck		2	2
Psittacidae	<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet		4	
Rallidae	<i>Tribonyx ventralis</i>	Black-tailed Native-hen			1
Rhipiduridae	<i>Rhipidura leucophrys</i>	Willie Wagtail		1	1
<b>Reptiles</b>					
Scincidae	<i>Liopholis inornata?</i>	Desert Skink (suspected)			burrows
Scincidae	<i>Menetia greyii</i>	Common Dwarf Skink		1	1
Gekkonidae	<i>Gehyra variegata</i>	Tree Dtella			1
Carphodactylidae	<i>Underwoodisaurus milii</i>	Thick-tailed Gecko			1
Scincidae	<i>Tiliqua rugosa</i>	Shingleback		2	
Varanidae	<i>Varanus gouldii</i>	Sand Goanna			1
<b>Mammals</b>					
Canidae	<i>Canis lupus</i>	Dingo, Domestic Dog	int	prints	prints
Canidae	<i>Vulpes vulpes</i>	Fox	int		prints
Felidae	<i>Felis catus</i>	Feral Cat	int	prints	prints
Leporidae	<i>Oryctolagus cuniculus</i>	Rabbit	int	droppings	droppings
Macropodidae	<i>Macropus fuliginosus</i>	Western Grey Kangaroo		droppings	2
Muridae	<i>Mus musculus</i>	House Mouse	int	1	1

Key; int – Introduced Species

## Fauna likelihood of occurrence assessment

Species	Status		Desktop Search Ghooli			Desktop Search Dedari			Ecology and habitat	Likelihood of occurrence - Ghooli	Likelihood of occurrence - Dedari
	WC Act	EPBC	NM	PaW	PMST	NM	PaW	PMST			
Birds											
Carnaby's Black Cockatoo ( <i>Calyptorhynchus latirostris</i> )	EN	EN		X			X		This species mainly occurs in uncleared or remnant native eucalypt woodlands and in shrubland or kwongan heathland dominated by <i>Hakea</i> , <i>Dryandra</i> , <i>Banksia</i> and <i>Grevillea</i> species. The species also occurs in forests containing Marri ( <i>Corymbia calophylla</i> ), Jarrah ( <i>Eucalyptus marginata</i> ) or Karri ( <i>E. diversicolor</i> ). Breeding usually occurs in the Wheatbelt region of Western Australia, with flocks moving to the higher rainfall coastal areas to forage after the breeding season. Feeds on the seeds of a variety of native plants, including <i>Allocasuarina</i> , <i>Banksia</i> , <i>Dryandra</i> , <i>Eucalyptus</i> , <i>Grevillea</i> and <i>Hakea</i> , and some introduced plants (DSEWPaC 2012).	<b>Unlikely – irregular visitor</b> <u>Habitat:</u> Potential breeding trees are present and limited foraging habitat present <u>Records:</u> Scattered throughout northern Wheatbelt however no records from the Survey area which is also outside of the mapped distributional range.	<b>Unlikely – irregular visitor</b> <u>Habitat:</u> Potential breeding trees are present and limited foraging habitat present <u>Records:</u> Scattered throughout northern Wheatbelt however no records from the Survey area which is also outside of the mapped distributional range.
Australian Peregrine Falcon ( <i>Falco peregrinus</i> subsp. <i>macropus</i> )	OS		X						The Peregrine Falcon is seen occasionally anywhere in the south-west of Western Australia. It is found everywhere from woodlands to open grasslands and coastal cliffs - though less frequently in desert regions. The species nests primarily on ledges of cliffs, shallow tree hollows, and ledges of building in cities (Morcombe 2004).	<b>Likely– vagrant</b> <u>Habitat:</u> Potential breeding in large hollows observed and habitat used for aerial hunting /foraging <u>Records:</u> Scattered records in the region and 1 records within 10 km	<b>Unlikely– vagrant, opportunistic use</b> <u>Habitat:</u> The species may opportunistically utilise the terrestrial habitats for foraging as the species is an aerial hunter which preys upon other birds. No large hollows for breeding. <u>Records:</u> Scattered records in the region and no records within 10 km



