

**Lot 201 on Plan
409860**

**West Boundary
Road, Manjimup**

**Reconnaissance flora and vegetation and
targeted fauna survey report**



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Author (s): Bianca Theyer & Joanne Smith

Reviewer (s): C. Cramer, K. Bain & K. Kinnear

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Bio Diverse Solutions

29 Hercules Crescent

Albany WA 6330

08 9842 1575

www.biodiversesolutions.com.au

ABN 48 138 824 272

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TABLE OF CONTENTS

1.	Introduction, scope and background information.....	1
1.1.	Site location and Development Proposal	1
1.2.	Geology and soils.....	2
1.3.	Climate	3
1.4.	Existing Land use.....	3
1.5.	Habitat Connectivity	3
1.6.	Water.....	3
1.7.	Environmentally Sensitive Areas.....	4
2.	Flora and Vegetation Values	4
2.1.	Remnant Vegetation	4
2.2.	Survey Methods	4
2.3.	Threatened Flora.....	5
2.4.	Threatened Ecological Communities	6
2.5.	Survey Limitations and constraints	6
3.	Flora and vegetation survey outcomes.....	6
3.1.	Vegetation Classification.....	6
3.2.	Vegetation Condition.....	9
3.3.	Weeds and disturbance	10
3.4.	Threatened Flora.....	10
4.	Fauna	13
4.1.	Field Methodology.....	13
4.2.	Habitat Connectivity	13
4.3.	Potential Breeding, Foraging and Roosting Black Cockatoo Habitat	13
4.4.	Survey Limitations and Constraints.....	14
4.5.	Fauna / significant tree survey outcomes.....	14
5.	Summary	21
5.1.	Vegetation, Threatened and Priority Flora and Ecological Communities	21
5.2.	Fauna	21
6.	References	22
7.	Appendices.....	24

LIST OF TABLES

Table 1: Survey Limitations and constraints

Table 2: Condition Rating Scale (Keighery 1994)

Table 3: Weed species recorded from the subject site

Table 4: Potential threatened flora located within 10km of the subject site

Table 5: Survey Limitations and constraints

Table 6: Significant trees (>500mm DBH) containing hollows or with hollow bearing potential identified within the subject site

LIST OF FIGURES

Figure 1: Subject Site Locality

Figure 2: Photographs of existing remnant vegetation within the subject site

Figure 3: Vegetation Values Mapping

Figure 4: Significant Trees and Hollows observed within the subject site

Figure 5: Significant Trees

1. Introduction, scope and background information

Peter Johnson and Kathy Youkoff (“the client”) commissioned Bio Diverse Solutions as Environmental Consultants to undertake a reconnaissance flora and vegetation and targeted fauna survey within Lot 201 on Plan 409860, West Boundary Road, Manjimup. The scope of works included:

- Desktop assessment including all publicly available database searches and utilising preliminary advice from DWER;
- A reconnaissance flora survey across the subject site using traverse and quadrat sampling methods in vegetation types present, and mapping the boundaries of vegetation types;
- A targeted fauna survey across the subject site through low intensity sampling reconnaissance traverse-based survey to identify any significant (>500mm DBH) trees with hollows suitable for black cockatoos;
- GIS mapping of vegetation communities (including quadrat locations), vegetation condition mapping according to the Keighery condition rating scale (Keighery 1994, Table 2), mapping of fauna survey traverses, and GPS location of significant fauna observations;
- Preparation of reconnaissance flora and vegetation and targeted fauna report, which will be aligned with the appropriate government agency legislation and guidelines.

Reconnaissance flora assessment was undertaken by Botanist Joanne Smith on the 27th of November 2019. Targeted fauna assessment was undertaken by Wildlife Ecologist Dr. Karlene Bain and Conservation and Wildlife Biologist Bianca Theyer (Bio Diverse Solutions) on the 9th of December 2019.

1.1. Site location and Development Proposal

The “subject site” is defined as the 18.70ha (revised from the original 20.20ha) area within Lot 201 on Plan 409860, West Boundary Road, Manjimup WA. This proposal area has been reduced in size to protect the drainage line (Manjimup Brook) that runs through the property. The subject site is located approximately 2 km north west of the town site of Manjimup (refer to Figure 1) and lies within a semi-rural and agricultural landscape. A small nature reserve; Faunadale Nature Reserve is immediately to the west (Rumenos, 2014). The client is proposing to clear 18.70ha of native vegetation within Lot 201 for the purpose of cropping / horticulture.



Figure 1: Subject Site Locality

1.2. Geology and soils

Database searches using the NRInfo Portal (Department of Primary Industries and Regional Development (DPIRD), 2018) shows the subject site lies within the Manjimup Plateau System (254Mp). The system is described as “*Lateritic plateau, in the north-west of the Warren-Denmark Southland. Sandy gravel, loamy gravel, non-saline wet soil and deep sand. Jarrah-marri forest and woodland.*” (DPIRD, 2018). The Warren-Denmark Southland Zone (254) is described as having “*Rises in a series of broad benches from the Southern Ocean north to the Blackwood Valley. Deeply weathered granite and gneiss overlain by Tertiary and Quaternary sediments in the south. Swampy in places.*” (DPIRD, 2018).

The preliminary assessment report (DWER, 2019) provided by the client states the application area intersects two soil map units:

- Yanmah Subsystem (Manjimup), described as shallow (5-20 m) minor valleys, usually U-shaped with gentle sideslopes (3-10%) and broad swampy floors. Soils are loamy gravels, sandy gravels and deep sands with non-saline wet soils on the valley floors (Schoknecht et al., 2004); and
- Corbalup Subsystem (Manjimup), described as gently undulating rises over sedimentary deposits, relief 5-15 m, slopes 1-5%. Soils are loamy gravels and sandy gravels (Schoknecht et al., 2004).

1.3. Climate

The closest Bureau of Meteorology (BoM) site is Manjimup. The average annual temperature in Manjimup ranges from 9.7 – 20.4°C. The average summer temperature ranges between 11.7-27.2°C, whilst average winter temperatures range between 6.4-15.4°C. The annual mean rainfall for Manjimup is 990.0mm (BOM, 2019).

1.4. Existing Land use

The subject site has previously been logged (*pers comms* P. Johnson 2019) and lies within a semi-rural and agricultural landscape, with horticultural lands to the north, south east and west. The subject site itself is currently not utilised and contains remnant native vegetation. Refer to Figure 2 below for photographs of remnant native vegetation throughout the subject site.



Figure 2: Photographs of existing remnant vegetation within the subject site

1.5. Habitat Connectivity

The *South West Regional Ecological Linkages* is a regional scale spatial modelling of ecological linkages to help achieve long-term biodiversity management outcomes (Molloy & Deeley 2013). The subject site is classified as 2c and lies less than 500m from a natural area selected in 2b (Faunadale Nature Reserve) as outlined with the *South West Regional Ecological Linkages* project (WALGA, 2019a).

At a local level the remnant vegetation within the subject site provides a corridor to the adjacent Faunadale Nature Reserve to the west as well as to remnant vegetation in the adjacent lot to the south. Although there are no other direct connections to other surrounding vegetation the subject site acts as a stepping stone throughout the area.

1.6. Water

The subject site lies within an unassigned Public Drinking Water Source Area (WALGA, 2018b). The subject site intersects the Manjimup Brook which flows to the north and then west for a total distance of approximately seven kilometres to where it enters the Donnelly River (DWER, 2019).

1.7. Environmentally Sensitive Areas

The subject site does not lie within an Environmentally Sensitive Area (WALGA, 2018c).

2. Flora and Vegetation Values

2.1. Remnant Vegetation

The subject site lies within the Jarrah Forest (Southern Jarrah Forest JAF02 subregion) IBRA region. Hearn et al. (2002) describes the Western Mallee IBRA region as “*Duricrusted plateau of Yilgarn Craton characterised by Jarrah-Marri forest on laterite gravels and, in the eastern part, by Wandoo - Marri woodlands on clayey soils. Eluvial and alluvial deposits support Agonis shrublands. In areas of Mesozoic sediments, Jarrah forests occur in a mosaic with a variety of species-rich shrublands.*”

The vegetation has been mapped on a broad scale by J.S. Beard (Shepherd et al. 2002) in the 1970's, where a system was devised for state-wide mapping and vegetation classification based on geographic, geological, soil, climate structure, life form and vegetation characteristics (Sandiford and Barrett, 2010). Vegetation units were regarded as associations and were grouped into Vegetation Systems representing a particular pattern of association distribution within a given area. A GIS search of J.S. Beards (Beard et al. 2013) vegetation classification places the subject site within one System and Vegetation Association (Source Pre-European dataset, DPIRD-006):

- **System Association Name:** Bridgetown
- **Vegetation Association Number:** 3
- **Floristic Description:** Mainly jarrah and marri *Eucalyptus marginata*, *Corymbia calophylla*.
- **Remnant Vegetation by Beard Association Rarity in LGA:** >40% remaining (WALGA, 2018d).
- **Remnant Vegetation by Beard Association Rarity in IBRA Region:** >40% remaining (WALGA, 2018e).

2.2. Survey Methods

Desktop inventory of potential threatened flora species likely to occur within 10km of the subject site was undertaken using the following databases:

- Preliminary advice provided by the client from DWER;
- Nature Map Database Search (combined data from DBCA, WA Museum and WA Herbarium);
- Protected matters search tool (DoEE 2019a); and
- WA Herbarium records accessed through Flora Base (Western Australian Herbarium, DBCA).

The full species list compiled from all available data (Appendix B) is based on observations from a broader area than the subject site and is likely to include species that would not occur in the actual subject site due to a lack of suitable habitat. The data also includes very old records and in some cases the species in question may have become locally or regionally extinct.

The conservation significance of flora species has been assessed using data from the following sources:

- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Administered by the Australian Government Department of the Environment and Energy (DoEE);
- Biodiversity Conservation Act 2016 (BC Act). Administered by the Western Australian Department of Biodiversity Conservation and Attractions (DBCA); and
- DBCA Priority Flora list. A non-legislative list maintained by DBCA for management purposes.

Bio Diverse Solutions undertook flora and vegetation survey on the 27th of November 2019. Five traverse surveys were conducted across the three identified vegetation complexes to identify habitat for the target threatened species and gather information on vegetation structure and condition. Habitat suitability for species of threatened/priority flora that have been recorded in the Manjimup area were assessed as part of the survey. The survey area covered from 10m either side of the traverse line (refer Figure 3). The traverse survey included opportunistic sampling with the majority of these being from spring

flowering species. Old tracks were surveyed for *Thysanotus unicusensis*. Quadrat locations were selected in areas that were considered best condition and potential habitat for the target species. Four 10m x 10m quadrats were surveyed; one in each vegetation complexes for Corbalup (Site 1) and Collis1 (Site 3) due to the small hectares of both these and two quadrats were surveyed in Yanmah1; one west of Manjimup Brook (Site 2) and one on the east side (Site 4). Refer to Figure 3. Quadrats were marked out in a N-S/E-W orientation using a compass bearing, defined using a stringline and corners secured. The NW corner of each quadrat was plotted with a GPS.

Information collected:

- GPS location (UTM)
- Mattiske Vegetation Complex
- Plant community description
- Vegetation condition – Keighery Scale
- Local site topography
- Aspect
- Soil type
- Exposed rock/outcropping
- Drainage
- Litter depth
- Percentage of bare ground at each site

Two photos were taken at each site; NW corner facing SE and SE corner facing NW (Refer to Appendix A). Species were recorded for each site and samples collected for later verification if required. Species that did not have enough diagnostic features for identification were not listed nor collected (Appendix A).

The survey was carried out following the EPA Guidance Statement 51: *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA 2016).

2.3. Threatened Flora

As a result of the above-mentioned database searches three Threatened and eleven Priority species were identified as potentially being present within the subject site.

Caladenia harringtoniae (T), *Caladenia christineae* (T), *Thysanotus unicusensis* (P3) *Hemigenia microphylla* (P3), and *Caladenia longicauda ssp. Extrema* (P1) have been targeted for this survey. Habitat for these species may be present within at least two of the vegetation complexes (CO1, YN1 or CL1) and have a medium to high likelihood of being present within the subject site. Populations for these species have previously been recorded elsewhere in these vegetation complexes.

The remaining nine species listed had a low to medium likelihood of being present within the subject site based on known distributions and habitat preferences and therefore were not directly targeted during the survey. Although not directly targeted habitat suitability for the below species was assessed during the survey. In the event suitable habitat was identified these areas were surveyed for the relevant species.

- *Drosera occidentalis*, *Calytrix pulchella*, *Chamelaucium* sp. Mt. Frankland (A.S George117), *Caladenia erythrochila*, *Stylidium roseonatum* and *Diuris drummondii* as they are unlikely to be present due to lack of suitable habitat within the subject site. Populations of these species have not been recorded in YN1, CO or CL1.
- *Deyeuxia inaequalis* flowering time is December and therefore diagnostic features are unlikely to be present currently. Records of this species are in a variety of Mattiske vegetation complexes. Of the 7 records of this species in the Manjimup area none of these occur in CL1, YN1 or CO1.
- *Lepyrodia heleocharoides*, and *Tetraria* sp. Blackwood (AR Annels 3043) prefer peaty sand, seasonally inundated heath or woodland swamps and creeks / river banks. Given the implemented buffer to the creek line suitable habitat is unlikely to be present within the subject site.

- The Herbarium record for *Chamelaucium* sp. Mt. Frankland (A.S George117) is located at DBCA Warren Region Office. This species is restricted to granite outcropping in the Walpole area.

2.4. Threatened Ecological Communities

Database results indicate that no threatened ecological communities are present on the subject site.

2.5. Survey Limitations and constraints

Two survey limitations were encountered during this survey (timing and access restrictions), however they are not considered to be a significant limiting factor for this survey. See below for details.

Table 1: Survey Limitations and constraints

Limitation	Comment
Survey timing	<i>Caladenia christineae</i> optimum flowering time is Sept. to early Nov. and <i>Caladenia harringtoniae</i> optimum flowering time is early Oct. to mid-Nov. No Orchid species were found during the survey. <i>Deyeuxia inaequalis</i> flowering time is December, however no Poaceae species that could be <i>D. inaequalis</i> were sighted.
Access restrictions	Access by vehicle around the boundary of the property was limited to west of the Manjimup Brook. Access to areas was by foot where Blackberry thickets limited navigation along and near the creek-lines east of Manjimup Brook.
Availability of contextual information	Property location details, owner contact details, maps, 2014 survey report, NatureMap flora report 2014 and NatureMap Flora and Threatened Flora report 2019 provided.
Survey effort and extent	68 species were identified. Some species observed during the traverse survey and listed in the 2014 survey were recorded and additional spring flowering species.
Disturbances that may affect results	No disturbances.
Identification issues	98% of species collected/observed were able to be identified. Plants that did not have adequate diagnostic features were not recorded.
Skill and knowledge of surveyor	The surveyor has had extensive experience over the past 17years both as a member of the Northcliffe Wildflower Society for 5yrs and 13yrs as the Flora Officer for DBCA, Warren Region, Donnelly District (Retired).

3. Flora and vegetation survey outcomes

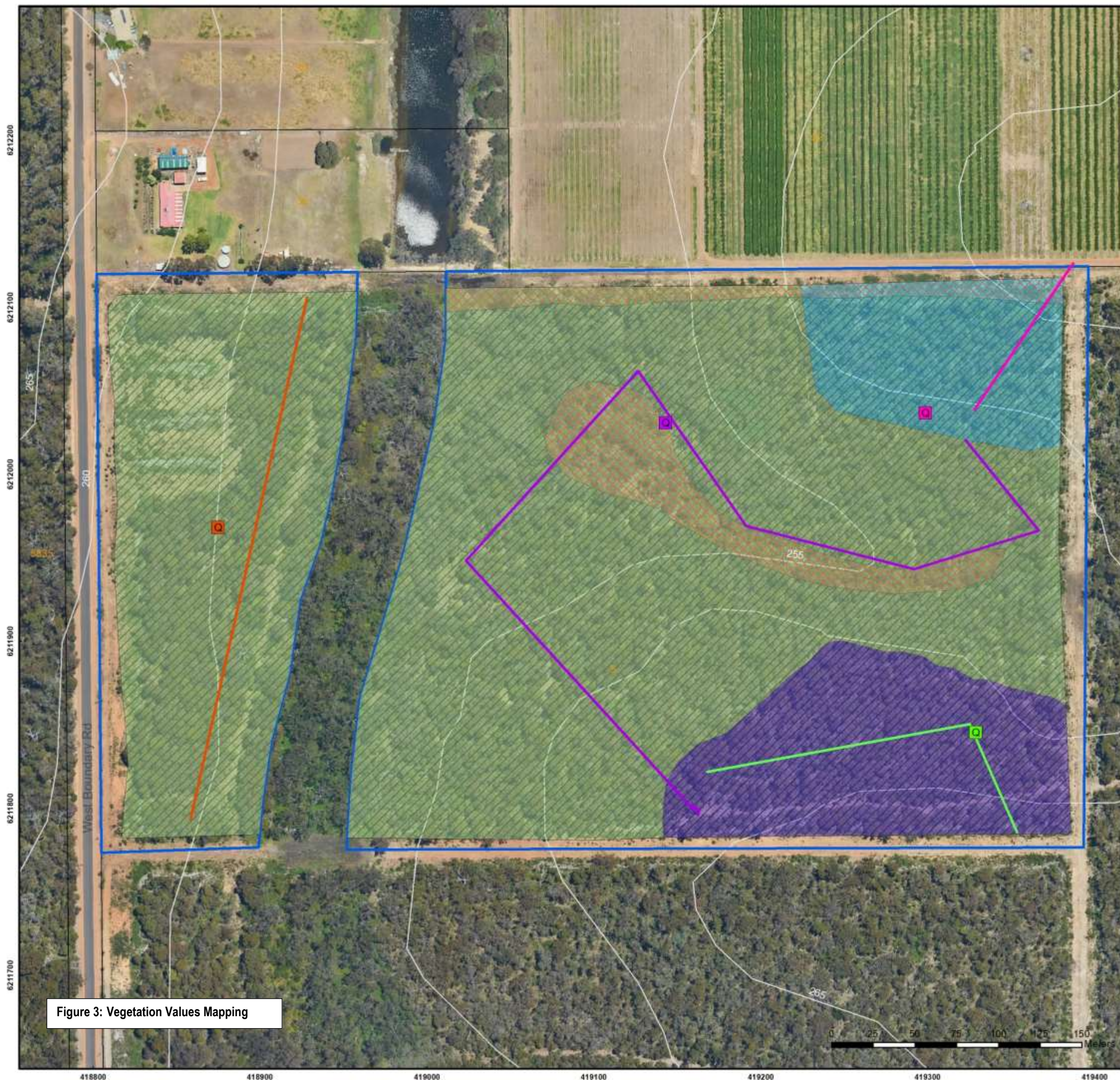
During the survey 68 species, consisting of 31 families and 56 genera were found. The most commonly occurring family was Fabaceae. The list includes 60 native species (Refer to Appendix A) and 8 introduced / alien species. No threatened or priority species were identified during the survey period. The vegetation complexes identified across the subject site are described in Section 3.1. Refer to Figure 3 for vegetation mapping, and Appendix A for full species list and quadrat specific data.