Species	Status		Desktop Search Ghooli			Desktop Search Dedari			Ecology and habitat	Likelihood of occurrence - Ghooli	Likelihood of occurrence - Dedari
	WC Act	EPBC	NM	PaW	PMST	NM	PaW	PMST			
Malleefowl ( <i>Leipoa ocellata</i> )	VU	VU	X		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 Western Australia). The Malleefowl is associated with long unburnt thick vegetation and occupies shrublands and low woodlands that are dominated by mallee vegetation, as well as native pine <i>Callitris</i> woodlands, <i>Acacia</i> shrublands, Broombush ( <i>Melaleuca uncinata</i> ) vegetation or coastal heathlands. The nest is a conspicuous large mound of sand or soil and organic matter (Jones and Goth 2008; Morcombe 2004).	<b>Unlikely – irregular visitor</b> <u>Habitat:</u> A small amount of Mallee/ shrubland vegetation present, however the patches are small, regularly disturbed and fragmented. Suitable substrate to build nesting mound present, however no mounds were observed during the field survey. <u>Records:</u> No records within the survey area with 7 records within the greater study site (40 km)	<b>Likely – regular visitor</b> <u>Habitat:</u> Mallee/shrubland vegetation for foraging and dispersal. Which adjoins much larger contiguous expanses of habitat. Suitable substrate to build nesting mound present, however no mounds were observed during the field survey. <u>Records:</u> One record is present and within 2 km of the survey area with 11 records within the greater study site (40 km)
Night Parrot ( <i>Pezoporus occidentalis</i> )	CR	EN			X			X	The Night Parrot inhabits arid and semi-arid areas that are characterised by having dense, low vegetation. Based on accepted records, the habitat of the Night Parrot consists of <i>Triodia</i> grasslands in stony or sandy environments and of samphire and chenopod shrublands, on floodplains and claypans, and on the margins of saltlakes, creeks or other sources of water. The distribution of the Night Parrot is very poorly understood (DEE 2017).	<b>Highly unlikely</b> <u>Habitat:</u> No suitable habitat <u>Records:</u> None in the region	<b>Highly unlikely</b> <u>Habitat:</u> No suitable habitat <u>Records:</u> None in the region
Mammals											

Species	Status		Desktop Search Ghooli			Desktop Search Dedari			Ecology and habitat	Likelihood of occurrence - Ghooli	Likelihood of occurrence - Dedari
	WC Act	EPBC	NM	PaW	PMST	NM	PaW	PMST			
Chuditch ( <i>Dasyurus geoffroii</i> )	VU	VU	X		X			X	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. Occasional records are obtained from the Wheatbelt and goldfields where it persists in very low numbers (DEE 2016).	<b>Unlikely – limited habitat</b> <u>Habitat:</u> The habitat in the survey area is patchy and surrounded by agriculture. <u>Records:</u> 2 x records in the study site (with 10 km) and scattered records in the region. Both records are from the 1990's with no recent records available.	<b>Likely – irregular visitor</b> <u>Habitat:</u> The survey area and regional remnant vegetation would provide habitat for this species. Species may also utilise hollow logs and rubbish piles within the project area for diurnal resting. <u>Records:</u> No records in the study site (10 km) and scattered records in the region, however the survey area is part of contiguous habitat.
Numbat ( <i>Myrmecobius fasciatus</i> )	EN	VU	X						The Numbat was originally widespread across southern semi-arid and arid Australia, however there are currently only two remnant native populations at Dryandra and Perup, WA and several reintroduced populations including Boyagin, Karroun Hill and Tutanning Nature Reserve, Batalling block (Van Dyck <i>et al</i> 2013). More recently the species has been released (re introduced) to Mt Gibson Station.	<b>Unlikely</b> The species currently known range is restricted to isolated populations that do not occur in proximity	<b>Unlikely</b> The species currently known range is restricted to isolated populations that do not occur in proximity
Migratory birds											
Grey Wagtail ( <i>Motacilla cinerea</i> )	IA	MIT			X			X	Non-breeding habitat only: has a strong association with water, particularly rocky substrates along water courses but also lakes and marshes (Commonwealth of Australia 2015). Rare visitor to WA. Mainly banks and rocks in fat-running freshwater habitats: rivers, creeks, streams, and around waterfalls, both in forest and open country; but occurs almost anywhere during migration (Johnstone and Storr 2004).	<b>Unlikely – migrant</b> <u>Habitat:</u> Some foraging and refuge habitat (during migration period) within project area, however no breeding habitat. <u>Records:</u> No records within the study site or within 50 km.	<b>Unlikely – migrant</b> <u>Habitat:</u> Some foraging and refuge habitat (during migration period) within project area, however no breeding habitat. <u>Records:</u> No records within the study site or within 50 km.