3.1. Vegetation Classification

The property contains three vegetation complexes as per Havel and Mattiske, 2000;

- YN1 Yanmah. (~13.4ha) Tall open forest of *Corymbia calophylla* (marri) and *Eucalyptus marginata* (jarrah) over *Banksia grandis* and *Xanthorrhoea preissii*. Occasional *Eucalyptus diversicolor* (karri) in the south-west corner. The creek line in the eastern cell contained occasional *Eucalyptus patens* and stands of *Melaleuca incana*.
- CL1 Corbalup. (~2.2ha) Open forest of *Corymbia calophylla* (marri) and *Eucalyptus marginata* (jarrah) over *Bossiaea linophylla*, *Banksia grandis* and *Hovea trisperma*.

- CO1 Collis. (~1.4ha) Open forest of *Eucalyptus marginata* (jarrah) and *Corymbia calophylla* (marri) over *Banksia grandis*, *Leucopogon verticillatus*, *Bossiaea linophylla* and *Hakea oleifolia*



29 Hercules Crescent
Albany, WA 6330
Australia
Tel: 08 9842 1575
Fax: 08 9842 1575



Overview Map Scale 1:100,000

Legend

- Subject Site
- Cadastre
- 5m Contours
- Yanmah (YN1)
- Corbalup (CL1)
- Collis (CO1)
- Good to Very Good
- Degraded
- Quadrat 1
- Quadrat 2
- Quadrat 3
- Quadrat 4
- Traverse
- Collis
- Corbalup
- Yanmah1_Ecell
- Yanmah1_Wcell



Scale
1:2,250 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: SLIP Virtual Mosaic WMS Service, Landgate 2016
Cadastre and Contours: Landgate 2016
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Peter Johnson and Kathy Youkoff
Lot 201 on Deposited Plan 409860
Manjimup WA 6258

Vegetation Values Mapping

STATUS	FILE	DATE
FINAL	MSC0263	12/12/2019

3.2. Vegetation Condition

The subject site is approximately 18ha of native vegetation consisting mainly of open forest of jarrah and marri with occasional blackbutt and melaleuca associated with a broad drainage line east of Manjimup Brook. The highest points of the property are the NE and SE corners with gentle slopes to a natural drainage line though the centre running north-south. The mid to lower reaches of the drainage line opens to a broad valley floor containing areas of *Melaleuca incana*. Most of the site is intact aside from blackberry thickets along the drainage line and several significant weed species; alien wattles, gladiolus and blackberry occur for the full extent of the northern boundary.

West of Manjimup Brook – The vegetation condition is mainly “Good” to “Very Good” condition on the Keighery scale (Keighery 1994) for most of the area with layers intact. The tree layer contains Eucalypts of various ages including mature, young and saplings. Alien wattles and blackberry growing in the northern section and thickets of blackberry along the eastern edge have severely impacted the vegetation structure in these areas. An old track going from north to south west of Manjimup Brook has signs of regeneration with native and incursion of weed species. There are signs of regeneration from a previous clearing near the NW corner of the property.

East of Manjimup Brook – The vegetation condition is mainly “Good” to “Very Good” condition on the Keighery scale (Keighery 1994), with layers intact for the northern and southern slopes of the natural drainage line. The tree layer contains eucalypts of various ages including mature, young and saplings. The northern boundary and drainage-line condition is “Degraded” on the Keighery scale (Keighery 1994). Blackberry thickets cover approximately 50% of the drainage line severely impacting vegetation structure. The areas of *Melaleuca incana* are almost surrounded by blackberry and appeared stressed and dry for the time of year; blackberry possibly a contributing factor. Blackberry, alien wattles and *Gladiolus undulatus* occur along the full extent of the north boundary. An old track located in the southern section has signs of regeneration.

Table 2: Condition Rating Scale (Keighery 1994)

Vegetation Condition Rating	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires; the presence of some more aggressive weeds; dieback; logging; & grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate to it. For example, disturbance to vegetation structure caused by very frequent fires; the presence of some very aggressive weeds at high density; partial clearing; dieback; & grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires; the presence of very aggressive weeds; partial clearing; dieback; & grazing.
Completely Degraded	Vegetation structure not intact; the area 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.

3.3. Weeds and disturbance

Of the 68 species recorded within the subject site, 8 species are introduced; *Acacia dealbata*, *Acacia mearnsii*, *Acaena echinata*, *Briza maxima*, *Gladiolus undulata*, *Hypochaeris radicata*, *Oxalis sp.* and *Rubus sp.* All species except the blackberry are declared as “Permitted – s11” under the *Biosecurity and Agriculture Management Act 2007*. Blackberry is classified as a “Declared Pest – s22(2)”. Under the Environmental Weeds Strategy for Western Australia (CALM 1999) the species the majority of the introduced species are rated as “Moderate”. Three species did not have a rating within the strategy, and *Acacia dealbata* is rated as mild. The strategy classifies weeds according to their relative level of threat to conservation (high medium or low) and this rating is based on their distribution, relative level of invasiveness and environmental impact. Refer to Table 3 below.

Table 3: Weed species recorded from the subject site

Family	Species	Vernacular	WA Weed Strategy rating (CALM 1999) / BAM Act
Asteraceae	<i>Hypochaeris radicata</i>	Flatweed	Moderate / Permitted - s11
Fabaceae	<i>Acacia dealbata</i>	Silver Wattle	Mild / Permitted - s11
Fabaceae	<i>Acacia mearnsii</i>		- / Permitted - s11
Iridaceae	<i>Gladiolus undulata</i>	Wild Gladiolus	Moderate / Permitted - s11
Oxalidaceae	<i>Oxalis sp.</i>		- / Permitted - s11
Poaceae	<i>Briza maxima</i>	Blowfly Grass	Moderate / Permitted - s11
Rosaceae	<i>Acaena echinata</i>	Sheep's Burr	- / Permitted - s11
Rosaceae	<i>Rubus sp.</i>	Blackberry	Moderate / Declared Pest - s22(2)

3.4. Threatened Flora

The scope for this survey was to provide the client with information on any threatened or priority flora species that are potentially present within the subject site. The survey effort found no conservation listed flora or Threatened/Priority Ecological Communities. Suitable habitat to support the nine species not targeted (refer to section 2.3) for the survey were confirmed to not be present within the subject site. Refer to Table 4 below for species identified as potentially being present within the subject site.

Table 4: Potential threatened flora located within the subject site

Family	Species	Conservation Code	Habitat	Flowering period	Likelihood of being present	Comment
Asparagaceae	<i>Thysanotus unicus</i>	P3	Dry lateritic and grey sandy soils in moderately open sunny areas. Disturbed areas	Late Oct- Early Dec	Medium	Habitat suitable for this species was not identified during the traverse surveys.
Cyperaceae	<i>Tetraria sp. Blackwood</i> (AR Annels 3043)	P3	Creeks and river-banks	-	Medium	The traverse survey through the broad valley in Yanmah 1 complex found no suitable habitat for <i>Tetraria sp. Blackwood</i>
Droseraceae	<i>Drosera occidentalis</i>	P4	Sandy/grey sandy loam, winter wet flats	Oct-Dec	Low	Habitat suitable for this species was not identified during the traverse surveys.
Lamiaceae	<i>Hemigenia microphylla</i>	P3	Sandy clay, peaty soils over laterite, winter wet depressions, creek lines	Sept-Dec	High	Habitat suitable for this species was not identified during the traverse surveys.
Myrtaceae	<i>Calytrix pulchella</i>	P3	Grey or white sand over laterite on ridges, slopes	Aug-Nov	Low	Habitat suitable for this species was not identified during the traverse surveys. This species would have been in flower at the time of the survey and conspicuous if present.
Myrtaceae	<i>Chamelaucium sp. Mt Frankland</i> (A.S. George 1117)	P3	Associated with granite outcropping	Sept-Nov	Low	Habitat suitable for this species was not identified during the traverse surveys.
Orchidaceae	<i>Caladenia christineae</i>	T (EN)	Grey sandy clay, peaty soils winter wet flats, broad wet basins and drainage areas	Sept-Early Nov	High	Habitat suitable for this species was not identified during the traverse surveys.
Orchidaceae	<i>Caladenia erythrochila</i>	P2	Grey sand, gravelly lateritic soils, well-drained rises, crests	Sept-Oct	Low	Of the 3 records of this species in the Manjimup/Unicup area one of these occur in CL1, YN1 or CO1. Habitat suitable for this species was not identified during the traverse surveys.
Orchidaceae	<i>Caladenia harringtoniae</i>	T (VU)	Grey sandy loam, peaty soils, winter wet flats, margins of lakes, creek lines associated with granite or laterite	Oct-Mid Nov	Medium	Habitat suitable for this species was not identified during the traverse surveys.
Orchidaceae	<i>Caladenia longicauda ssp. extrema</i>	P1	Seasonally inundated swamps	Oct- Nov	Medium	Records of this species have been found with <i>Caladenia christineae</i> in similar habitat. No orchid species were found during the traverse and quadrat surveys in habitat suitable for this species.

Table 4 continued

Family	Species	Conservation Code	Habitat	Flowering period	Likelihood of being present	Comment
Orchidaceae	<i>Diuris drummondii</i>	T (VU)	Low lying depressions, swamps over peaty soils.	Nov-Dec or Jan	Low	Of the 38 records of this species in the Manjimup, Lake Jasper and Muir-Unicup areas none of these occur in CL1, YN1 or CO1. The traverse survey following the broad valley in the Yanmah 1 Vegetation Complex did not find habitat suitable for <i>Diuris drummondii</i> .
Poaceae	<i>Deyeuxia inaequalis</i>	P1	Sandy loams on slopes in open areas	December	Medium	Of the 7 records of this species in the Manjimup area none of these occur in CL1, YN1 or CO1. The surveys through these vegetation units traversed open areas/tracks that could potentially contain the species. No Poaceae species were sighted that could potentially be <i>Deyeuxia inaequalis</i> .
Restionaceae	<i>Lepyrodia heleocharoides</i>	P3	Moist peaty sand. Dry or seasonally inundated heath or woodland swamp.	Dec	Medium	The traverse survey through the broad valley in Yanmah 1 complex found no suitable habitat for <i>Lepyrodia heleocharoides</i> .
Stylidiaceae	<i>Stylidium roseonanthum</i>	P3	Winter wet swamps over laterite	Oct	Low	Of the 6 records of this species found in the Manjimup, Lake Muir/Unicup areas none of these occur in CL1, YN1 or CO1. Habitat suitable for this species was not identified during the traverse surveys.

4. Fauna

4.1. Field Methodology

The DWER provided a letter that states assessment / survey is required for the application area (Schedule 1, Item 3) and the survey is required to identify all trees that have a diameter, measured at 1.5 metres from the base of the tree, of 500 millimetres or greater that contain a hollow(s) that may be suitable for breeding by Carnaby's cockatoo, Baudin's cockatoo, and/or forest red-tailed black cockatoo. As such, a targeted survey was undertaken which focused solely on trees > 500mm DBH that contained hollows likely to be suitable for cockatoos or other threatened species such as western ringtail possums. The letter also outlined that the following must be documented:

- the date(s) of the survey;
- the GPS locations (i.e. eastings and northings or decimal degrees) of all trees identified as containing hollows which may be suitable for black cockatoos;
- the methodology for determining the evidence of use of each hollow; and
- a description/photo of the evidence of use.

Field survey work was carried out by Dr Karlene Bain (Wildlife Ecologist) and Bianca Theyer (Conservation and Wildlife Biologist) from Bio Diverse Solutions on the 9th December 2019 in accordance with Guidance Statement 56: *Terrestrial Fauna Surveys* (EPA 2016a) and Technical Guidance: Sampling methods for Terrestrial vertebrate fauna (EPA 2016b). All trees containing hollows were GPS located, measured 1.5m above ground (DBH), photographed and hollows assessed for use. Hollows were assessed based on evidence of scratching and chewing around the hollow entrance, hollow entrance size and signs of activity at the base of the tree, e.g. feathers, faecal material, feeding debris.

The assessment was carried out in a manner consistent with the following documents developed by the EPA and Department of Environment and Energy (DoEE) formerly the Department of Sustainability, Water, Population, and Communities (DSEWPaC) and Department of the Environment, Water, Heritage and the Arts (DEWHA):

- EPA (2016a) Technical Guidance: Terrestrial Fauna Surveys;
- EPA (2016b) Technical Guidance: Sampling Methods for Terrestrial Vertebrate Fauna;
- DEWHA (2010) Survey guidelines for Australia's threatened birds; and
- DSEWPaC (2012) Referral Guidelines for Three Threatened Black Cockatoo Species.

The results presented are based upon field data collected over a limited period of time and are indicative of the environmental condition of the site at the time.

4.2. Habitat Connectivity

The *South West Regional Ecological Linkages* is a regional scale spatial modelling of ecological linkages to help achieve long-term biodiversity management outcomes (Molloy & Deeley 2013; DBCA, 2017b). The subject site is classified as 2c and lies less than 500m from a natural area selected in 2b (Faunadale Nature Reserve) as outlined with the *South West Regional Ecological Linkages* project (WALGA, 2019a).

The vegetation in the subject site is connected to high quality habitat within the Faunadale nature reserve to the west, and remnant forest on private property to the south. The block of vegetation that these three properties contribute to is isolated in a cleared agricultural landscape with limited broader connectivity.

4.3. Potential Breeding, Foraging and Roosting Black Cockatoo Habitat

Desktop searches of publicly available information indicates that areas of the jarrah and marri dominated vegetation throughout the subject site is potential feeding / foraging habitat to Carnaby's black cockatoos (WALGA, 2018f). This dataset is based on vegetation containing plant species favoured by Carnaby's black cockatoos not point records of feeding (WALGA, 2018f). This dataset shows no confirmed or potential breeding or roosting areas for Carnaby's Black Cockatoos to be present within the subject site. Based on known habitat preferences for Baudin's black cockatoos and forest red-tailed black cockatoos the vegetation present in the subject site also holds potential for foraging, breeding and roosting for the two species (DSEWPaC (2012)).

4.4. Survey Limitations and Constraints

Remoteness or access issues where the only potential limitations for this survey. However, these are not deemed to have affected completeness of this survey. See below for details.

Table 5: Survey Limitations and constraints

Limitation	Comment
Scope	The scope was a targeted survey to identify significant trees (>500mm DBH) that contain a hollow(s) that may be suitable for breeding by Carnaby's cockatoo, Baudin's cockatoo, and/or forest red-tailed black cockatoo.
Disturbances that may affect results	The vegetation has been previously cleared, since then the vegetation has regenerated. No recent disturbances (fire etc.) were observed to have impacted the vegetation. The previous disturbances of the subject site are not deemed to have affected the completeness of the survey.
Intensity of survey	The threatened targeted assessment was deemed appropriate given the scope was to identify suitable black cockatoo breeding hollows within the subject site.
Sources of information (recent or historic) and availability of contextual information	Site specific data is limited as it is privately owned land, this is not considered a limiting factor for this survey.
Remoteness or access issues	Access by vehicle around the boundary of the property was limited to west of the Manjimup Brook. Access to areas was by foot, blackberry thickets limited navigation along and near the creek-lines east of Manjimup Brook. The thick areas of blackberry also restricted access to several trees and DBH had to be estimated. A dependence on relative visibility of the canopy to identify potential hollows and the assessment of hollows from the ground. The assumption is that the hollow has certain entrance dimensions then it is likely to contain some depth.
Experience of personnel	Dr Karlene Bain has over 20 years of fauna survey experience. Bianca Theyer has 4.5 years' experience in fauna assessment working alongside Dr Karlene Bain (Wildlife Ecologist) since working with Bio Diverse Solutions.

4.5. Fauna / significant tree survey outcomes

Seventeen significant trees were identified within the subject site, 10 *Corymbia calophylla* (marri) and 7 *Eucalyptus marginata* (jarrah). These trees were deemed significant if they were >500mm DBH and contained hollows. Of the 17 trees identified five had evidence that they had been used by cockatoos within the past 10 years (tree ID 1, 4, 12, 14 and 17) and one (tree ID 15) appeared to have been used within the past 12 months (not within this breeding season). A further 6 trees were identified as containing hollows suitable for black cockatoos (tree ID 2, 3, 9, 11, 13 and 16), but had no evidence of recent use or were being utilised by other species. Of those hollows suitable for cockatoos, two (tree ID 3, 9 and 13) had significant brushtail possum activity up the tree and around the hollow and one was occupied by a brushtail possum (tree ID 9). Hollows located within tree ID 2 and 11 had scratchings around the entrance that were not consistent with cockatoo use. Tree ID 16 contains a suitable sized hollow but showed no evidence of usage. The remaining trees (tree ID 5, 6, 7, 8 and 10) contained hollows that have the potential to form or are developing suitable black cockatoo hollows. Please also note, tree ID 2 contained multiple hollows, two of which have hollow forming potential and one hollow that is suitable. Please refer to Table 6 over the page for assessment details for each significant tree and Figure 4 and 5 for images and locations.

During the survey two individual forest red-tailed black cockatoos were observed flying over the subject site in a westerly direction. They did not land in the subject site. A small flock (with a juvenile) were heard calling from adjacent remnant vegetation to the east of the subject site. Additionally, during the survey, it was noted there were no signs of large and/or

significant feeding events observed within the subject site, with only scattered, small-scale feeds observed (mainly on marri nuts). There was some minor feed evidence (several scattered chewed jarrah nuts) observed at the base of tree 15.

Table 6: Significant trees (>500mm DBH) containing hollows or with hollow bearing potential identified within the subject site