Species	Status		Desktop Search Ghooli			Desktop Search Dedari			Ecology and habitat	Likelihood of occurrence - Ghooli	Likelihood of occurrence - Dedari
	WC Act	EPBC	NM	PaW	PMST	NM	PaW	PMST			
Curlew Sandpiper ( <i>Calidris ferruginea</i> )	Vu, IA	Cr, MiW			X			X	Curlew Sandpipers mainly occur in areas with soft mud conditions, including intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are found inland less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. In WA, they are widespread around coastal and subcoastal plains from Cape Arid to south-west Kimberley Division, but are more sparsely distributed between Carnarvon and Dampier Archipelago (DEE 2017).	<b>Unlikely – migrant, opportunistic use</b> <u>Habitat:</u> No foraging habitat (during migration period) within survey area. <u>Records:</u> No records within the study site or within 50 km.	<b>Unlikely – migrant, opportunistic use</b> <u>Habitat:</u> No foraging habitat (during migration period) within survey area. <u>Records:</u> No records within the study site or within 50 km.
Pectoral Sandpiper ( <i>Calidris melanotos</i> )	IA	MiW			X			X	In Australia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species will utilise coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum (DEE 2017). The bird can be seen in the South West Coastal Plain but is rare to scarce on Lake on any freshwater wetlands with shallow, well-grassed margins. They are seen at Lake Warden, Esperance, and at Lake McLarty (Nevill 2013).	<b>Unlikely – migrant, opportunistic use</b> <u>Habitat:</u> No foraging habitat (during migration period) within survey area. <u>Records:</u> No records within the study site or within 50 km.	<b>Unlikely – migrant, opportunistic use</b> <u>Habitat:</u> No foraging habitat (during migration period) within survey area. <u>Records:</u> No records within the study site or within 50 km.



Species	Status		Desktop Search Ghooli			Desktop Search Dedari			Ecology and habitat	Likelihood of occurrence - Ghooli	Likelihood of occurrence - Dedari
	WC Act	EPBC	NM	PaW	PMST	NM	PaW	PMST			
Sharp-tailed Sandpiper ( <i>Calidris acuminata</i> )			X					X	<p>In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, salt pans and hypersaline salt lakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgeland and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. Sometimes they occur on rocky shores. They are widespread from Cape Arid to Carnarvon, around coastal and subcoastal plains of Pilbara Region to south-west and east Kimberley Division. Inland records indicate the species is widespread and scattered from Newman, east to Lake Cohen, south to Boulder and west to Meekatharra (DEE 2017).</p>	<p><b>Unlikely – migrant, opportunistic use</b>  <u>Habitat:</u> No foraging habitat (during migration period) within survey area.  <u>Records:</u> No records within the study site or within 50 km.</p>	<p><b>Unlikely – migrant, opportunistic use</b>  <u>Habitat:</u> No foraging habitat (during migration period) within survey area.  <u>Records:</u> No records within the study site or within 50 km.</p>
Common Sandpiper ( <i>Actitis hypoleucos</i> )	IA	MiW			X			X	<p>The Common Sandpiper is found along all coastlines of Australia and uses a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around open narrow and steep muddy margins or rocky shores. The species has been recorded in estuaries and deltas of streams, as well as on banks further upstream; around lakes, pools, mangroves, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. It is often found near mangroves, and sometimes in areas of mud littered with rocks or snags. Found along all coastlines of Australia and in many areas inland, the Common Sandpiper is widespread in small numbers. The population when in Australia is concentrated in northern and western Australia (DEE 2017).</p>	<p><b>Unlikely – migrant, opportunistic use</b>  <u>Habitat:</u> No foraging habitat (during migration period) within survey area.  <u>Records:</u> No records within the study site or within 50 km.</p>	<p><b>Unlikely – migrant, opportunistic use</b>  <u>Habitat:</u> No foraging habitat (during migration period) within survey area.  <u>Records:</u> No records within the study site or within 50 km.</p>