Tree ID	Species	DBH (mm)	Northing	Eastings	Crown senescent (Y/N)	Hollows Present (Y/N)	Location (trunk, branch)	Size of entrance (w x h) cm	Type of entrance (side, chimney, elbow)	Height above ground (m)	Chewing and/ or scratching present (Y/N)	Other Observations
1	<i>Eucalyptus marginata</i>	1356	6211915.793	418913.3179	Dead	Y	Trunk	18x20	Elbow	10	Y	Old cockatoo use.
							Trunk	U	Elbow	9	N	Not clearly visible from ground. May have a small hollow. If not, potential hollow. Additional potential branch hollows.
2	<i>Corymbia calophylla</i>	1541	6211897.16	418889.4817	Dead	Y	Branch	10x12	Chimney	10	Y	Scratching around entrance.
							Branch	U	Chimney	11	N	Potential cockatoo hollow forming.
							Trunk	U	Chimney	15	N	Potential cockatoo hollow forming.
3	<i>Corymbia calophylla</i>	1678	6212094.1	419007.7061	Dead	Y	Trunk	15x20	Side	10	Y	Brushtail possum scratching to entrance and scat found near base of tree.
4	<i>Corymbia calophylla</i>	1350	6212094.1	419007.7061	Y	Y	Branch	25x35	Elbow	5	Y	Old chew marks around entrance consistent with cockatoo; hollow looks deep.
5	<i>Corymbia calophylla</i>	1250	6212075.909	419064.5518	N	Y	Branch	8x6	Chimney	12	N	Feral bees.
6	<i>Corymbia calophylla</i>	1550	6212073.736	419069.8196	Y	N	Trunk	U	Chimney	12	N	Large broken off branch rotting. High level of hollow forming potential.
7	<i>Corymbia calophylla</i>	1372	6212094.995	419110.5515	Y	Y	Branch	U	Chimney	20	N	Upward facing canopy, high likelihood of large hollows. No obvious sign of use.
8	<i>Eucalyptus marginata</i>	1260	6212078.11	419135.4993	Dead	U	Branch	U	Chimney	35	N	Upward facing canopy, high likelihood of hollows. No obvious sign of use.
9	<i>Corymbia calophylla</i>	1390	6212064.71	419116.6525	Y	Y	Trunk	55x12	Side	10	Y	Scratching around entrance; currently occupied by Brushtail Possum. Suitable cockatoo hollow.
10	<i>Corymbia calophylla</i>	1350	6211966.581	419029.0004	Y	Y	Trunk	8x8	Side	12	Y	Light scratching on bark below entrance; hollow directly into large trunk. Has potential to develop into a cockatoo hollow.
11	<i>Eucalyptus marginata</i>	2233	6211889.871	419052.6129	Y	Y	Branch	15x20	Chimney	18	Y	Scratching on branch below entrance.
12	<i>Eucalyptus marginata</i>	1691	6211856.748	419187.3484	Y	Y	Trunk	50x40	Chimney	24	N	Large hollow entrance into thick trunk. Large burl.
							Trunk	25x20	Side	14	Y	Old chew marks around entrance consistent with cockatoo; hollow looks deep.
13	<i>Eucalyptus marginata</i>	1312	6211955.216	419184.7745	Y	Y	Branch	12x12	Chimney	18	Y	High level of brushtail possum scratching up trunk into hollow. Scat at base of tree.
14	<i>Corymbia calophylla</i>	1650	6211984.812	419355.0899	Y	Y	Branch	20x25	Chimney	20	Y	Currently occupied by feral bees. Old chewing around entrance consistent with cockatoo use.
15	<i>Eucalyptus marginata</i>	740	6212035.106	419365.8088	Y	Y	Trunk	12x8	Side	16	Y	High level of chewing around entrance consistent with cockatoo use. Recently used. Female did not flush when side of tree scraped.
16	<i>Corymbia calophylla</i>	514	6211883.453	419254.9128	Dead	Y	Trunk	30x30	Chimney	12	N	Potential cockatoo hollow. No evidence of use.
17	<i>Eucalyptus marginata</i>	987	6211834.171	419235.5923	Y	Y	Branch	13x15	Elbow	16	Y	Old chewing around entrance consistent with cockatoo use.



Tree ID: 1



Tree ID: 1



Tree ID: 1



Tree ID: 2



Tree ID: 2



Tree ID: 2



Tree ID: 2



Tree ID: 3



Tree ID: 3



Tree ID: 4



Tree ID: 4



Tree ID: 4



Tree ID: 5



Tree ID: 5



Tree ID: 6



Tree ID: 6



Tree ID: 7



Tree ID: 7

Figure 4: Significant Trees and Hollows observed within the subject site



Tree ID: 8



Tree ID: 8



Tree ID: 9



Tree ID: 9



Tree ID: 10



Tree ID: 10



Tree ID: 11



Tree ID: 11



Tree ID: 12



Tree ID: 12



Tree ID: 12



Tree ID: 13



Tree ID: 13
Figure 4 continued.



Tree ID: 14



Tree ID: 14



Tree ID: 15



Tree ID: 15



Tree ID: 16

Figure 4 continued.



Tree ID: 16



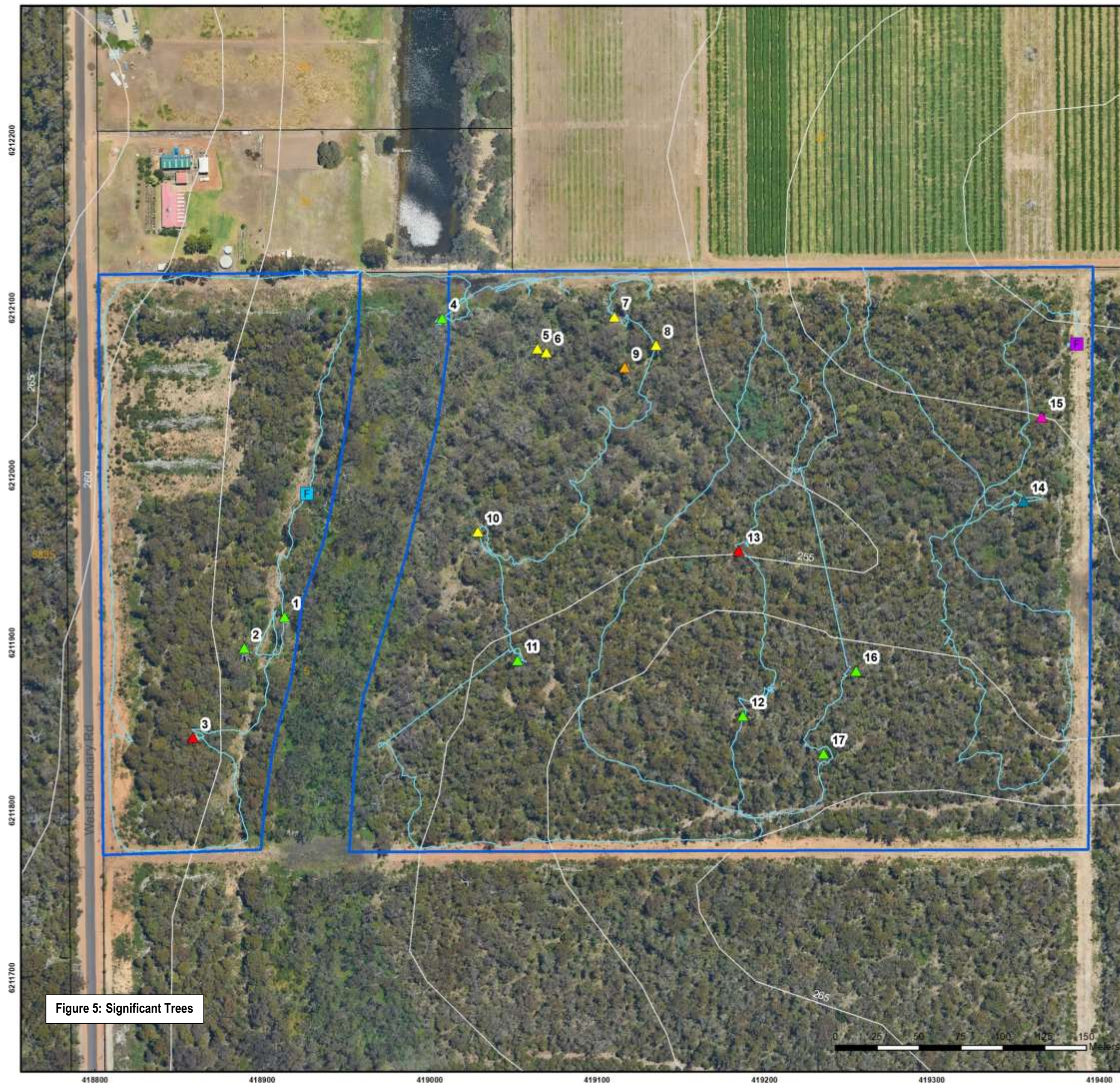
Tree ID: 17



Tree ID: 17



Tree ID: 17



29 Hercules Crescent
Albany, WA 6330
Australia
Tel: 08 9842 1575
Fax: 08 9842 1575



Overview Map Scale 1:100,000

Legend

- Subject Site
- Cadastre
- 5m Contours

Fauna Survey Transect

- Fauna Survey Transect

Fauna Observed Calling

- Baudin's black cockatoo
- Forest red-tailed black cockatoo

Significant Trees

- ▲ Potential black cockatoo hollow
- ▲ Suitable black cockatoo hollow
- ▲ Suitable black cockatoo hollow - BTP activity
- ▲ Suitable black cockatoo hollow - Feral bees
- ▲ Suitable black cockatoo hollow - Occupied BTP
- ▲ Suitable black cockatoo hollow - Recently used



Scale
1:2,250 @ A3
GDA MGA 94 Zone 50

Data Sources
Aerial Imagery: SLIP Virtual Mosaic WMS Service, Landgate 2016
Cadastre and Contours: Landgate 2016
Overview Map: World Topographic map service, ESRI 2012

CLIENT
Peter Johnson and Kathy Youkoff
Lot 201 on Deposited Plan 409860
Manjimup WA 6258

Significant Trees

STATUS	FILE	DATE
FINAL	MSC0263	28/04/2020

5. Summary

5.1. Vegetation, Threatened and Priority Flora and Ecological Communities

The scope for this survey was to provide the client with information on any threatened or priority flora species that are potentially present within the subject site. A total of 68 flora species were identified throughout the subject site, of these eight are introduced. Three vegetation complexes were identified within the area Yanmah, Corbalup and Collis. The vegetation structure consisted of a tree layer containing eucalypts of various ages including mature, young and saplings, with a sparse yet relatively diverse mid and understorey. There are several alien wattle species as well as blackberry infestations present throughout the subject site. The majority of the vegetation within the subject site is considered to be in “Good to Very Good” condition with a small area of “Degraded” vegetation present east of Manjimup Brook along the drainage line and along the northern boundary. The survey effort found no conservation listed flora or Threatened/Priority Ecological Communities. Habitats to support species not targeted for the survey were not present.

5.2. Fauna

The scope for this survey was to provide the client with information on the presence of suitable breeding hollows for black cockatoos within the subject site. Only the significant trees containing hollows were assessed and presented within this report.

A total of 17 trees with hollows were identified within the subject site; 10 marri and seven jarrah. Of these, 12 were assessed as being suitable breeding hollows for black cockatoos, with the remaining five having the future potential to develop further and become suitable. Of the suitable hollows, one is currently occupied by a brushtail possum and another contained feral bees. Of the 12 cockatoo hollows, five had evidence that they had been used by cockatoos within the past 10 years (tree ID 1, 4, 12, 14 and 17). The chew marks present around the hollows are old indicating they have not been recently used. The presence of feral bees in tree ID 14 also indicates the hollow has not been recently utilised by black cockatoos. The more recent chew evidence around the hollows present in tree ID 15 indicates this hollow is likely to have been utilised within the last 12 months. The previous clearing of the area is likely to be a contributing factor to the relatively low number of suitable breeding hollows within the subject site, due to the low proportion of mature trees.

There were six trees with evidence of black cockatoo use in the subject site, with only one of these having been used within the past 12 months. The area does not have any evidence of being used regularly for breeding, and this is not surprising given the limited availability of high-quality feeding habitat and the higher quality habitat available to the west within the nature reserve and further west within the more continuous state forest. There is however a need to protect known hollows. Retention of the six trees with known cockatoo activity is recommended, in conjunction with a small vegetated buffer around these to reduce the likelihood of loss due to future weather events.

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7. Appendices

Appendix A – Full Species List and Quadrat Specific Data

Appendix B – Database Searches

Appendix A

Full Species List and Quadrat Specific Data

Family	Scientific Name	Common Name	Conservation Status	Quadrat / Traverse (T)
Anthericaceae	<i>Agrostocrinum scabrum</i>	Blue Grass Lily	Not threatened	T
Anthericaceae	<i>Chamaescilla corymbosa</i>	Blue Squill	Not threatened	T,1
Anthericaceae	<i>Tricoryne elatior</i>	Yellow Autumn Lily	Not threatened	1
Apiaceae	<i>Platysace filiformis</i>		Not threatened	T
Apiaceae	<i>Xanthosia candida</i>		Not threatened	4
Asparagaceae	<i>Lomandra sp.</i>		Not threatened	1,2,3,4
Asteraceae	<i>Hypochaeris radicata</i>	Flatweed	Alien	2
Asteraceae	<i>Lagenophora huegelii</i>	Coarse Lagenophora	Not threatened	1
Asteraceae	<i>Trichocline spathulata</i>	Native Gerbera	Not threatened	1
Asparagaceae	<i>Lomandra pauciflora</i>		Not threatened	4
Cyperaceae	<i>Lepidosperma leptostachyum</i>		Not threatened	3,4
Cyperaceae	<i>Tetraria octandra</i>		Not threatened	1,2,3
Dennstaedtiaceae	<i>Pteridium esculentum</i>	Bracken	Not threatened	T,1,2,3
Dilleniaceae	<i>Hibbertia amplexicaulis</i>		Not threatened	1,3
Dilleniaceae	<i>Hibbertia cuneiformis</i>	Cut leaf Hibbertia	Not threatened	1
Dilleniaceae	<i>Hibbertia cunninghamii</i>		Not threatened	1,2,3
Ericaceae	<i>Leucopogon capitellatus</i>		Not threatened	1,2,3
Ericaceae	<i>Leucopogon propinquus</i>		Not threatened	1,2,3
Ericaceae	<i>Leucopogon verticillatus</i>	Tassel Flower	Not threatened	1
Euphorbiaceae	<i>Phyllanthus calycinus</i>	False Boronia	Not threatened	3
Goodeniaceae	<i>Dampiera alata</i>	Winged stem Dampiera	Not threatened	1,2
Goodeniaceae	<i>Scaevola calliptera</i>	Royal Robe	Not threatened	T
Fabaceae	<i>Acacia dealbata</i>	Silver Wattle	Alien	1,2,3
Fabaceae	<i>Acacia lateritica</i>		Not threatened	T
Fabaceae	<i>Acacia mearnsii</i>	Black Wattle	Alien	T
Fabaceae	<i>Acacia myrtifolia</i>	Myrtle Wattle	Not threatened	T
Fabaceae	<i>Acacia saligna</i>	Orange Wattle	Not threatened	3
Fabaceae	<i>Acacia urophylla</i>	Pointed Leaved Acacia	Not threatened	T,1
Fabaceae	<i>Bossiaea linophylla</i>		Not threatened	2
Fabaceae	<i>Callistachys lanceolata</i>	Native Willow	Not threatened	T
Fabaceae	<i>Hardenbergia comptoniana</i>	Native Wisteria	Not threatened	1,3
Fabaceae	<i>Hovea trisperma</i>	Common Hovea	Not threatened	T
Fabaceae	<i>Kennedia prostrata</i>	Running Postman	Not threatened	T
Haemodoraceae	<i>Conostylis aculeata</i>	Prickly Conostylis	Not threatened	T
Haemodoraceae	<i>Anigozanthos flavidus</i>	Tall Kangaroo Paw	Not threatened	T
Iridaceae	<i>Gladiolus undulata</i>	Wild Gladiolus	Alien	T,3
Iridaceae	<i>Patersonia occidentalis</i>	Purple Flag	Not threatened	1,2,3,4
Myrtaceae	<i>Corymbia calophylla</i>	Marri	Not threatened	1,2,3
Myrtaceae	<i>Eucalyptus marginata</i>	Jarrah	Not threatened	4
Myrtaceae	<i>Eucalyptus patens</i>	Blackbutt	Not threatened	4

Family	Scientific Name	Common Name	Conservation Status	Quadrat / Traverse (T)
Myrtaceae	<i>Melaleuca incana</i>	Grey Honey Myrtle	Not threatened	T
Orchidaceae	<i>Pyrorchis nigricans</i>	Red Beaks	Not threatened	4
Orchidaceae	<i>Thelymitra cornicina</i>	Lilac Sun Orchid	Not threatened	2,3
Oxalidaceae	<i>Oxalis</i> sp.		Alien	T
Phormiaceae	<i>Stypandra glauca</i>	Blind Grass	Not threatened	T,3
Pittosporaceae	<i>Billardiera heterophylla</i>	Australian Bluebells	Not threatened	2,3,4
Poaceae	<i>Austrodanthonia</i> sp.		Not threatened	1,2,3
Poaceae	<i>Briza maxima</i>	Blowfly Grass	Alien	1,4
Poaceae	<i>Tetrarrhena laevis</i>	Forest Rice grass	Not threatened	2
Podocarpaceae	<i>Podocarpus drouynianus</i>	Wild Plum, Emu Bush	Not threatened	2,3
Proteaceae	<i>Banksia grandis</i>	Bull Banksia	Not threatened	1,3
Proteaceae	<i>Hakea amplexicaulis</i>	Prickly Hakea	Not threatened	3
Proteaceae	<i>Hakea oleifolia</i>	Dungyn	Not threatened	T,3
Proteaceae	<i>Persoonia longifolia</i>	Snottygobble	Not threatened	1
Polygalaceae	<i>Comesperma calymega</i>	Blue-spike Milkwort	Not threatened	T
Restionaceae	<i>Desmocladius fasciculatus</i>		Not threatened	T
Restionaceae	<i>Desmocladius flexuosa</i>		Not threatened	1,2,3
Ranunculaceae	<i>Clematis pubescens</i>	Common clematis	Not threatened	1,3
Rubiaceae	<i>Opercularia hispidula</i>	Hispid Stinkweed	Not threatened	2
Rosaceae	<i>Acaena echinata</i>	Sheeps Burr	Alien	T,2,4
Rosaceae	<i>Rubus</i> sp.		Alien	1,2,3
Rubiaceae	<i>Opercularia hispidula</i>	Hispid Stinkweed	Not threatened	1,2,3,4
Scrophulariaceae	<i>Veronica calycina</i>	Cup speedwell	Not threatened	T
Stylidiaceae	<i>Stylidium affine</i>	Queen Triggerplant	Not threatened	T
Stylidiaceae	<i>Stylidium amoenum</i>	Lovely Triggerplant	Not threatened	3
Violaceae	<i>Hybanthus debilissimus</i>	Wild Violet	Not threatened	2
Xanthorrhoeaceae	<i>Xanthorrhoea preissii</i>	Grass Tree	Not threatened	T,2
Zamiaceae	<i>Macrozamia riedlei</i>	Zamia Palm	Not threatened	T

PLANT SURVEY RECORDING SHEET

LOCATION: Lot 201 on Deposited Plan 409860 **DATE:** 27/11/2019

SITE NO: 1 **RECORDER:** J. Smith

LOCATION OF QUADRAT

Latitude 62 11 845N **Longitude** 419 329E

Vegetation Unit: Corbalup (CL1)

Plant Community: Open *Eucalyptus marginata*, *Corymbia calophylla* forest over *Bossiaea linophylla*, *Hibbertia cuneiformis*, *Hovea trisperma*.