Species	Status		Desktop Search Ghooli			Desktop Search Dedari			Ecology and habitat	Likelihood of occurrence - Ghooli	Likelihood of occurrence - Dedari
	WC Act	EPBC	NM	PaW	PMST	NM	PaW	PMST			
Fork-tailed swift ( <i>Apus pacificus</i> )	IA	Mi, Ma			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 Cocklebidy 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 out to sea as well as from offshore islands especially when on passage from Indonesia. This species is almost exclusively aerial (DEE 2017).	<b>Unlikely – vagrant, rarely seen, opportunistic use</b> <u>Habitat:</u> Some foraging habitat (during migration period) within project area, however no breeding habitat. <u>Records:</u> No records within the study site or within 50 km.	<b>Unlikely – vagrant, rarely seen, opportunistic use</b> <u>Habitat:</u> Some foraging habitat (during migration period) within project area, however no breeding habitat. <u>Records:</u> No records within the study site or within 50 km.
Rainbow Bee-eater ( <i>Merops ornatus</i> )	IA	MI				X			The Rainbow Bee-eater occurs mainly in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation. It also inhabits sand dune systems in coastal areas and at inland sites that are in close proximity to permanent water (Morcombe 2004). The movement patterns of the Rainbow Bee-eater are complex, and are not fully understood. Populations that breed in southern Australia are migratory. After breeding, they move north and remain there for the duration of the Australian winter.	<b>Likely – opportunistic, migrant</b> <u>Habitat:</u> Suitable habitat for foraging and dispersal within project area. Limited areas of breeding habitat. <u>Records:</u> Numerous records throughout the Wheatbelt region. 11 records within in region (40 km)	<b>Likely – opportunistic, migrant</b> <u>Habitat:</u> Suitable habitat for foraging and dispersal within project area. Some areas of breeding habitat. <u>Records:</u> Numerous records throughout the Wheatbelt region. 12 records within in study site (40 km)
Invertebrates											

Species	Status		Desktop Search Ghooli			Desktop Search Dedari			Ecology and habitat	Likelihood of occurrence - Ghooli	Likelihood of occurrence - Dedari
	WC Act	EPBC	NM	PaW	PMST	NM	PaW	PMST			
Tree-stem Trapdoor Spider ( <i>Aganippe castellum</i> )	P4		X						The Tree-Stem Trapdoor Spider inhabits flood-prone depressions and flats which support myrtaceous shrub communities. In particular, those areas supporting Broombush and Sheoaks (such as <i>Allocasuarina acutivalvis</i> ) in sandy loam soils (ACC 2007). Until recently, the spider was known only from populations distributed across the north-eastern Wheatbelt from south of Mullewa and Dowerin to east of Tammin and Southern Cross. However, new populations have now been recorded in the Yilgarn region on the Mt Jackson, Windarling and Koolyanobbing ranges (Jarvie-Eggart 2015).	<b>Unlikely</b> <u>Habitat:</u> Some habitat is present in the survey area, however much of the area has been previously cleared. <u>Records:</u> No records within the study site, one recorded is within 6 km.	<b>Highly Unlikely</b> <u>Habitat:</u> Some habitat is present in the survey area, however much of the area has been previously disturbed. <u>Records:</u> No records within the study site or within 50 km.

Refer to Appendix B for conservation code descriptions

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## Black Cockatoo Habitat trees identified during the field survey at Ghooli