Vegetation Condition Scale (Keighery): Very good

Photo No: 1 (NW corner SE aspect) 2 (SE corner NW aspect)

Slope: Flat ☐ Gentle ☒ Steep ☐

Aspect: N **NE** S E SE S SW W NW

Surface Soil: Light brown gravelly loam

Rock type: No exposed rock

Drainage: Well-drained - dry

Litter: Leaf - 1cm

Bare Ground %: <10%



Photo: 1 – Site 1 Corbalup NW corner SE aspect



Photo: 2 – Site 1 Corbalup SE corner NW aspect

SPECIES LIST Site 1

Family	Scientific Name	Common Name	Conservation Status
Apiaceae	<i>Platysace filiformis</i>	O	Not threatened
Asteraceae	<i>Hypochaeris radicata</i>	Flatweed	Alien
Asteraceae	<i>Trichocline spathulata</i>	Native Gerbera	Not threatened
Asparagaceae	<i>Lomandra pauciflora</i>	O	Not threatened
Dennstaedtiaceae	<i>Pteridium esculentum</i>	Bracken	Not threatened
Dilleniaceae	<i>Hibbertia amplexicaulis</i>	O	Not threatened
Dilleniaceae	<i>Hibbertia cuneiformis</i>	Cutleaf Hibbertia	Not threatened
Dilleniaceae	<i>Hibbertia cunninghamii</i>	O	Not threatened
Ericaceae	<i>Leucopogon capitellatus</i>	O	Not threatened
Ericaceae	<i>Leucopogon propinquus</i>	O	Not threatened
Ericaceae	<i>Leucopogon verticillatus</i>	Tassel Flower	Not threatened
Euphorbiaceae	<i>Phyllanthus calycinus</i>	False Boronia	Not threatened
Goodeniaceae	<i>Scaevola calliptera</i>	Royal Robe	Not threatened
Fabaceae	<i>Acacia lateriticola</i>	O	Not threatened
Fabaceae	<i>Bossiaea linophylla</i>	O	Not threatened
Myrtaceae	<i>Corymbia calophylla</i>	Marri	Not threatened
Myrtaceae	<i>Eucalyptus marginata</i>	Jarrah	Not threatened
Poaceae	<i>Briza maxima</i>	Blowfly Grass	Alien
Poaceae	<i>Tetrarrhena laevis</i>	Forest Ricegrass	Not threatened
Proteaceae	<i>Hakea amplexicaulis</i>	Prickly Hakea	Not threatened
Polygalaceae	<i>Comesperma calymega</i>	Blue-spike Milkwort	Not threatened
Ranunculaceae	<i>Clematis pubescens</i>	Common clematis	Not threatened
Rubiaceae	<i>Opercularia hispidula</i>	Hispid Stinkweed	Not threatened
Scrophulariaceae	<i>Veronica calycina</i>	Cup speedwell	Not threatened
Traverse Corbalup			
Anthericaceae	<i>Agrostocrinum scabrum</i>	Blue Grass Lily	Not threatened
Anthericaceae	<i>Chamaescilla corymbosa</i>	Blue Squill	Not threatened
Fabaceae	<i>Acacia saligna</i>	Orange Wattle	Not threatened
Orchidaceae	<i>Pyrorchis nigricans</i>	Red Beaks	Not threatened
Pittosporaceae	<i>Billardiera heterophylla</i>	Australian Bluebells	Not threatened
Proteaceae	<i>Persoonia longifolia</i>	Snottygobble	Not threatened
Stylidiaceae	<i>Stylidium amoenum</i>	Lovely Triggerplant	Not threatened

PLANT SURVEY RECORDING SHEET

LOCATION: Lot 201 on Deposited Plan 409860 **DATE:** 27/11/2019

SITE NO:2 **RECORDER:** J. Smith

LOCATION OF QUADRAT

Latitude 62 11 968N **Longitude** 418 875E

Vegetation Unit: Yanmah1 (YN1)

Plant Community: Open *Eucalyptus marginata*, *Corymbia calophylla* forest over *Banksia grandis*, *Callistachys lanceolata*, *Podocarpus drounianus*.

Vegetation Condition Scale (Keighery): Good

Photo No: 3 (NW corner SE aspect) 4 (SE corner NW aspect)

Slope: Flat ☐ Gentle ☒ Steep ☐

Aspect: N NE S **E** SE S SW W NW

Surface Soil: Light brown loam

Rock type: No exposed rock

Drainage: Well-drained - dry

Litter: Leaf - 5cm

Bare Ground %: 1%



Photo: 3 Site 2 Yanmah NW corner SE aspect



Photo: 4 Site 2 Yanmah SE corner NW aspect

Species List Site 2

Family	Scientific Name	Common Name	Conservation Status
Asteraceae	<i>Lagenophora huegelii</i>	Coarse Lagenophora	Not threatened
Asteraceae	<i>Hypochaeris radicata</i>	Flatweed	Alien
Dennstaedtiaceae	<i>Pteridium esculentum</i>	Bracken	Not threatened
Dilleniaceae	<i>Hibbertia amplexicaulis</i>	O	Not threatened
Ericaceae	<i>Leucopogon capitellatus</i>	O	Not threatened
Ericaceae	<i>Leucopogon propinquus</i>	O	Not threatened
Ericaceae	<i>Leucopogon verticillatus</i>	Tassel Flower	Not threatened
Fabaceae	<i>Acacia lateriticola</i>	O	Not threatened
Fabaceae	<i>Callistachys lanceolata</i>	Native Willow	Not threatened
Goodeniaceae	<i>Scaevola calliptera</i>	Royal Robe	Not threatened
Myrtaceae	<i>Corymbia calophylla</i>	Marri	Not threatened
Myrtaceae	<i>Eucalyptus marginata</i>	Jarra	Not threatened
Oxalidaceae	<i>Oxalis</i> sp.		Alien
Poaceae	<i>Briza maxima</i>	Blowfly Grass	Alien
Poaceae	<i>Austrodanthonia</i> sp.		Not threatened
Podocarpaceae	<i>Podocarpus drouynianus</i>	Wild Plum, Emu Bush	Not threatened
Proteaceae	<i>Banksia grandis</i>	Bull Banksia	Not threatened
Ranunculaceae	<i>Clematis pubescens</i>	Common clematis	Not threatened
Rosaceae	<i>Acaena echinata</i>	Sheep's Burr	Alien
Rosaceae	<i>Rubus</i> sp.	Blackberry	Alien
Rubiaceae	<i>Opercularia hispidula</i>	Hispid Stinkweed	Not threatened
Scrophulariaceae	<i>Veronica calycina</i>	Cup speedwell	Not threatened
Xanthorrhoeaceae	<i>Xanthorrhoea preissii</i>	Grass Tree	Not threatened
Zamiaceae	<i>Macrozamia riedlei</i>	Zamia Palm	Not threatened
Traverse Yanmah Vegetation Complex – Eastern cell			
Anthericaceae	<i>Tricoryne elatior</i>	Yellow Autumn Lily	Not threatened
Dilleniaceae	<i>Hibbertia cuneiformis</i>	Cutleaf Hibbertia	Not threatened
Haemodoraceae	<i>Conostylis aculeata</i>	Prickly Conostylis	Not threatened
Haemodoraceae	<i>Anigozanthos flavidus</i>	Tall Kangaroo Paw	Not threatened
Fabaceae	<i>Acacia myrtifolia</i>	Myrtle Wattle	Not threatened
Fabaceae	<i>Kennedia prostrata</i>	Running Postman	Not threatened
Iridaceae	<i>Patersonia occidentalis</i>	Purple Flag	Not threatened
Phormiaceae	<i>Stypandra glauca</i>	Blind Grass	Not threatened
Pittosporaceae	<i>Billardiera heterophylla</i>	Australian Bluebells	Not threatened
Restionaceae	<i>Desmocladus fasciculatus</i>	O	Not threatened
Restionaceae	<i>Desmocladus flexuosus</i>	O	Not threatened

PLANT SURVEY RECORDING SHEET

LOCATION: Lot 201 on Deposited Plan 409860 **DATE:** 27/11/2019

SITE NO: 3 **RECORDER:** J. Smith

LOCATION OF QUADRAT

Latitude 62 12 037N **Longitude** 419 299E

Vegetation Unit: Collis (CO1)/Yanmah1 (YN1) transition

Plant Community: Open *Eucalyptus marginata*, *Corymbia calophylla* forest over *Banksia grandis*, *Hakea oleifolia*, *Hovea trisperma*, *Leucopogon verticillatus*.

Vegetation Condition Scale (Keighery): Very Good

Photo No: 6 (NW corner SE aspect) 7 (SE corner NW aspect)