Point	Type	DBH	Hollows	Easting	Northing
1	Salmon Gum	500		733808	6539757
2	Salmon Gum	300		733817	6539747
3	Salmon Gum	400		733815	6539755
4	Salmon Gum	400		733809	6539762
5	Salmon Gum	300		733802	6539767
6	Salmon Gum	400		733800	6539790
7	Salmon Gum	450		733831	6539766
8	Salmon Gum	300		733835	6539764
9	Salmon Gum	500		733842	6539763
10	Salmon Gum	300		733855	6539758
11	Salmon Gum	600		733849	6539744
12	Salmon Gum	450		733826	6539751
13	Salmon Gum	550		733876	6539735
14	Salmon Gum	400		733880	6539743
15	Salmon Gum	700		733877	6539748
16	Salmon Gum	500		733879	6539760
17	Salmon Gum	300		733885	6539759
18	Salmon Gum	450		733887	6539759
19	Salmon Gum	600		733900	6539771
20	Salmon Gum	550		733918	6539765
21	Salmon Gum	350		733910	6539761
22	Salmon Gum	350		733912	6539754
23	Salmon Gum	350		733912	6539751
24	Salmon Gum	550		733915	6539751
25	Salmon Gum	450		733918	6539748
26	Salmon Gum	400		733945	6539747
27	Salmon Gum	350		733952	6539742
28	Salmon Gum	400		733744	6539684
29	Salmon Gum	700		733582	6539733
30	Salmon Gum	500		733432	6539779
31	Salmon Gum	500		733446	6539759
32	Salmon Gum	300		733457	6539771
33	Salmon Gum	300		733435	6539744
34	Salmon Gum	300		733414	6539764
35	Salmon Gum	500		733404	6539774
36	Salmon Gum	450		733418	6539780
37	Salmon Gum	400		733352	6539798
38	Salmon Gum	350		733342	6539777
39	Salmon Gum	600	3 small hollows	733339	6539775
40	Salmon Gum	800	2 small hollows	733337	6539750
41	Salmon Gum	550		733340	6539748
42	Salmon Gum	750	3 small hollows	733364	6539717
43	Salmon Gum	300		733370	6539711
44	Salmon Gum	300		733369	6539711
45	Salmon Gum	450		733384	6539712
46	Salmon Gum	300		733385	6539724
47	Salmon Gum	300		733381	6539752
48	Salmon Gum	300		733382	6539767

Point	Type	DBH	Hollows	Easting	Northing
49	Salmon Gum	300		733386	6539767
50	Salmon Gum	600		733358	6539773
51	Salmon Gum	300		733356	6539776
52	Salmon Gum	500		733402	6539752
53	Salmon Gum	350		733395	6539737
54	Salmon Gum	400		733408	6539731
55	Salmon Gum	450		733420	6539723
56	Salmon Gum	300		733417	6539708
57	Salmon Gum	300		733418	6539710
58	Salmon Gum	350		733414	6539710
59	Salmon Gum	500		733415	6539703
60	Salmon Gum	300		733416	6539693
61	Salmon Gum	400		733420	6539683
62	Salmon Gum	300		733419	6539681
63	Salmon Gum	600	2 small hollows	733418	6539674
64	Salmon Gum	600		733450	6539666
65	Salmon Gum	600		733456	6539660
66	Salmon Gum	500		733452	6539654
67	Salmon Gum	650	2 medium hollows	733462	6539644
68	Salmon Gum	550		733469	6539656
69	Salmon Gum	500	1 medium hollows	733491	6539654
70	Salmon Gum	1200	1 large hollow in trunk chews present	733458	6539703
71	Salmon Gum	500		733428	6539701
72	Salmon Gum	400		733426	6539701
73	Salmon Gum	300		733434	6539721
74	Salmon Gum	500		733116	6539864
75	Salmon Gum	500	1 small hollow	733126	6539865
76	Salmon Gum	300		733122	6539864
77	Salmon Gum	300		733748	6539509
78	Salmon Gum	500	1 small hollow	733749	6539508
79	Salmon Gum	350		733744	6539518
80	Salmon Gum	500		733728	6539516
81	Salmon Gum	400		733720	6539517
82	Salmon Gum	350		733707	6539507
83	Salmon Gum	450		733698	6539513
84	Salmon Gum	300		733701	6539519
85	Salmon Gum	350		733679	6539524
86	Salmon Gum	400		733677	6539530
87	Salmon Gum	600		733659	6539531
88	Salmon Gum	350		733659	6539537
89	Salmon Gum	500	1 small hollows	733643	6539543
90	Salmon Gum	500	2 small hollows	733637	6539545
91	Salmon Gum	600		733634	6539585
92	Salmon Gum	300		733636	6539589
93	Salmon Gum	400		733640	6539600
94	Salmon Gum	500		733647	6539600
95	Salmon Gum	600	2 small hollows	733653	6539594
96	Salmon Gum	500		733665	6539619