Slope: Flat ☐ Gentle ☒ Steep ☐

Aspect: N NE S E SE **S** SW W NW

Surface Soil: Brown sandy loam

Rock type: No exposed rock

Drainage: Well-drained - dry

Litter: Leaf – 2.5cm

Bare Ground %: 1



Photo: 6 Site 3 Collis NW corner SE aspect



Photo: 7 Site 3 Collis SE corner NW aspect

Species List Site 3

Family	Scientific Name	Common Name	Conservation Status
Asteraceae	<i>Hypochaeris radicata</i>	Flatweed	Alien
Anthericaceae	<i>Tricoryne elatior</i>	Yellow Autumn Lily	Not threatened
Cyperaceae	<i>Tetraria octandra?</i>		Not threatened
Dennstaedtiaceae	<i>Pteridium esculentum</i>	Bracken	Not threatened
Dilleniaceae	<i>Hibbertia amplexicaulis</i>	O	Not threatened
Dilleniaceae	<i>Hibbertia cuneiformis</i>	Cutleaf Hibbertia	Not threatened
Ericaceae	<i>Leucopogon capitellatus</i>	O	Not threatened
Ericaceae	<i>Leucopogon propinquus</i>	O	Not threatened
Ericaceae	<i>Leucopogon verticillatus</i>	Tassel Flower	Not threatened
Fabaceae	<i>Acacia lateriticola</i>	O	Not threatened
Fabaceae	<i>Acacia urophylla</i>	Pointed Leaved Acacia	Not threatened
Fabaceae	<i>Hovea trisperma</i>	Common Hovea	Not threatened
Iridaceae	<i>Patersonia</i> sp.		Not threatened
Myrtaceae	<i>Corymbia calophylla</i>	Marri	Not threatened
Myrtaceae	<i>Eucalyptus marginata</i>	Jarrah	Not threatened
Oxalidaceae	<i>Oxalis</i> sp.		Alien
Pittosporaceae	<i>Billardiera heterophylla</i>	Australian Bluebells	Not threatened
Poaceae	<i>Briza maxima</i>	Blowfly Grass	Alien
Poaceae	<i>Austrodanthonia</i> sp.		Not threatened
Proteaceae	<i>Banksia grandis</i>	Bull Banksia	Not threatened
Proteaceae	<i>Hakea amplexicaulis</i>	Prickly Hakea	Not threatened
Proteaceae	<i>Hakea oleifolia</i>	Dungyn	Not threatened
Proteaceae	<i>Persoonia longifolia</i>	Snottygobble	Not threatened
Ranunculaceae	<i>Clematis pubescens</i>	Common clematis	Not threatened
Rubiaceae	<i>Opercularia hispidula</i>	Hispid Stinkweed	Not threatened
Scrophulariaceae	<i>Veronica calycina</i>	Cup speedwell	Not threatened
Violaceae	<i>Hybanthus debilissimus</i>	Wild Violet	Not threatened
Traverse Collis Vegetation Complex			
Dilleniaceae	<i>Hibbertia cuneiformis</i>	Cutleaf Hibbertia	Not threatened
Fabaceae	<i>Acacia dealbata</i>	Silver Wattle	Alien
Fabaceae	<i>Bossiaea linophylla</i>	O	Not threatened
Fabaceae	<i>Hardenbergia comptoniana</i>	Native Wisteria	Not threatened
Iridaceae	<i>Gladiolus undulata</i>	Wild Gladiolus	Alien
Rosaceae	<i>Rubus</i> sp.	Blackberry	Alien
Stylidiaceae	<i>Stylidium affine</i>	Queen Triggerplant	Not threatened
Stylidiaceae	<i>Stylidium amoenum</i>	Lovely Triggerplant	Not threatened
Zamiaceae	<i>Macrozamia riedlei</i>	Zamia Palm	Not threatened

PLANT SURVEY RECORDING SHEET

LOCATION: Lot 201 on Deposited Plan 409860 **DATE:** 27/11/2019

SITE NO: 4 **RECORDER:** J. Smith

LOCATION OF QUADRAT

Latitude 62 12 031N **Longitude** 419 143E

Vegetation Unit: Yanmah1 (YN1) western cell

Plant Community: *Melaleuca incana*, woodland over sedgeland.

Vegetation Condition Scale (Keighery): Degraded

Photo No: 8 (NW corner SE aspect) 9 (SE corner NW aspect)

Slope: Flat ☒ Creek-line

Aspect: N NE S E SE **S** SW W NW

Surface Soil: Grey sandy loam

Rock type: No exposed rock

Drainage: Potentially seasonally inundated - dry

Litter: <1cm

Bare Ground %: 25

SPECIES LIST Site 4

Family	Scientific Name	Common Name	Conservation Status
Asparagaceae	<i>Lomandra sp.</i>		Not threatened
Asteraceae	<i>Hypochaeris radicata</i>	Flatweed	Alien
Cyperaceae	<i>Lepidosperma leptostachyum</i>	O	Not threatened
Myrtaceae	<i>Corymbia calophylla</i>	Marri	Not threatened
Myrtaceae	<i>Eucalyptus patens</i>	Blackbutt	Not threatened
Myrtaceae	<i>Melaleuca incana</i>	Grey Honey myrtle	Not threatened
Orchidaceae	<i>Thelymitra cornicina</i>	Lilac Sun Orchid	Not threatened
Poaceae	<i>Austrodanthonia sp.</i>		Not threatened
Poaceae	<i>Tetrarrhena laevis</i>	Forest Ricegrass	Not threatened
Rosaceae	<i>Rubus sp.</i>	Blackberry	Alien
Scrophulariaceae	<i>Veronica calycina</i>	Cup speedwell	Not threatened



Photo: 8 Site 4 Yanmah1 NW corner SE aspect



Photo: 9 Site 4 Yanmah1 SE corner NW aspect

Appendix B

Database Searches

NatureMap 10km Threatened Flora Species Report

Created By Guest user on 26/11/2019

Kingdom Plantae
Conservation Status Conservation Taxon (T, X, IA, S, P1-P5)
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 116° 07' 19" E, 34° 13' 49" S
Buffer 10km
Group By Family

Family	Species	Records
Asparagaceae	1	1
Droseraceae	1	1
Lamiaceae	1	1
Myrtaceae	2	2
Orchidaceae	3	7
Poaceae	1	2
Stylidiaceae	1	1
TOTAL	10	15

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Asparagaceae				
1.	35519 <i>Thysanotus unicus</i>		P3	
Droseraceae				
2.	3115 <i>Drosera occidentalis</i> (Western Sundew)		P4	
Lamiaceae				
3.	6859 <i>Hemigenia microphylla</i>		P3	
Myrtaceae				
4.	5474 <i>Calytrix pulchella</i>		P3	
5.	36040 <i>Chamelaucium</i> sp. Mt Frankland (A.S. George 11117)		P3	
Orchidaceae				
6.	13617 <i>Caladenia christineae</i>		T	
7.	18504 <i>Caladenia erythrochila</i>		P2	
8.	13621 <i>Caladenia harringtoniae</i>		T	
Poaceae				
9.	298 <i>Deyeuxia inaequalis</i>		P1	
Stylidiaceae				
10.	7791 <i>Stylidium roseonanthum</i>		P3	

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

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



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: 26/11/19 14:26:30

[Summary](#)

[Details](#)

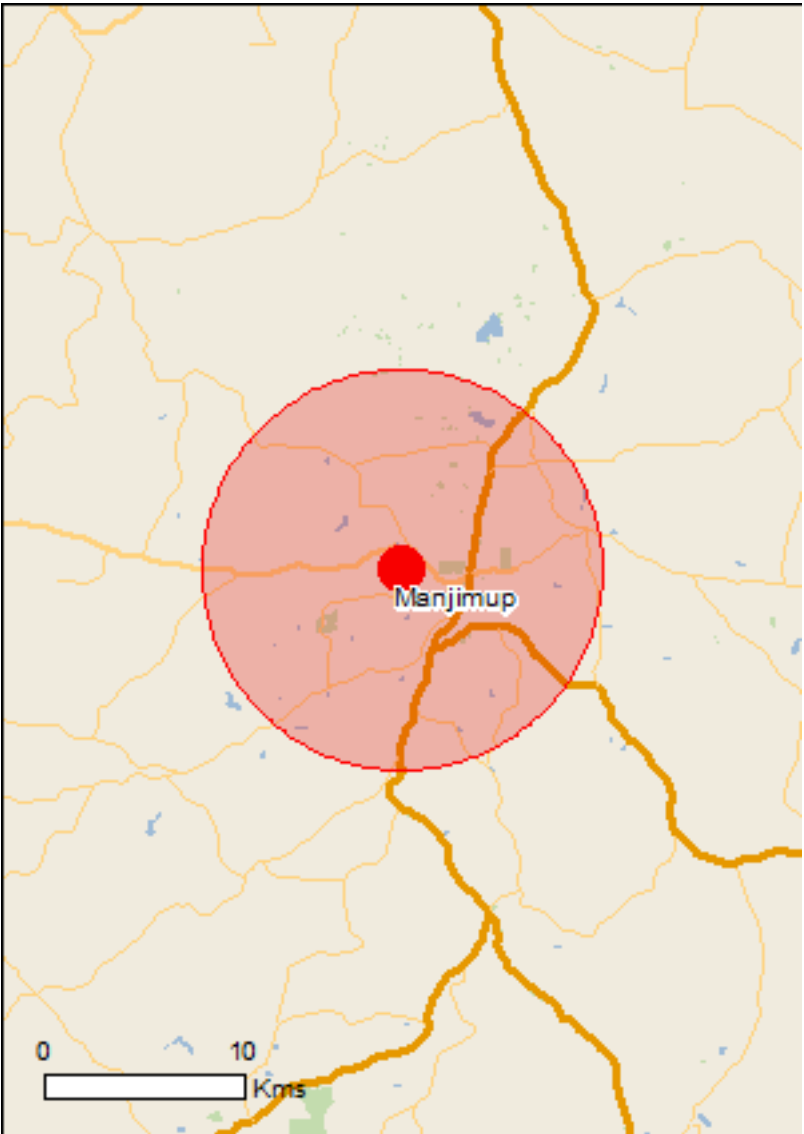
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	18
Listed Migratory Species:	9

Other Matters Protected by the EPBC Act

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

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

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

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

Extra Information

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

State and Territory Reserves:	5
Regional Forest Agreements:	1
Invasive Species:	22
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Breeding known to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Fish		
Galaxiella nigrostriata Blackstriped Dwarf Galaxias, Black-stripe Minnow [88677]	Endangered	Species or species habitat may occur within area
Nannatherina balstoni Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat may occur within area
Mammals		
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat likely to occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
Myrmecobius fasciatus Numbat [294]	Endangered	Species or species habitat known to occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat known to occur within area
Setonix brachyurus Quokka [229]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat known to occur within area
Other		
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat likely to occur within area
Plants		
Caladenia christineae Christine's Spider Orchid [56716]	Vulnerable	Species or species habitat likely to occur within area
Caladenia harringtoniae Harrington's Spider-orchid, Pink Spider-orchid [56786]	Vulnerable	Species or species habitat known to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area
Sphenotoma drummondii Mountain Paper-heath [21160]	Endangered	Species or species habitat may occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land

[Resource Information]

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

Name
Commonwealth Land -

Listed Marine Species

[Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves		[Resource Information]
Name		State
Alco		WA
Faunadale		WA
Sir James Mitchell		WA
Unnamed WA39199		WA
Unnamed WA51982		WA

Regional Forest Agreements		[Resource Information]
Note that all areas with completed RFAs have been included.		
Name		State
South West WA RFA		Western Australia

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

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area

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

-34.23013 116.12136

Acknowledgements

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- [-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.