Point	Type	DBH	Hollows	Easting	Northing
97	Salmon Gum	500		733665	6539622
98	Salmon Gum	650	numerous small and medium hollows	733669	6539640
99	Salmon Gum	300		733646	6539623
100	Salmon Gum	450		733640	6539613
101	Salmon Gum	400		733639	6539614
102	Salmon Gum	300		733643	6539633
103	Salmon Gum	600		733642	6539644
104	Salmon Gum	650	2 small hollows	733632	6539644
105	Salmon Gum	300		733626	6539635
106	Salmon Gum	600		733621	6539629
107	Salmon Gum	800		733612	6539653
108	Salmon Gum	300		733604	6539586
109	Salmon Gum	450		733590	6539579
110	Salmon Gum	400		733590	6539596
111	Salmon Gum	450	1 medium hollows	733563	6539579
112	Salmon Gum	750	2 small hollows	733561	6539584
113	Salmon Gum	700		733564	6539603
114	Salmon Gum	550		733537	6539594
115	Salmon Gum	350	1 small hollow	733543	6539600
116	Salmon Gum	650	numerous small and medium hollows	733519	6539623
117	Salmon Gum	450	2 small hollows	733568	6539613
118	Salmon Gum	300		733580	6539623
119	Salmon Gum	300		733579	6539627
120	Salmon Gum	350		733579	6539630
121	Salmon Gum	300		733565	6539626
122	Salmon Gum	450		733563	6539628
123	Salmon Gum	450		733567	6539637
124	Salmon Gum	350		733574	6539643
125	Salmon Gum	500		733574	6539651
126	Salmon Gum	550		733572	6539658
127	Salmon Gum	750	numerous medium hollows some chews	733576	6539671
128	Salmon Gum	600		733580	6539673
129	Salmon Gum	700	2 small hollows	733551	6539681
130	Salmon Gum	750	2 small hollows	733539	6539676
131	Salmon Gum	400		733442	6539620
132	Salmon Gum	300		733417	6539634
133	Salmon Gum	600		733393	6539639
134	Salmon Gum	300		733403	6539579
135	Salmon Gum	550		733403	6539560
136	Salmon Gum	700	3 small hollows	733396	6539537
137	Salmon Gum	700	1 large hollows some chews used	733434	6539551
138	Salmon Gum	700	1 large hollow some chews numerous small hollows	733434	6539507
139	Salmon Gum	700	1 large hollow some chews numerous small hollows	733346	6539524

Point	Type	DBH	Hollows	Easting	Northing
140	Salmon Gum	600		733348	6539503
141	Salmon Gum	300		733344	6539438
142	Salmon Gum	300		733386	6539455
143	Salmon Gum	300		733389	6539462
144	Salmon Gum	300		733394	6539473
145	Salmon Gum	300		733415	6539481
146	Salmon Gum	300		733403	6539435
147	Salmon Gum	300		733406	6539428
148	Salmon Gum	400		733397	6539397
149	Salmon Gum	450		733430	6539422
150	Salmon Gum	300		733435	6539397
151	Salmon Gum	600		733455	6539427
152	Salmon Gum	300		733472	6539416
153	Salmon Gum	500		733476	6539378
154	Salmon Gum	850		733500	6539387
155	Salmon Gum	400		733577	6539428
156	Salmon Gum	400		733569	6539456
157	Salmon Gum	400		733572	6539461
158	Salmon Gum	400		733600	6539465
159	Salmon Gum	400		733625	6539474
160	Salmon Gum	400		733637	6539483
161	Salmon Gum	300		733643	6539479
162	Salmon Gum	450		733652	6539479
163	Salmon Gum	400		733628	6539449
164	Salmon Gum	300		733626	6539448
165	Salmon Gum	450		733639	6539440
166	Salmon Gum	350		733706	6539478
167	Salmon Gum	500	1 small hollow	733685	6539465
168	Salmon Gum	450		733685	6539454
169	Salmon Gum	800		734173	6539517
170	Salmon Gum	450		734141	6539560
171	Salmon Gum	600		733853	6539599
172	Salmon Gum	500		733290	6539902
173	Stag	550	2 large hollows some chews	733318	6539894
174	Salmon Gum	450		733321	6539888
175	Salmon Gum	500		733263	6539919
176	Salmon Gum	400		733243	6539916
177	Salmon Gum	300		733230	6539924
178	Salmon Gum	400		733223	6539906
179	Salmon Gum	550		733190	6539915
180	Salmon Gum	550		733152	6539917
181	Salmon Gum	700		733139	6539918
182	Salmon Gum	600		733151	6539940

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